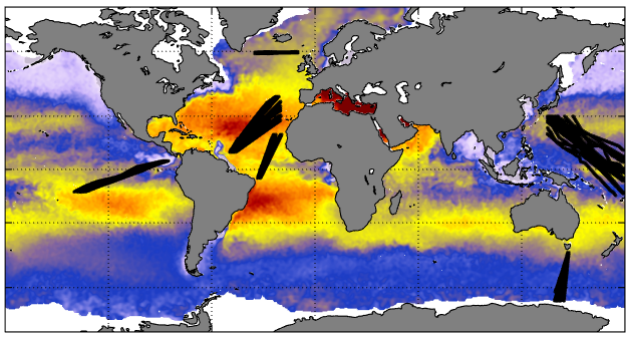
Spectrum Analysis Report



prepared by the Pi-MEP Consortium

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1 Overview

In this report, we present a systematic spectral analysis across 6 specific regions: the North Atlantic, Tropical Atlantic, Tropical Pacific, Arctic, Southern Ocean, and Western Pacific. This analysis compares well-sampled TSG lines with 26 satellite Sea Surface Salinity (SSS) products.

The methodology is detailed in Section 2, while the TSG dataset is described in Section 3.

For each satellite product, Section 4 provides figures of the average density and coherence spectra between Satellite and TSG data for each region.

To keep this report concise, links to supplementary documents are included. These documents contain the power density spectra of Satellite and TSG data for individual TSG transects used in the averaging process.

Section 5 consolidates the average density and coherence plots to facilitate a clearer comparison of results across satellite products for each region.

Section 6 presents estimates of spectral slopes and effective resolutions for each satellite product and region.

We highly recommend using Acrobat Reader to visualize animated figures, which can be navigated using arrows between the plots and their captions.

2 Methodology

This report aims to evaluate the horizontal effective resolution of Sea Surface Salinity (SSS) and the coherency of mesoscale SSS features captured by satellite products. The approach follows the methodology proposed by Boutin et al. (2018), which involves computing the spectra and coherency spectra between TSG SSS and various satellite SSS products across 6 specific regions.

These regions were selected due to the exceptional availability of repeated transects. Each transect was visually inspected, and incomplete data were excluded. To minimize uncertainty caused by noise in individual spectra, the spectra were averaged within each region.

The horizontal SSS coherency spectra quantify the correlation of SSS horizontal variability between collocated TSG and satellite data. This metric assesses how well satellite products capture mesoscale features larger than 50 km while accounting for the impact of noise and spurious SSS contamination.

The coherency spectrum provides detailed insights into the linear correlation between TSG and satellite SSS signals across different wavelengths. Coherency values range from 0 to 1, where 1 indicates perfect correlation and 0 signifies no correlation. High coherency suggests that the TSG and satellite signals share significant information at a specific wavelength, while low coherency indicates minimal or no correlation at that scale.

The coherency spectrum is derived from the cross-spectral density between two signals $x(f)$ and $y(f)$ and their individual power spectral densities. It is given by:

$$C(f) = \frac{|S_{xy}(f)|^2}{S_{xx}(f)S_{yy}(f)} \tag{1}$$

where:

- x and y stand for TSG and satellite SSS signals, repectively.
- $S_{xy}(f)$ is the cross-spectral density of the signals x and y.
- $S_{xx}(f)$ and $S_{yy}(f)$ are the spectral densities of x and y respectively.

For each TSG transect, we apply the following processing steps:

- Calculate the cumulative distance along the TSG transect.
- Interpolate satellite data using a nearest-neighbor algorithm to preserve the TSG sampling rate and avoid smoothing. If multiple satellite maps are available during the transect period, the interpolation is performed in both space and time.
- Linearly interpolate TSG and satellite data onto a uniform grid with 1 km resolution to ensure accurate and reliable spectrum calculations.
- Linearly detrend both signals before calculating the density spectra and cross-spectra using Welch's averaged, modified periodogram method Welch (1967) with no overlap.
- For each region, average all spectra and cross-spectra before calculating the coherency spectra using Equation 1.

The resulting spectra are presented in Section 4 for each satellite product, and a comparison of the results between satellite products across the six regions is provided in Section 5.

Using the averaged spectra and coherency spectra, estimates of spectral slopes and effective resolution for each satellite product and region are detailed in Section 6.

3 TSG data

The TSG lines considered in this report correspond to sea surface salinity delayed mode data derived from voluntary observing ships collected, validated, archived, and made freely available by the French Sea Surface Salinity Observation Service (Alory et al. (2015)). The TSG SSS measurements have a spatial resolution of about 1-3 km along tracks. Only TSG data with quality flags of 1 and 2 are kept. Details of these TSG lines over the 6 specific regions (North Atlantic, Tropical Atlatic, Tropical Pacific, Arctic, Southern Ocean and Western Pacific) are briefly presented in the following subsections.

3.1 North Atlantic region

55 TSG transects (Figure 1) are available between 2010 and 2020 in the North Atlantic subtropical SSS maximum region (50°–20°W, 10°–40°N). The TSG data were collected by the Colibri (FNHO) and the Toucan (FNAV) using a water intake located at a depth of 5 m.

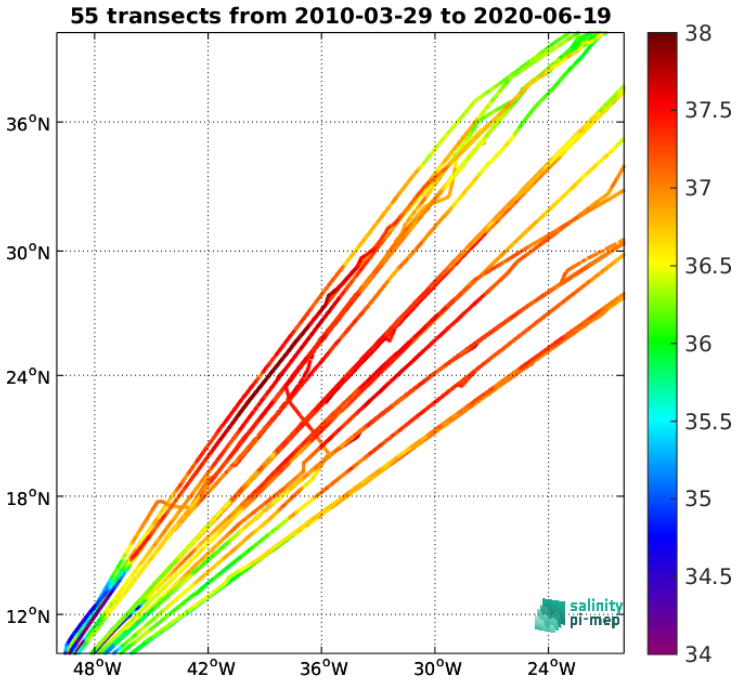

Figure 1: Scatter plot of the 55 TSG transects where the color represent the measured SSS.

3.2 Tropical Atlantic region

21 TSG transects (Figure 2) are available between 2014 and 2016 in the tropical Atlantic region (40°–10°W, 5°–20°N). The TSG data were gathered by the Cap San Lorenzo (LXSQ) using a water intake located at a depth of 10 m, and the Colibri (FNHO) with an intake at 5 m depth.

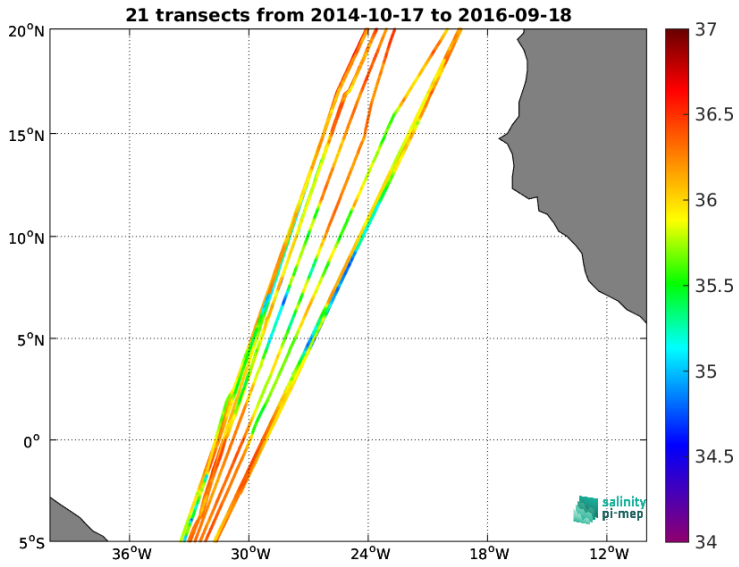

Figure 2: Scatter plot of the 21 TSG transects where the color represent the measured SSS.

3.3 Tropical Pacific region

29 TSG transects (Figure 3) are available between 2010 and 2021 in the tropical Pacific region (140°–85°W, 13°S–5°N). The TSG data were collected by the Matisse (5BAD2) and the Seatrade Blue (D5LS3) using a water intake located at a depth of 8 m and 9 m, respectively.

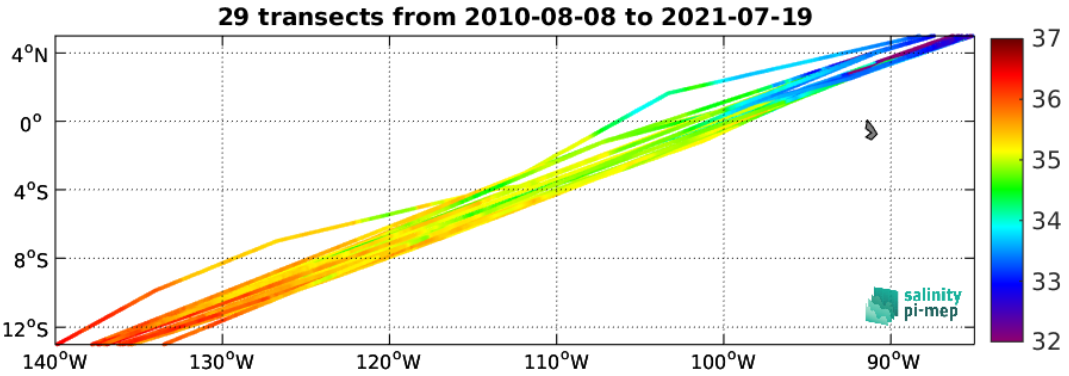

Figure 3: Scatter plot of the 29 TSG transects where the color represent the measured SSS.

3.4 Arctic region

29 TSG transects (Figure 4) are available between 2010 and 2016 in the Arctic region (140°–85°W, 13°S–5°N). The TSG data were collected by the Matisse (5BAD2) and the Seatrade Blue (D5LS3) using a water intake located at a depth of 8 m and 9 m, respectively.

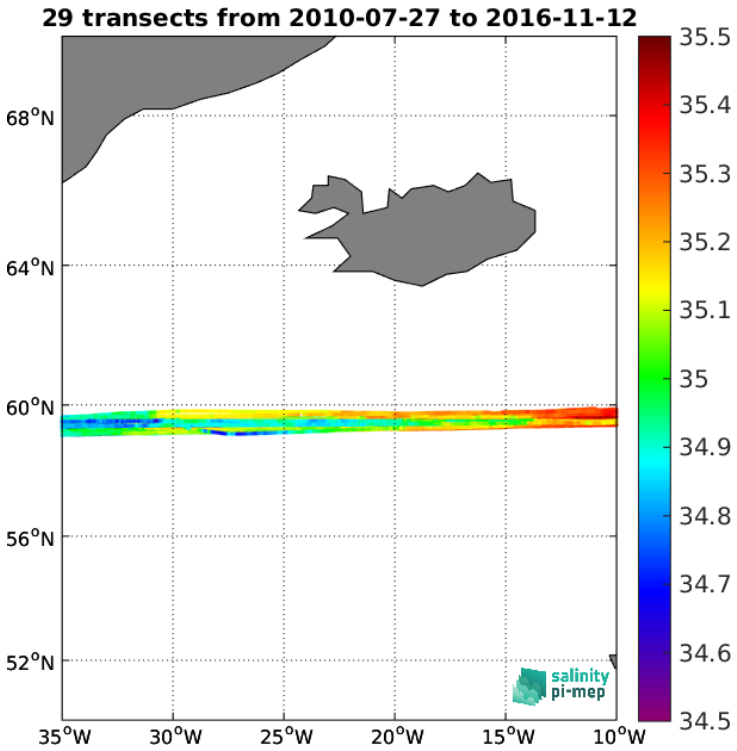

Figure 4: Scatter plot of the 29 TSG transects where the color represent the measured SSS.

3.5 Southern Ocean region

62 TSG transects (Figure 5) are available between 2010 and 2024 in the Southern Ocean region (135°–150°E, 65°S–45°S). The TSG data were collected by the Astrolabe (FHZI/FASB) using a water intake located at a depth of 5 m.

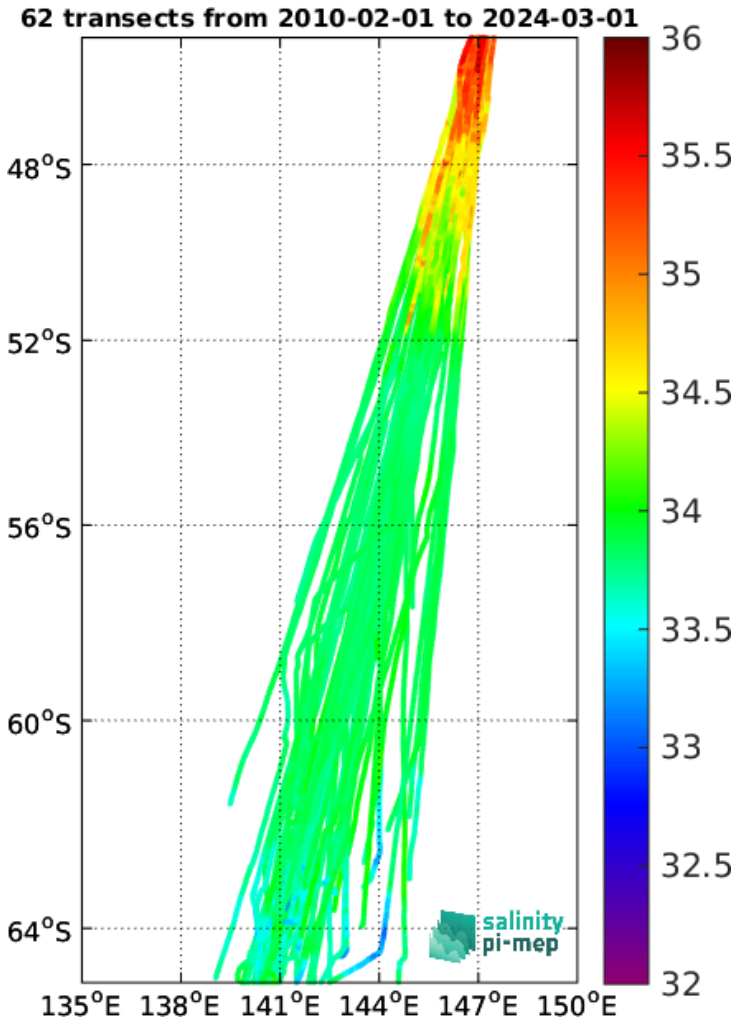

Figure 5: Scatter plot of the 62 TSG transects where the color represent the measured SSS.

3.6 Western Pacific region

49 TSG transects (Figure 6) are available between 2014 and 2023 in the Western Pacific region (135°–180°E, 15°S–30°N). The TSG data were collected by the South Islander (3ENY2/7KAA), the Tropical Islander (3FLZ/3JYD), the Pacific Islander 2 (7KAC/HOWN) and the Coral Islander 2 (HORQ) using water intakes located at a depth of 8 m.

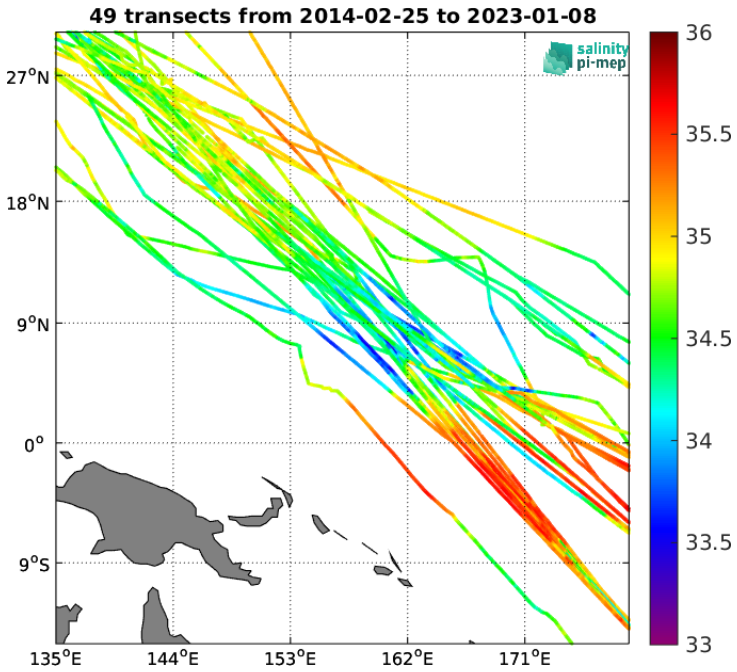

Figure 6: Scatter plot of the 49 TSG transects where the color represent the measured SSS.

4 Satellite products

The spectral analysis is available for the following 26 satellite SSS products:

- SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)
- SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)
- SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)
- SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)
- SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)
- SMOS SSS L3 v2 - 9-Days (BEC)
- SMAP SSS L3 v6 - 8-Day running (RSS)
- SMAP SSS L3 v6 - Monthly (RSS)
- SMAP SSS L3 v5.0 - 8-Day running (JPL)
- SMAP SSS L3 v5.0 - Monthly (JPL)
- Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)
- Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)
- Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)
- Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)
- Aquarius SSS L3 CAP v5 - 7-Day running (JPL)
- Aquarius SSS L3 CAP v5 - Monthly (JPL)
- SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)
- SMOS SSS L4 v1 - Daily (CMEMS-CNR)
- SMOS SSS L4 v1 - Monthly (CMEMS-CNR)

- CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)
- CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)
- SMAP SSS L4 OI v3 - Daily (ESR)
- SMAP SSS L4 OI v3 - Monthly (ESR)
- Aquarius SSS L4 OI v5 - Weekly (IPRC)
- Aquarius SSS L4 OI v5 - Monthly (IPRC)
- ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)

4.1 SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)

4.1.1 North Atlantic region

Figure 7 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

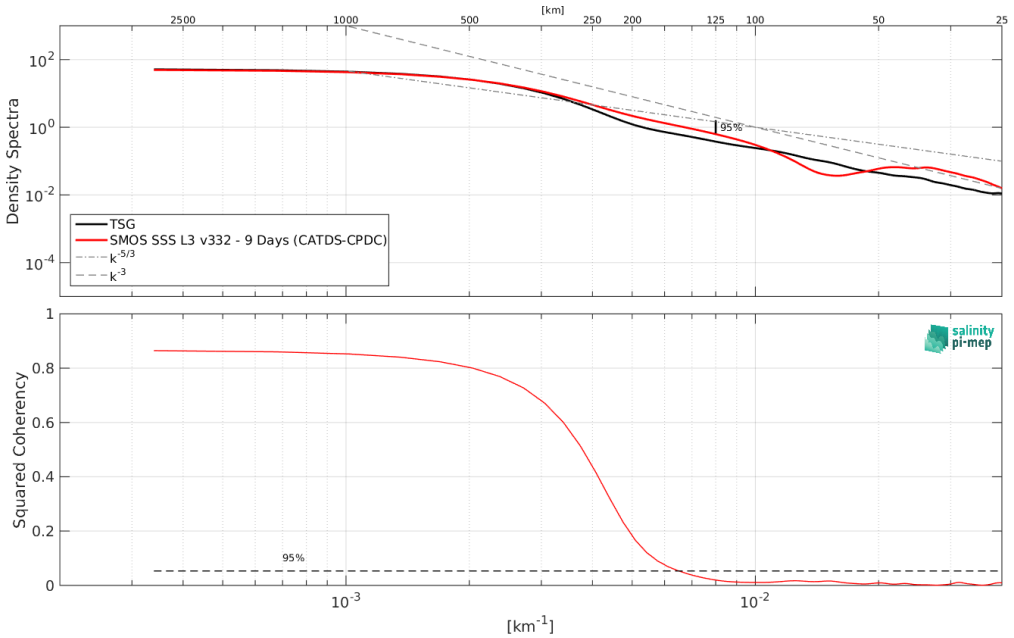

Figure 7: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l3-catds-cpdc-v332-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l3-catds-cpdc-v332-9d.nc.

4.1.2 Topical Atlantic region

Figure 8 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

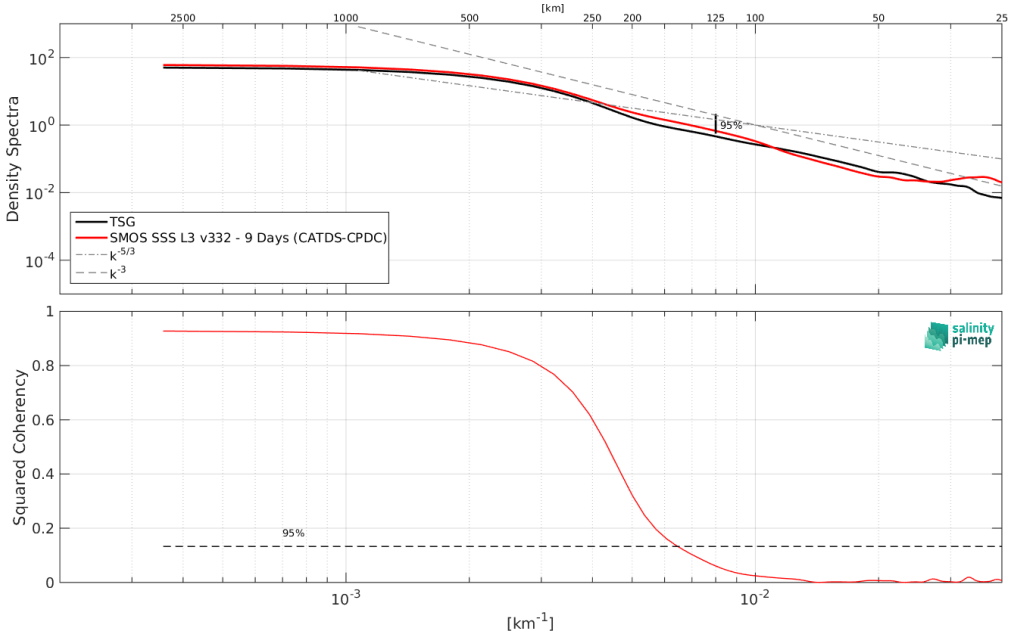

Figure 8: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l3-catds-cpdc-v332-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l3-catds-cpdc-v332-9d.nc.

4.1.3 Tropical Pacific region

Figure 9 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

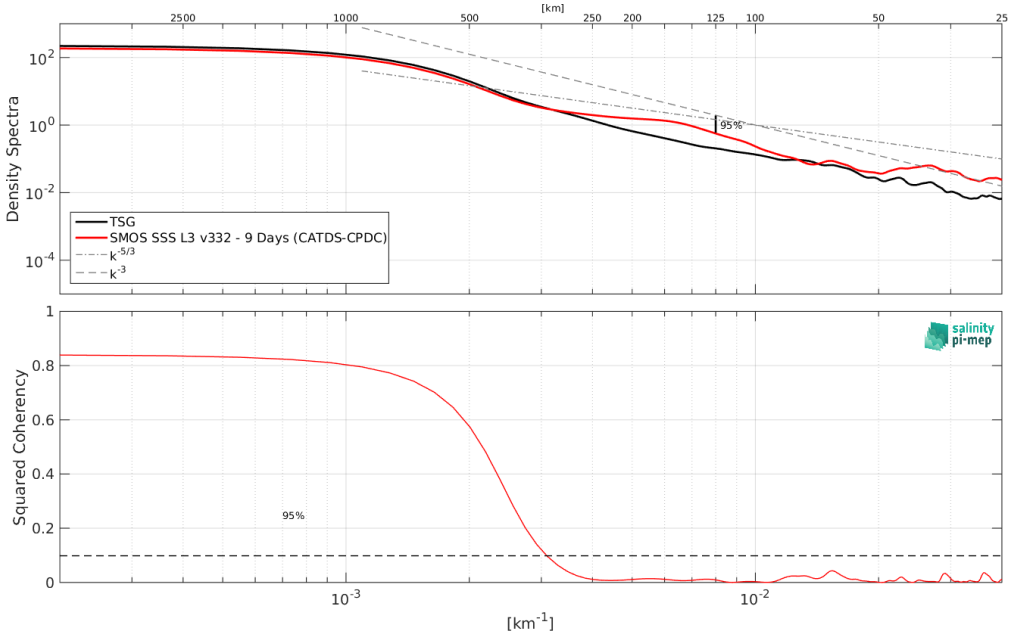

Figure 9: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l3-catds-cpdc-v332-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l3-catds-cpdc-v332-9d.nc.

4.1.4 Arctic region

Figure 10 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

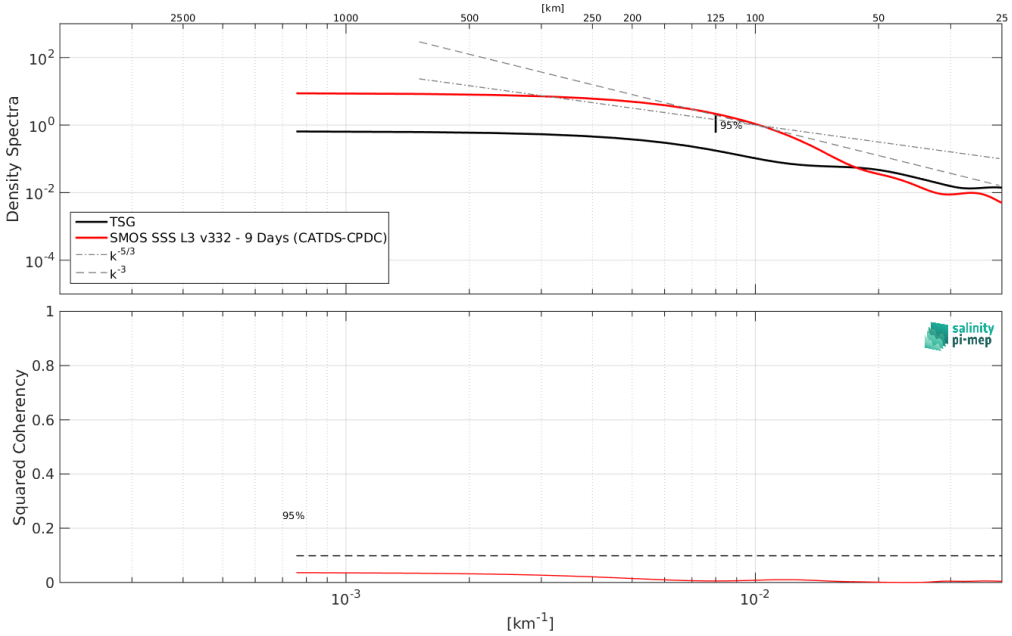

Figure 10: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l3-catds-cpdc-v332-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l3-catds-cpdc-v332-9d.nc.

4.1.5 Southern Ocean region

Figure 11 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

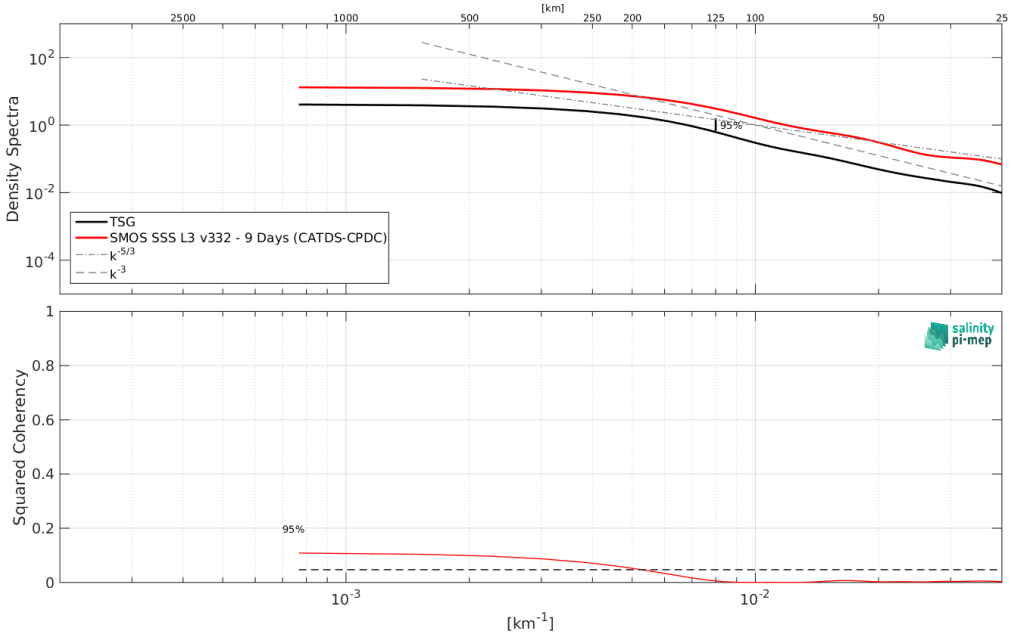

Figure 11: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l3-catds-cpdc-v332-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l3-catds-cpdc-v332-9d.nc.

4.1.6 Western Pacific region

Figure 12 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

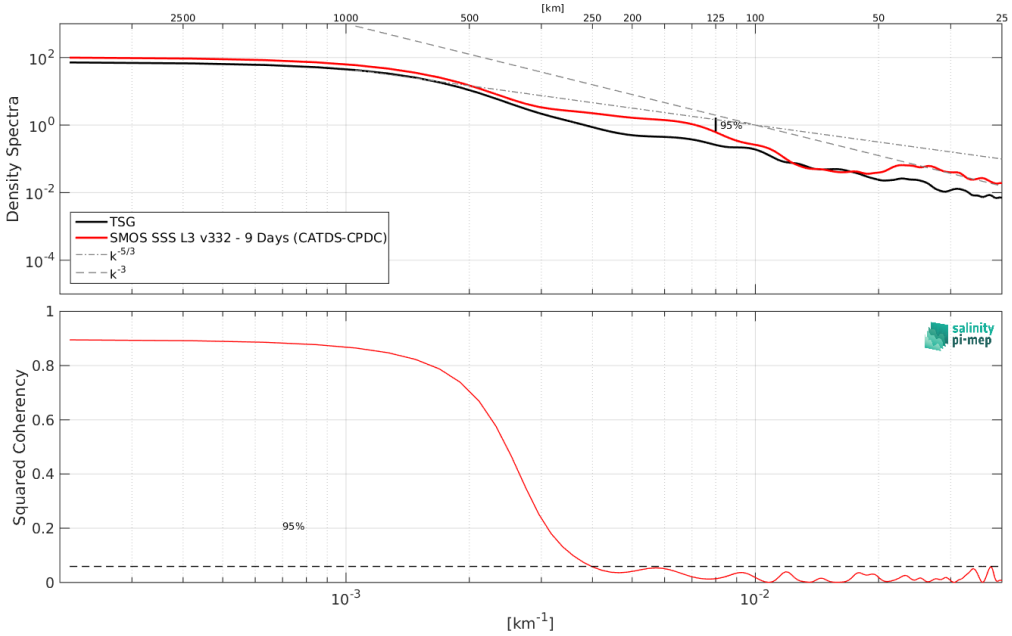

Figure 12: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v332 - 9 Days (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l3-catds-cpdc-v332-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l3-catds-cpdc-v332-9d.nc.

4.2 SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)

4.2.1 North Atlantic region

Figure 13 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

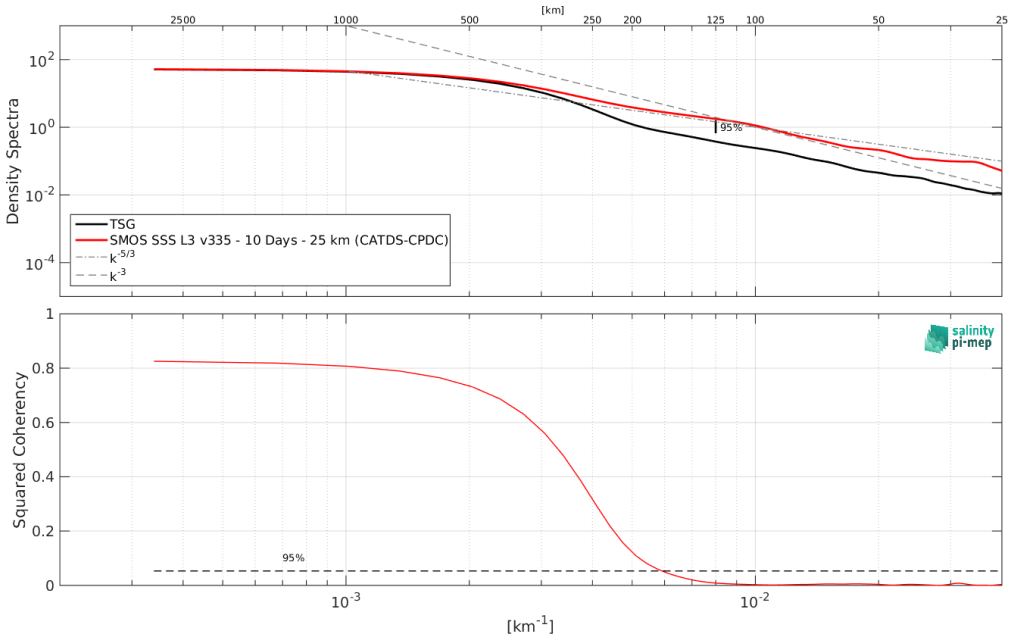

Figure 13: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l3-catds-cpdc-v335-10d-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l3-catds-cpdc-v335-10d-25km.nc.

4.2.2 Topical Atlantic region

Figure 14 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

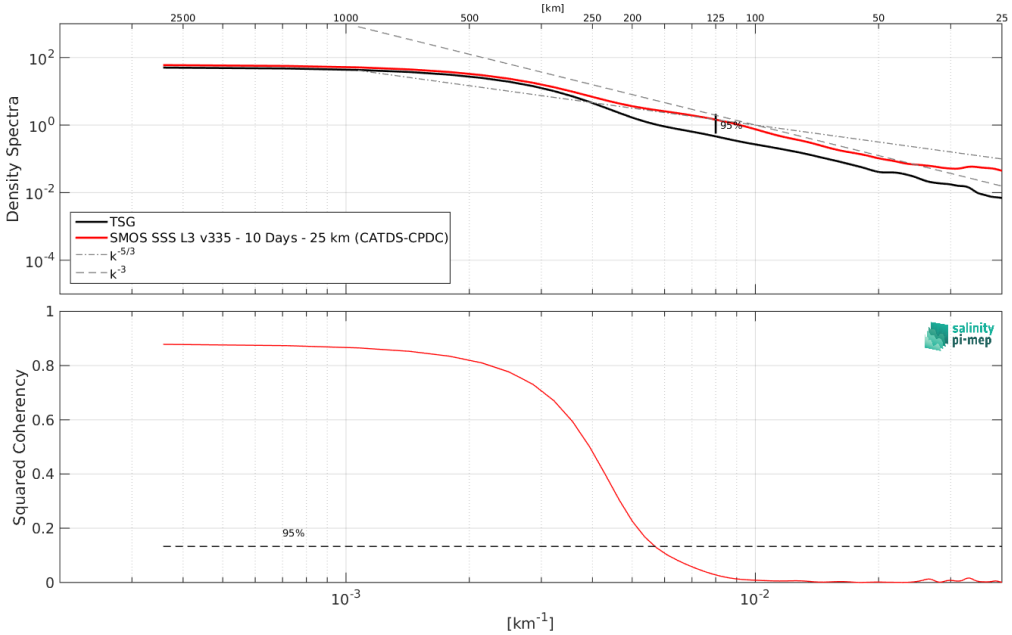

Figure 14: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l3-catds-cpdc-v335-10d-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l3-catds-cpdc-v335-10d-25km.nc.

4.2.3 Tropical Pacific region

Figure 15 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

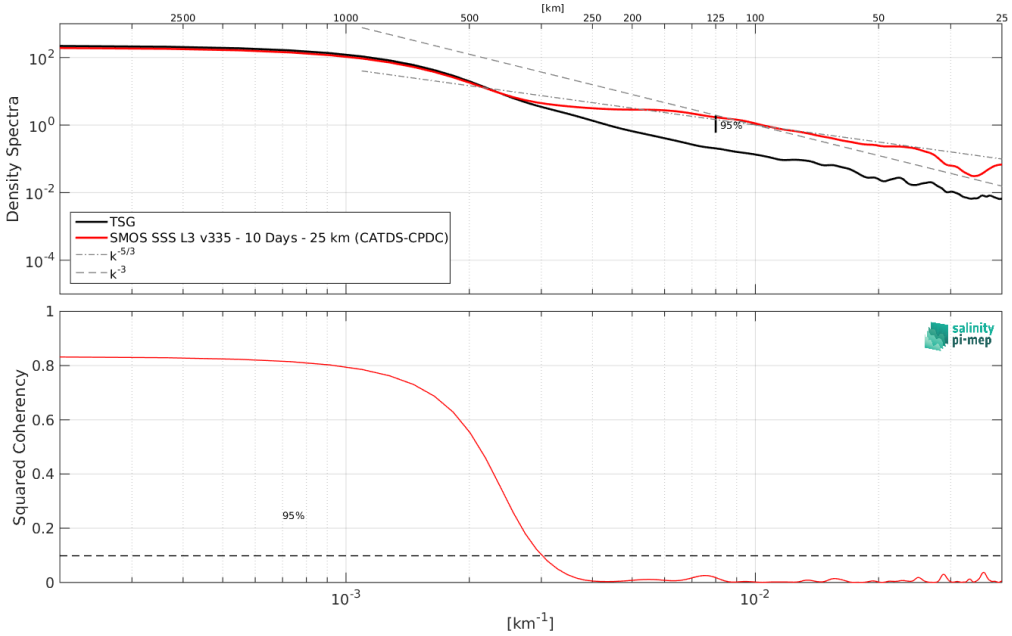

Figure 15: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l3-catds-cpdc-v335-10d-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l3-catds-cpdc-v335-10d-25km.nc.

4.2.4 Arctic region

Figure 16 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

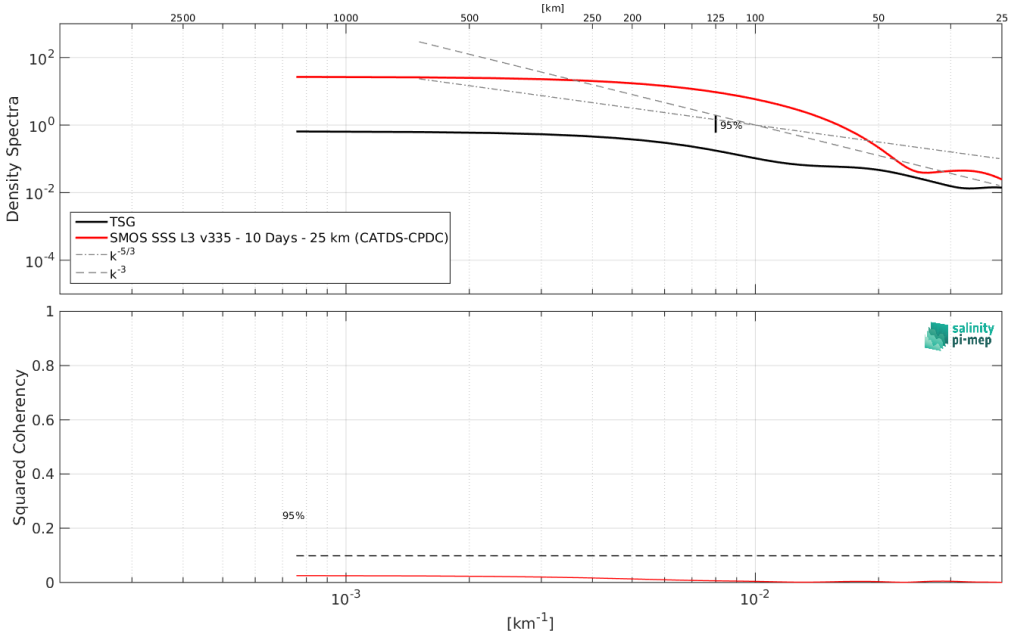

Figure 16: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l3-catds-cpdc-v335-10d-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l3-catds-cpdc-v335-10d-25km.nc.

4.2.5 Southern Ocean region

Figure 17 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

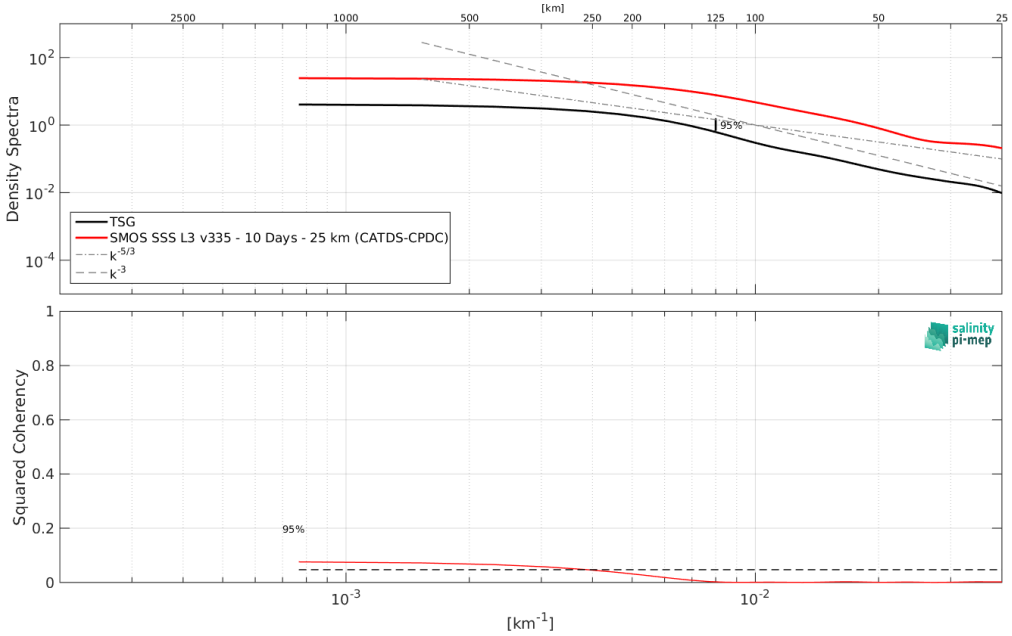

Figure 17: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l3-catds-cpdc-v335-10d-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l3-catds-cpdc-v335-10d-25km.nc.

4.2.6 Western Pacific region

Figure 18 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

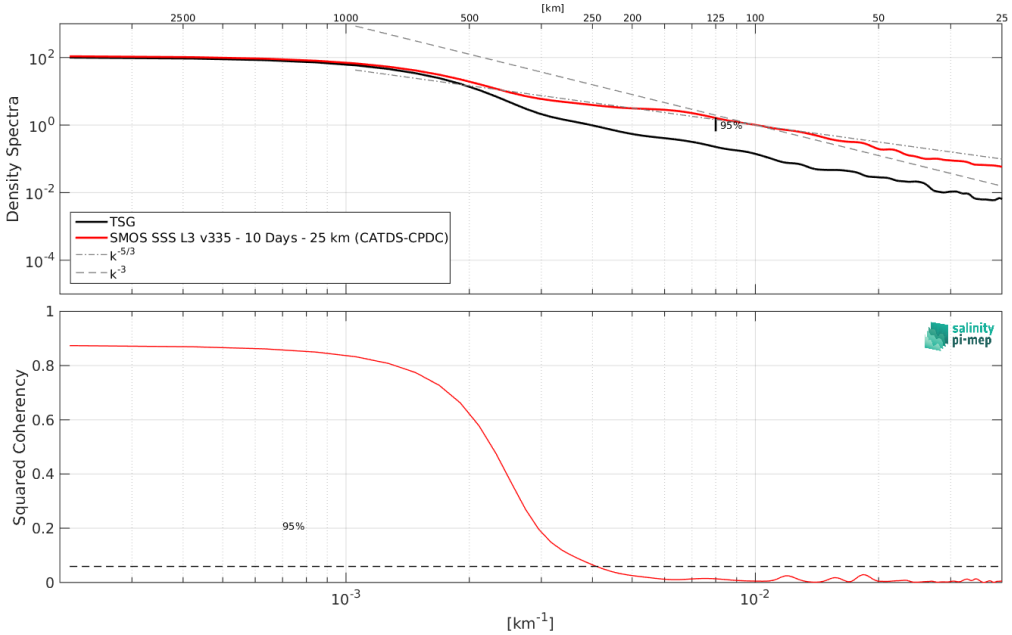

Figure 18: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l3-catds-cpdc-v335-10d-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l3-catds-cpdc-v335-10d-25km.nc.

4.3 SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)

4.3.1 North Atlantic region

Figure 19 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

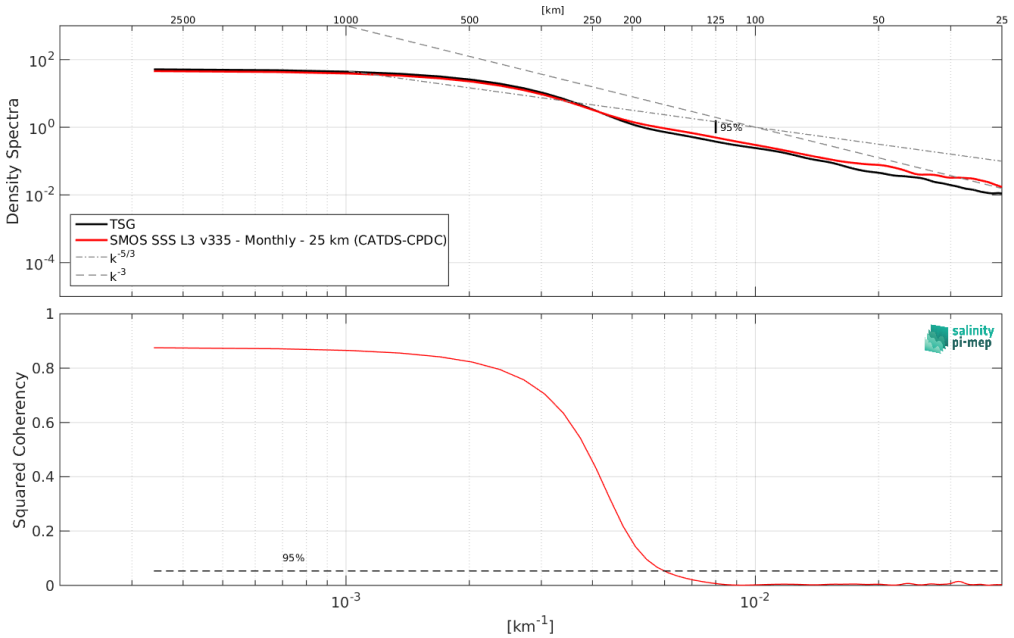

Figure 19: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l3-catds-cpdc-v335-1m-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l3-catds-cpdc-v335-1m-25km.nc.

4.3.2 Topical Atlantic region

Figure 20 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

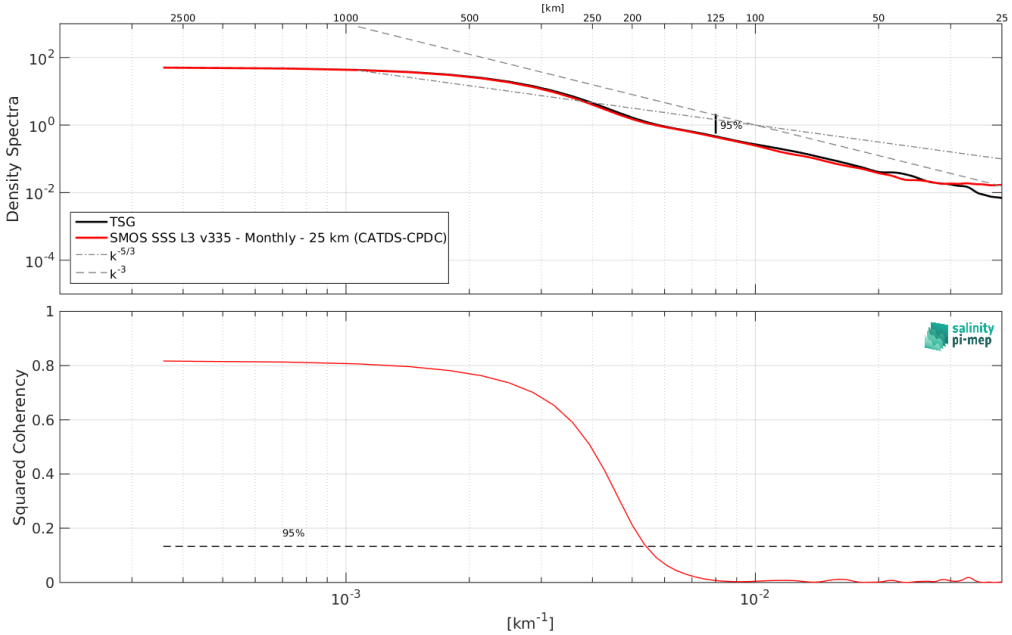

Figure 20: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l3-catds-cpdc-v335-1m-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l3-catds-cpdc-v335-1m-25km.nc.

4.3.3 Tropical Pacific region

Figure 21 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

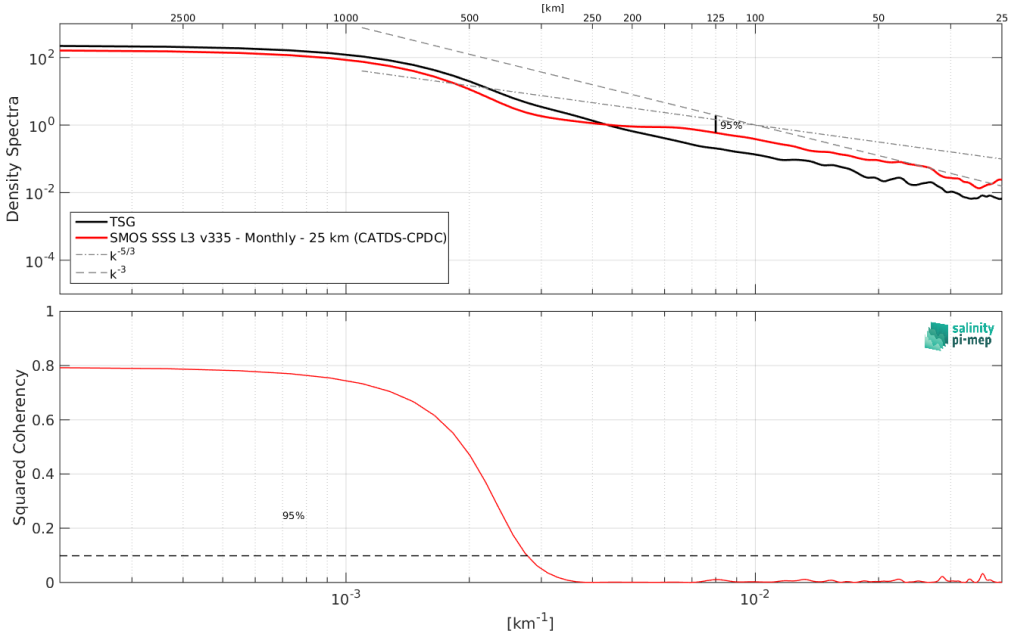

Figure 21: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l3-catds-cpdc-v335-1m-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l3-catds-cpdc-v335-1m-25km.nc.

4.3.4 Arctic region

Figure 22 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

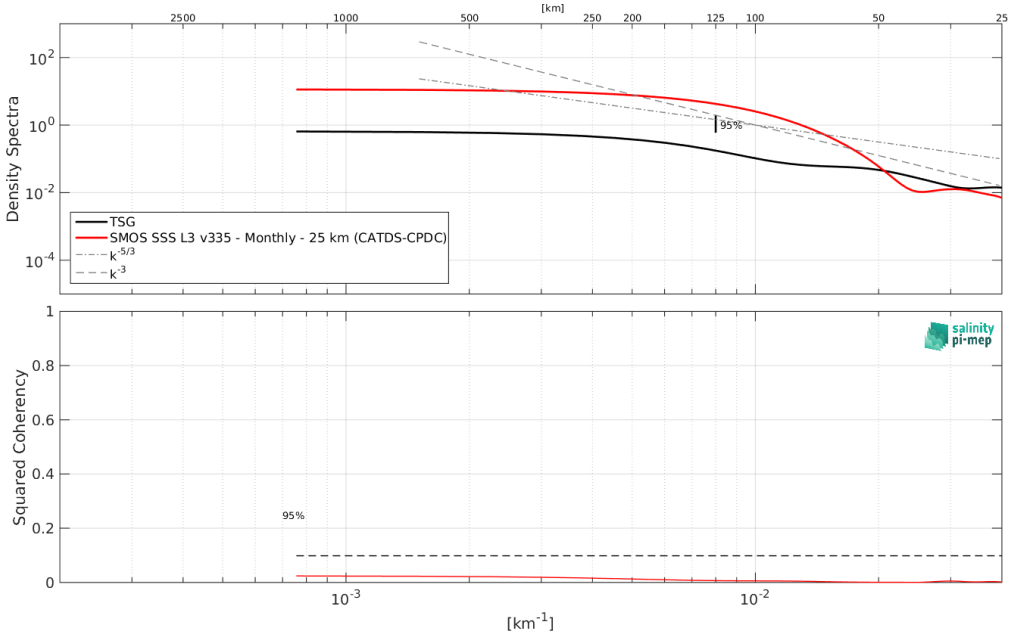

Figure 22: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l3-catds-cpdc-v335-1m-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l3-catds-cpdc-v335-1m-25km.nc.

4.3.5 Southern Ocean region

Figure 23 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

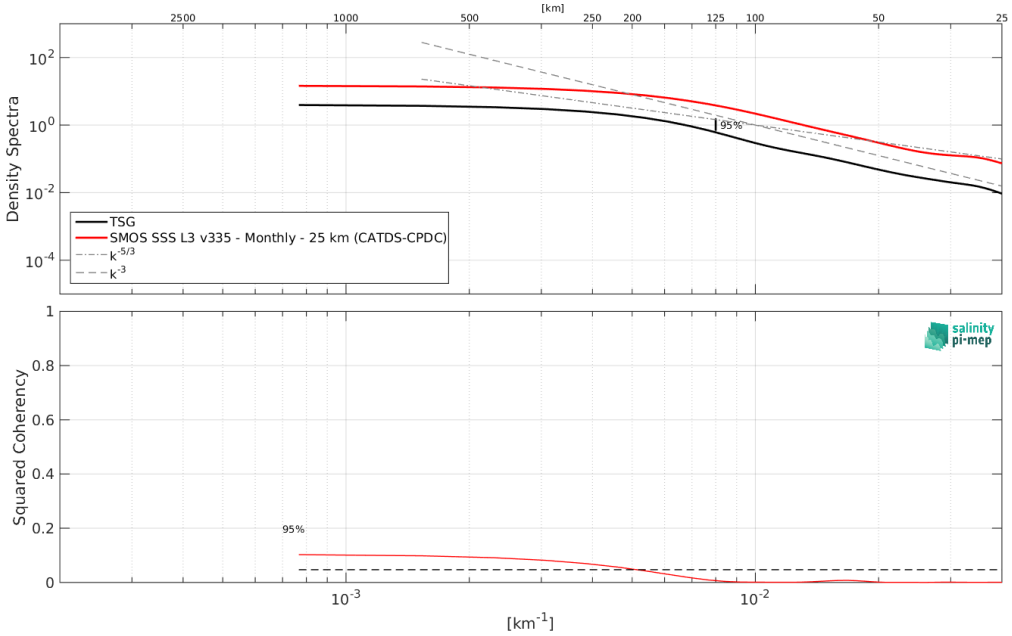

Figure 23: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l3-catds-cpdc-v335-1m-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l3-catds-cpdc-v335-1m-25km.nc.

4.3.6 Western Pacific region

Figure 24 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

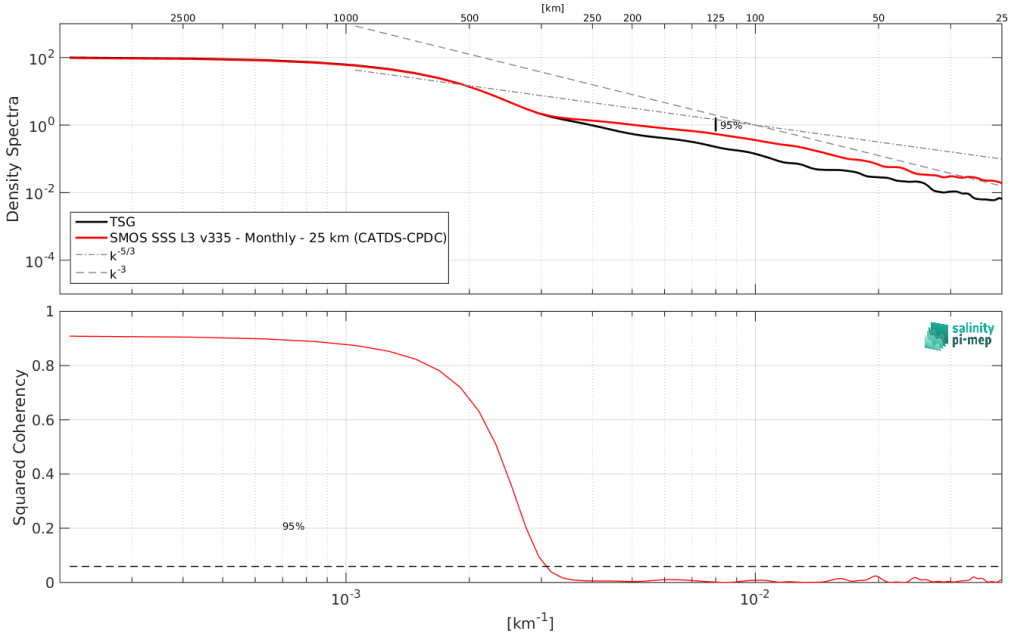

Figure 24: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l3-catds-cpdc-v335-1m-25km.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l3-catds-cpdc-v335-1m-25km.nc.

4.4 SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)

4.4.1 North Atlantic region

Figure 25 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

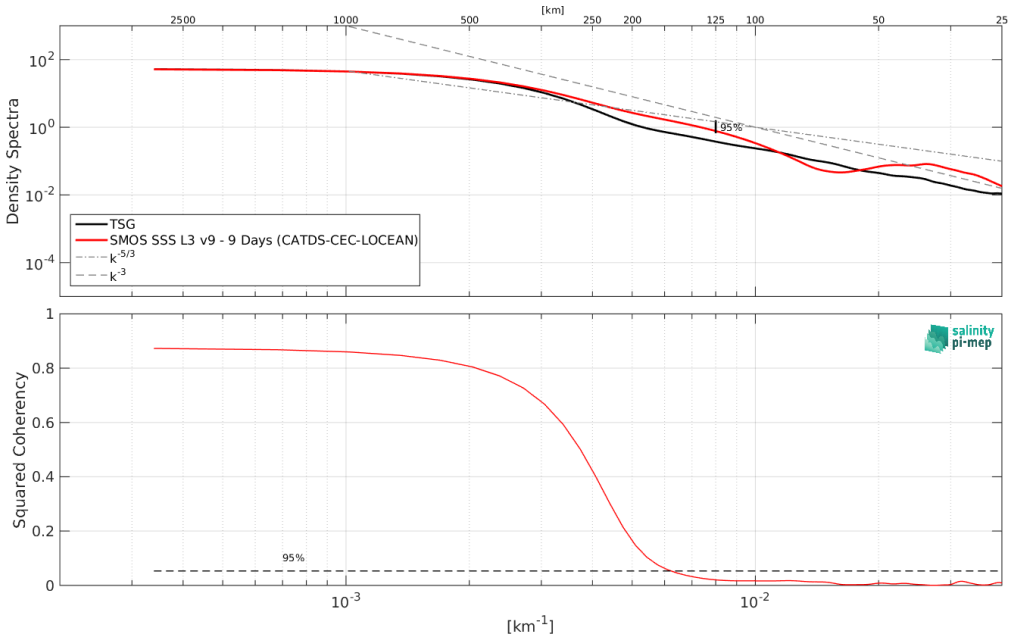

Figure 25: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l3-catds-locean-v9-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l3-catds-locean-v9-9d.nc.

4.4.2 Topical Atlantic region

Figure 26 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

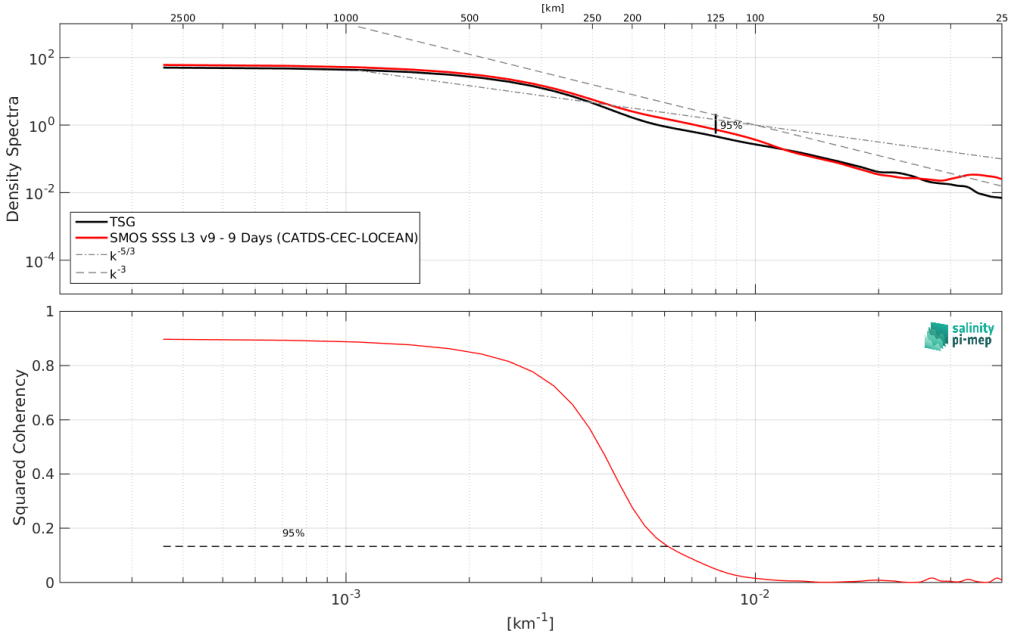

Figure 26: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l3-catds-locean-v9-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l3-catds-locean-v9-9d.nc.

4.4.3 Tropical Pacific region

Figure 27 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

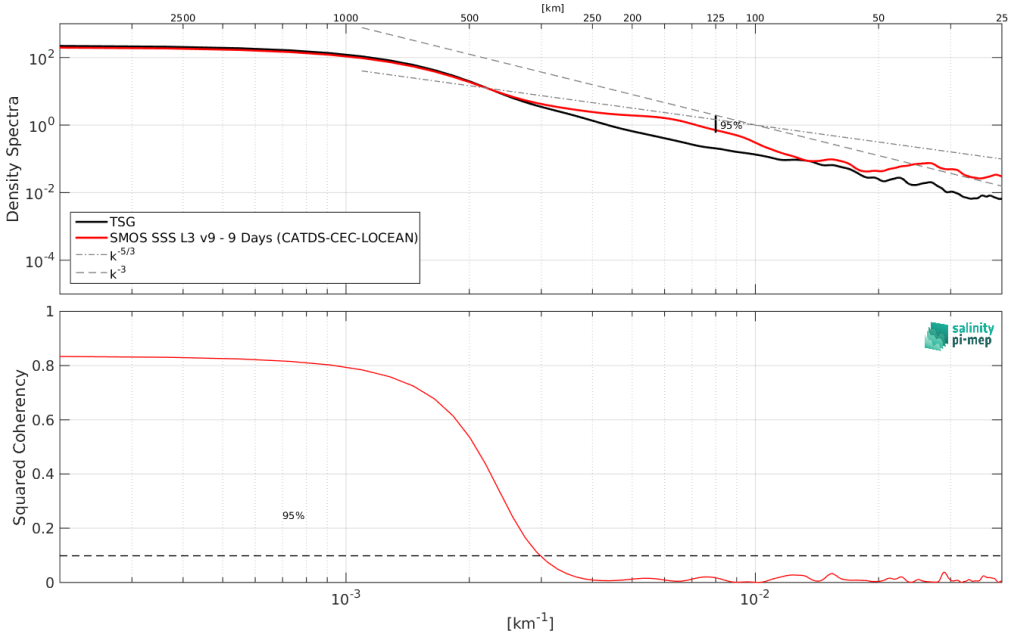

Figure 27: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l3-catds-locean-v9-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l3-catds-locean-v9-9d.nc.

4.4.4 Arctic region

Figure 28 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

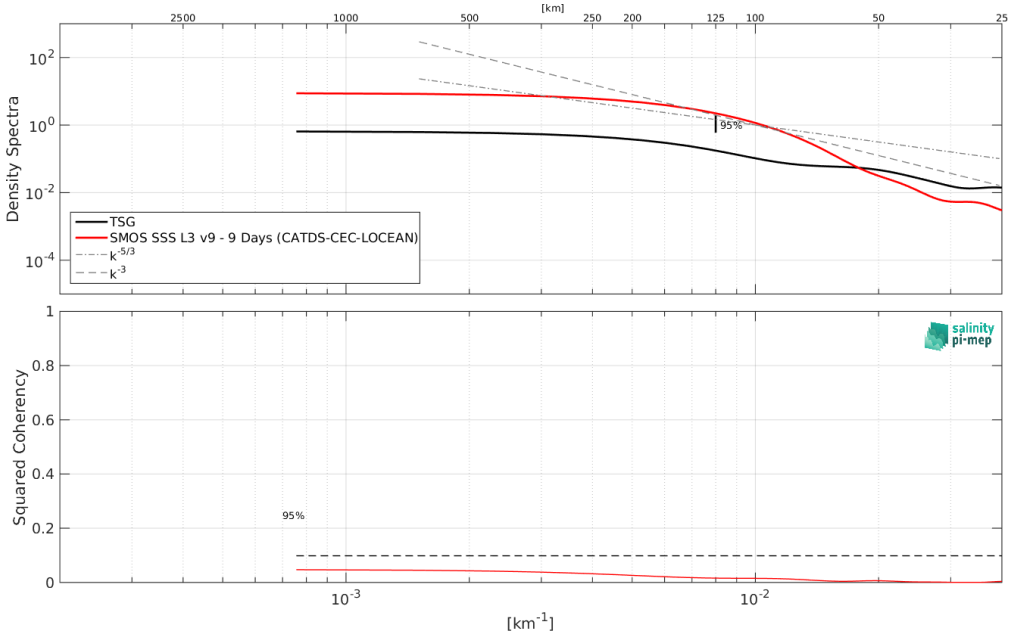

Figure 28: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l3-catds-locean-v9-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l3-catds-locean-v9-9d.nc.

4.4.5 Southern Ocean region

Figure 29 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

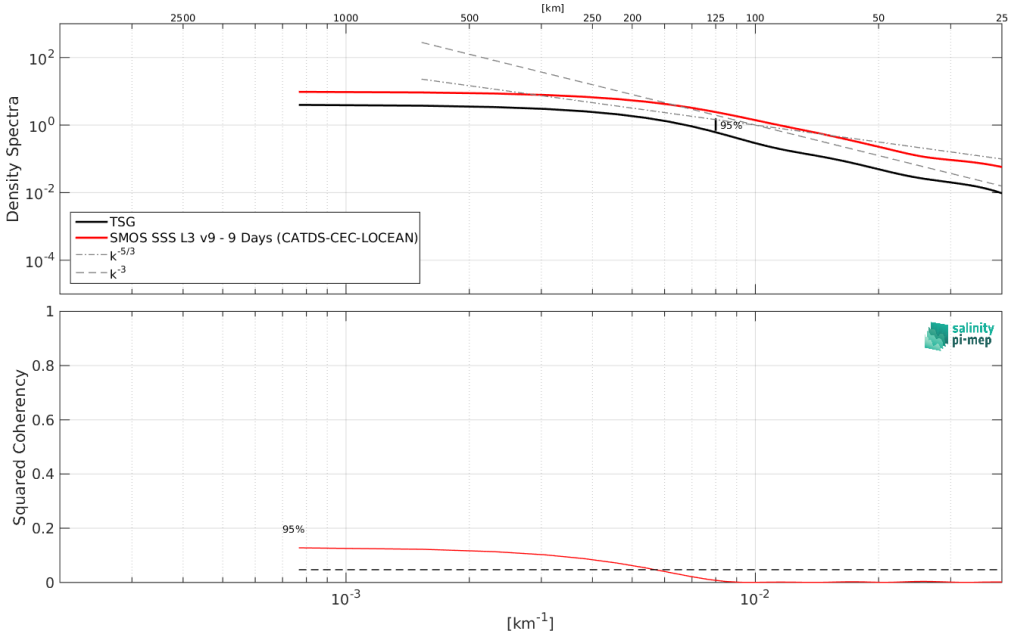

Figure 29: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l3-catds-locean-v9-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l3-catds-locean-v9-9d.nc.

4.4.6 Western Pacific region

Figure 30 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

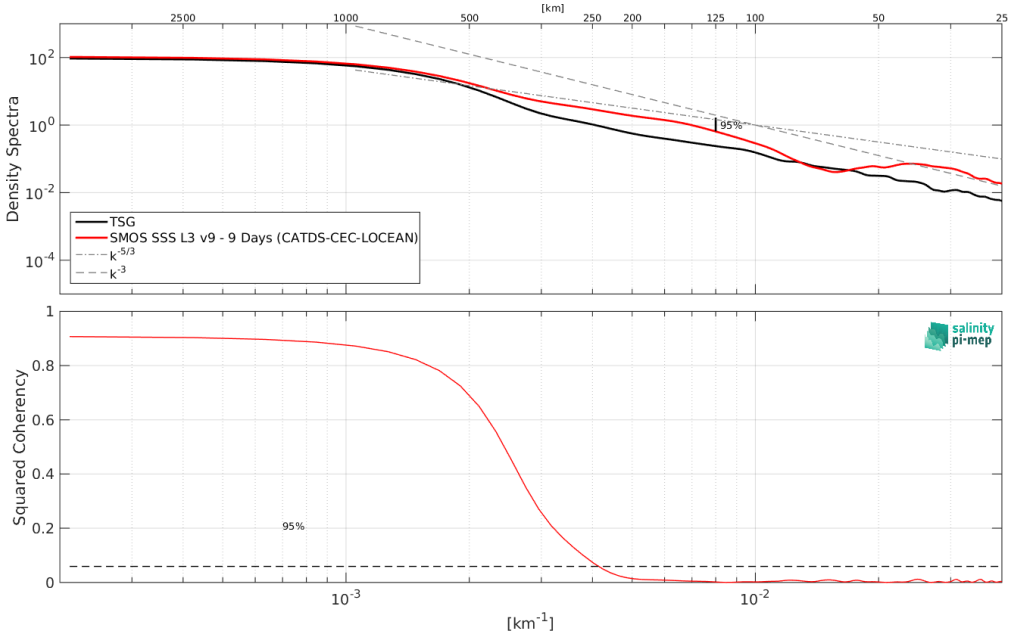

Figure 30: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l3-catds-locean-v9-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l3-catds-locean-v9-9d.nc.

4.5 SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)

4.5.1 North Atlantic region

Figure 31 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

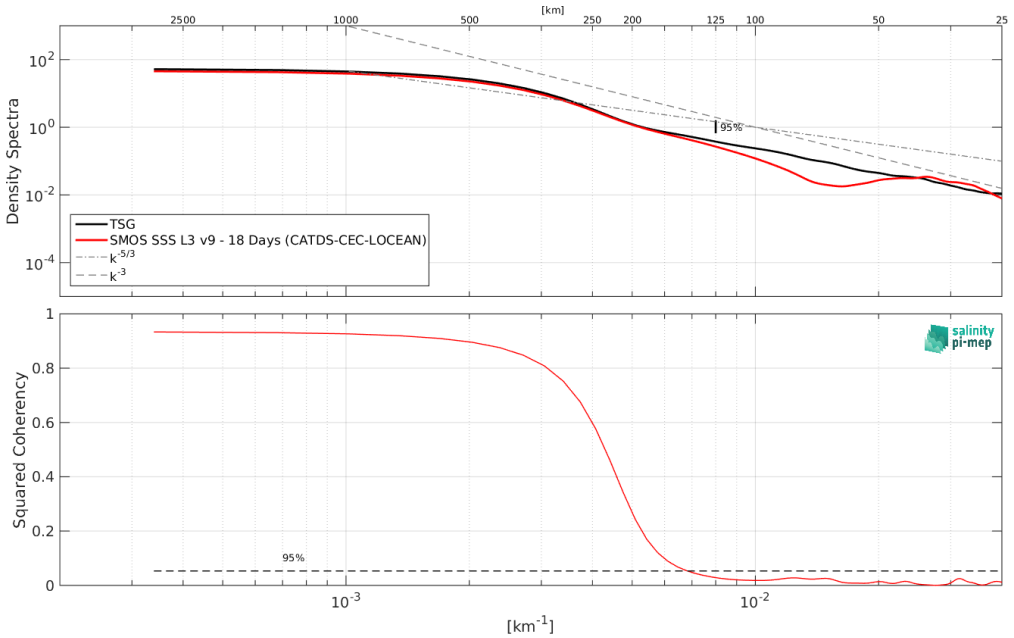

Figure 31: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l3-catds-locean-v9-18d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l3-catds-locean-v9-18d.nc.

4.5.2 Topical Atlantic region

Figure 32 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

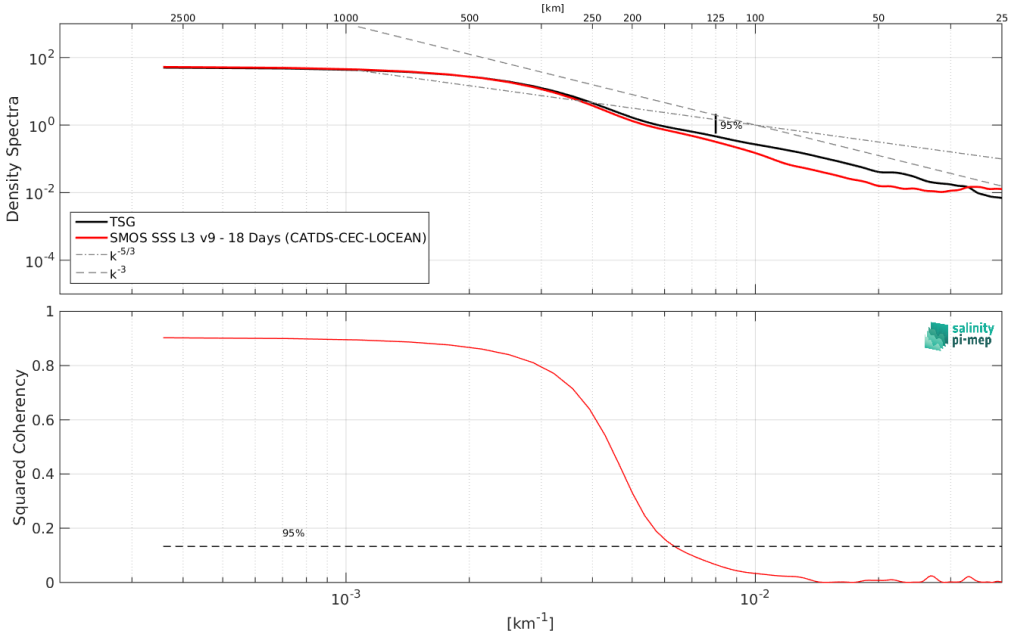

Figure 32: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l3-catds-locean-v9-18d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l3-catds-locean-v9-18d.nc.

4.5.3 Tropical Pacific region

Figure 33 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

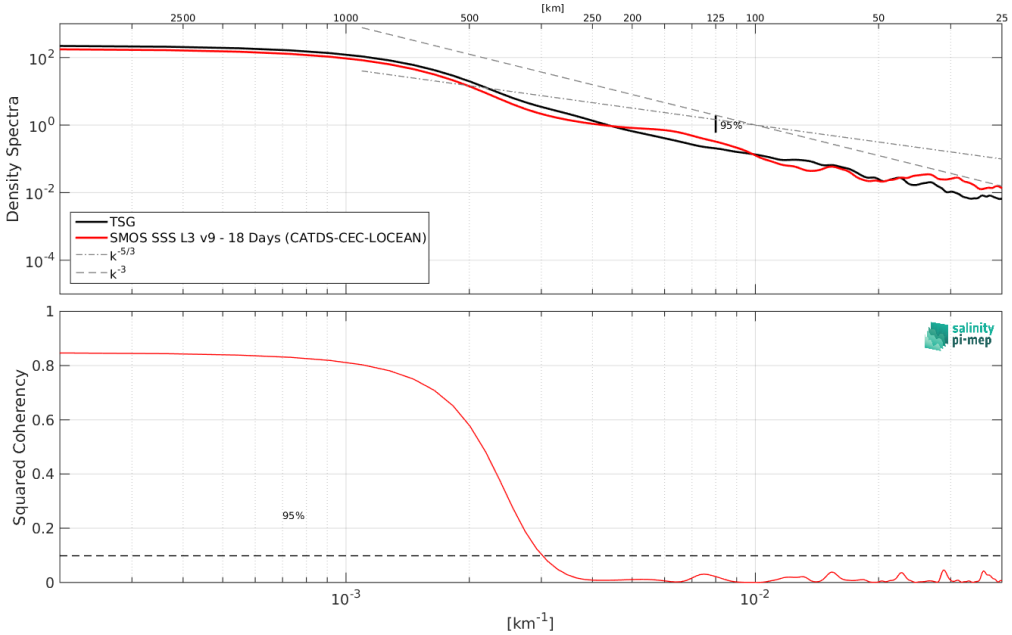

Figure 33: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l3-catds-locean-v9-18d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l3-catds-locean-v9-18d.nc.

4.5.4 Arctic region

Figure 34 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

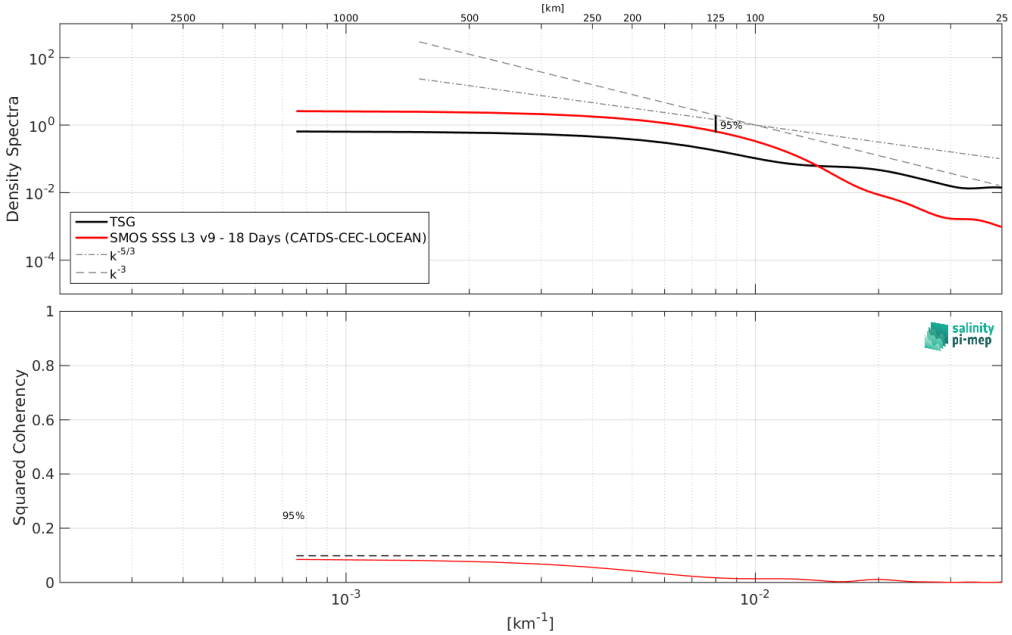

Figure 34: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l3-catds-locean-v9-18d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l3-catds-locean-v9-18d.nc.

4.5.5 Southern Ocean region

Figure 35 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

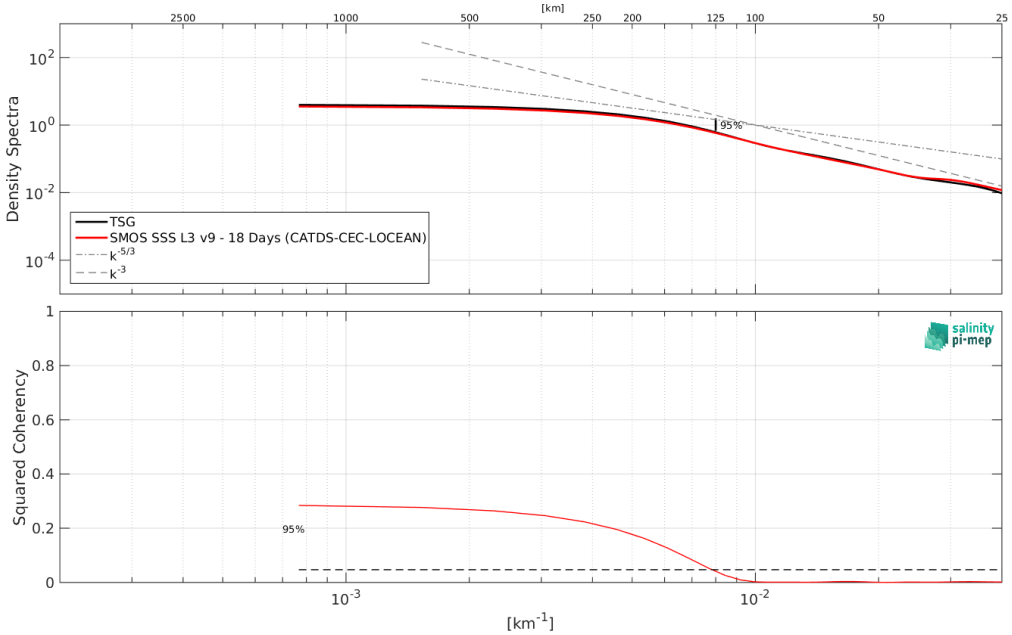

Figure 35: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l3-catds-locean-v9-18d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l3-catds-locean-v9-18d.nc.

4.5.6 Western Pacific region

Figure 36 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

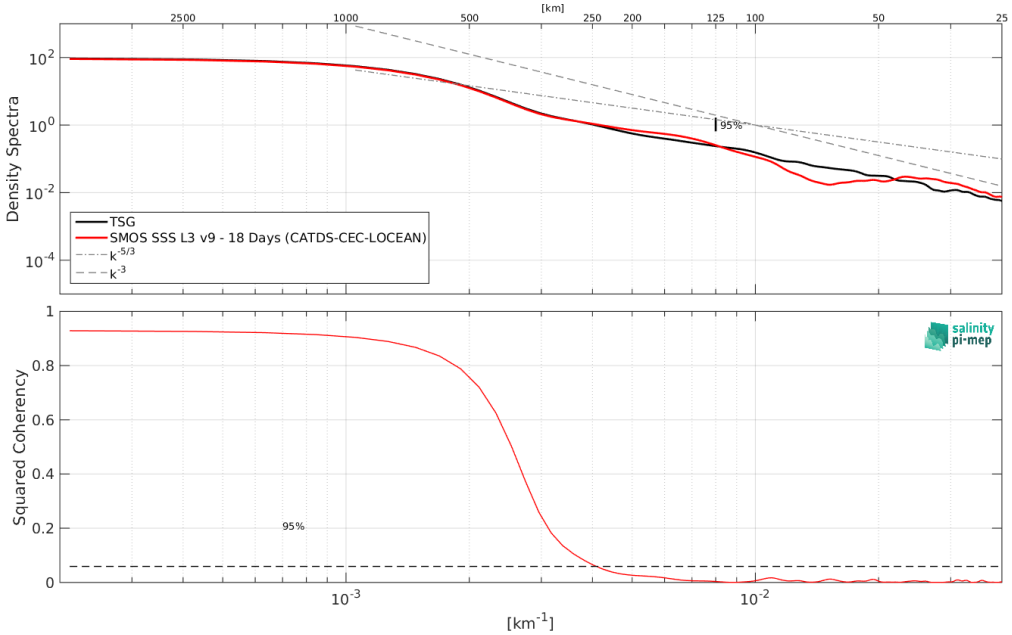

Figure 36: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l3-catds-locean-v9-18d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l3-catds-locean-v9-18d.nc.

4.6 SMOS SSS L3 v2 - 9-Days (BEC)

4.6.1 North Atlantic region

Figure 37 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

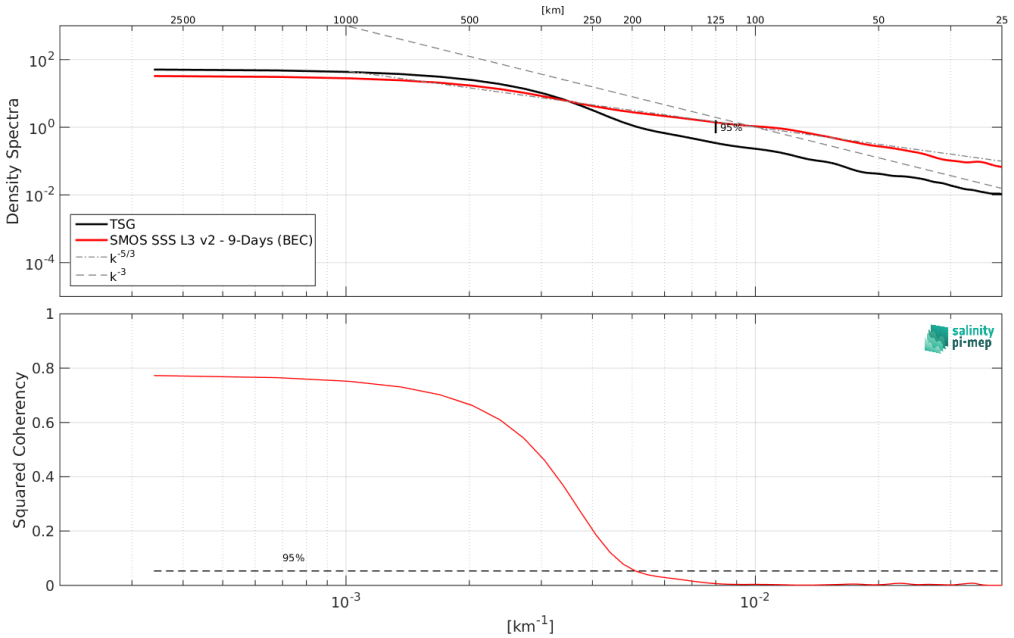

Figure 37: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l3-bec-v2-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l3-bec-v2-9d.nc.

4.6.2 Topical Atlantic region

Figure 38 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

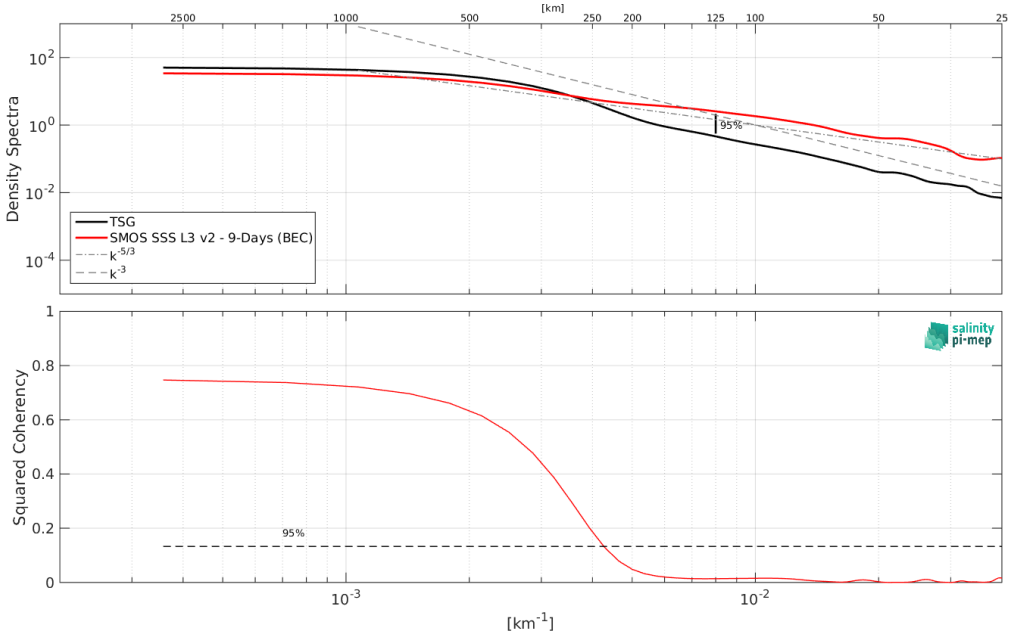

Figure 38: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l3-bec-v2-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l3-bec-v2-9d.nc.

4.6.3 Tropical Pacific region

Figure 39 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

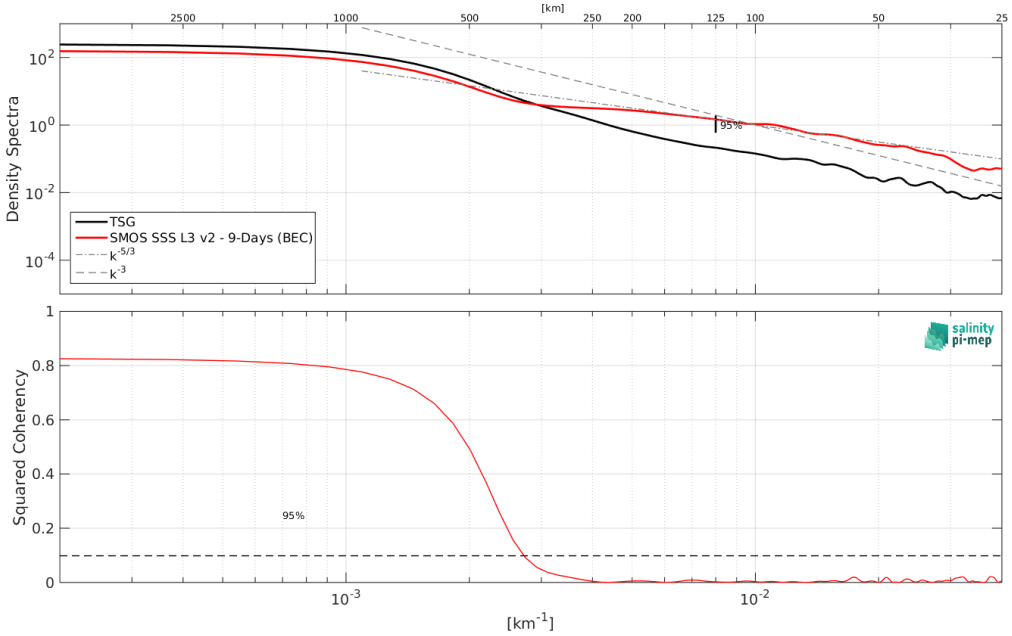

Figure 39: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l3-bec-v2-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l3-bec-v2-9d.nc.

4.6.4 Arctic region

Figure 40 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

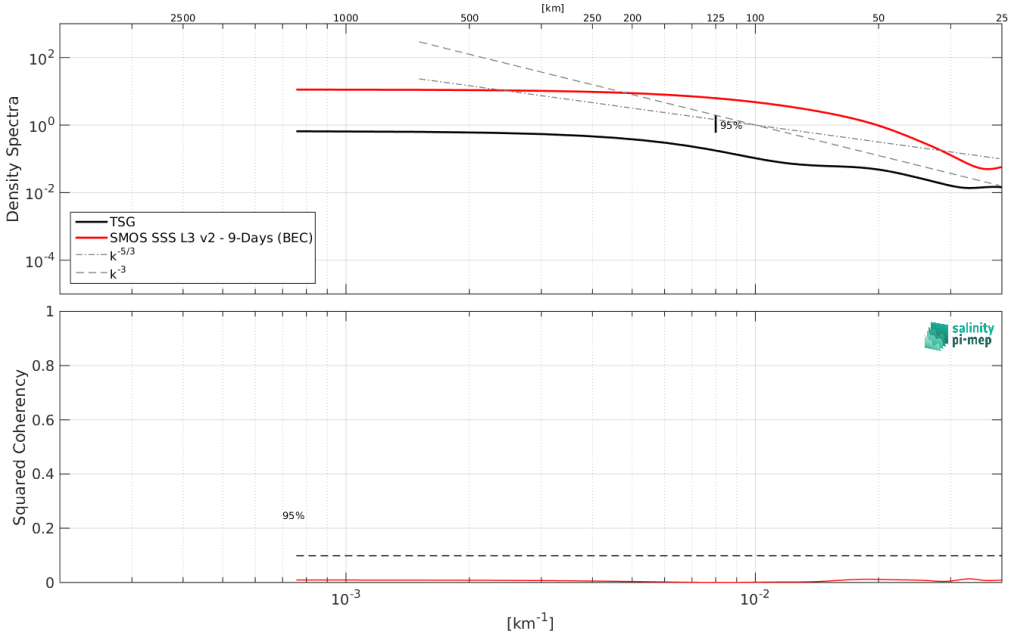

Figure 40: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l3-bec-v2-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l3-bec-v2-9d.nc.

4.6.5 Southern Ocean region

Figure 41 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

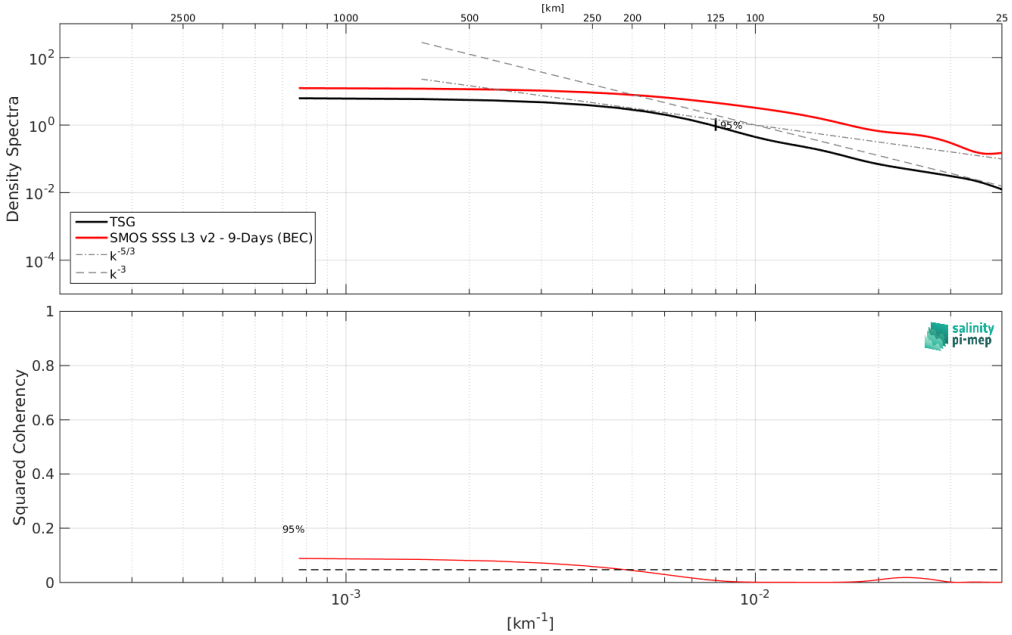

Figure 41: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l3-bec-v2-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l3-bec-v2-9d.nc.

4.6.6 Western Pacific region

Figure 42 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

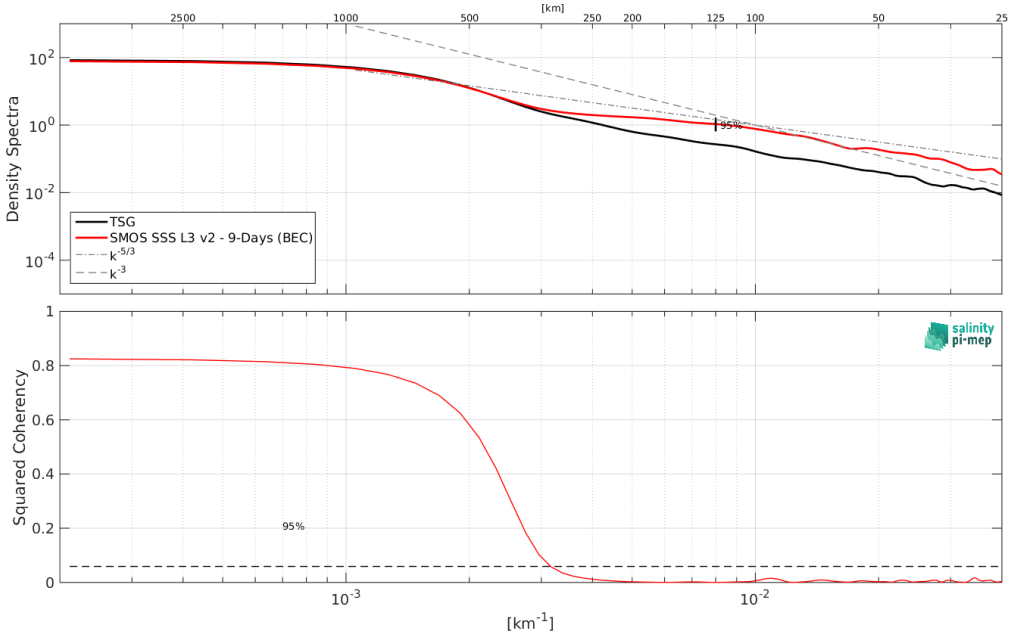

Figure 42: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L3 v2 - 9-Days (BEC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l3-bec-v2-9d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l3-bec-v2-9d.nc.

4.7 SMAP SSS L3 v6 - 8-Day running (RSS)

4.7.1 North Atlantic region

Figure 43 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

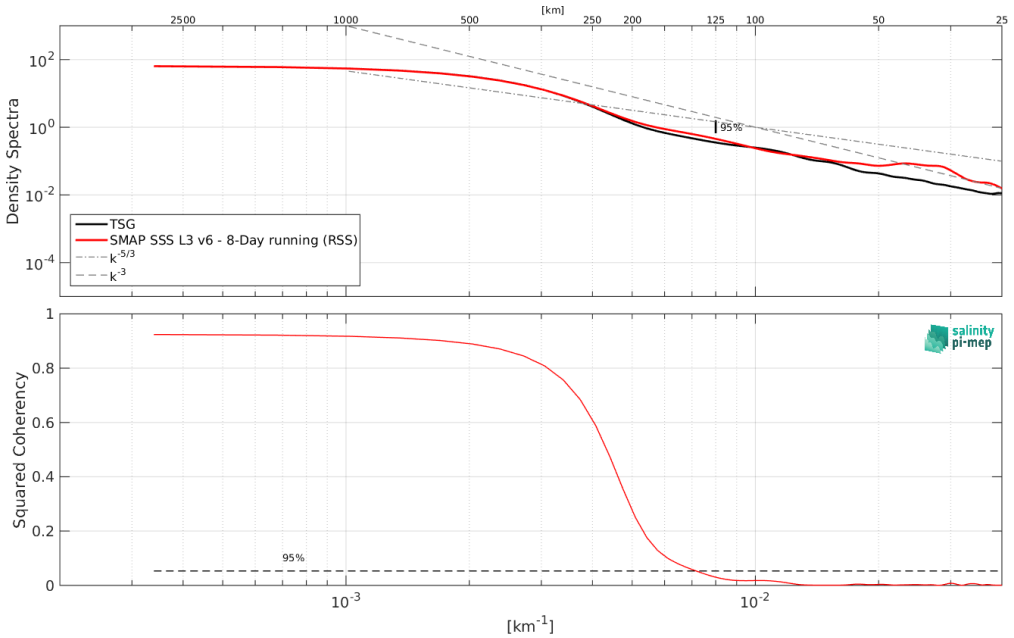

Figure 43: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smap-l3-rss-v6-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smap-l3-rss-v6-8dr.nc.

4.7.2 Topical Atlantic region

Figure 44 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

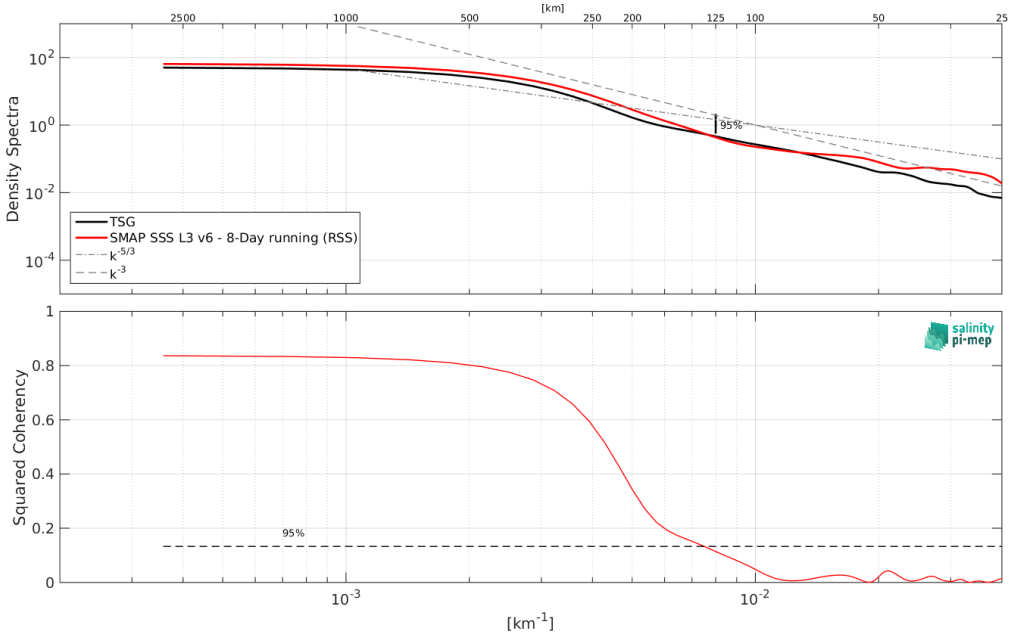

Figure 44: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smap-l3-rss-v6-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smap-l3-rss-v6-8dr.nc.

4.7.3 Tropical Pacific region

Figure 45 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

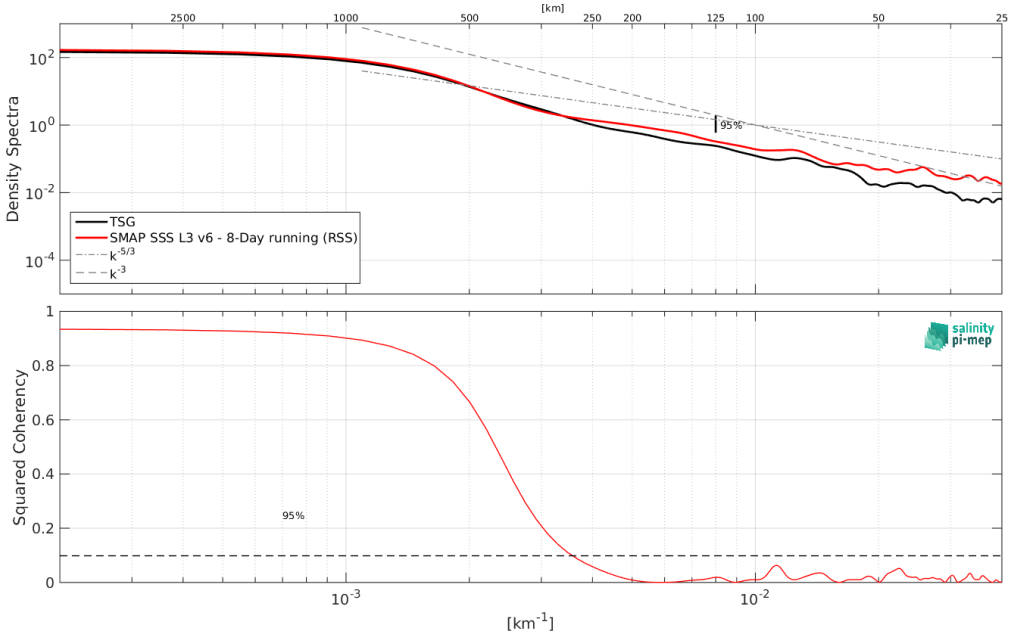

Figure 45: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smap-l3-rss-v6-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smap-l3-rss-v6-8dr.nc.

4.7.4 Arctic region

Figure 46 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

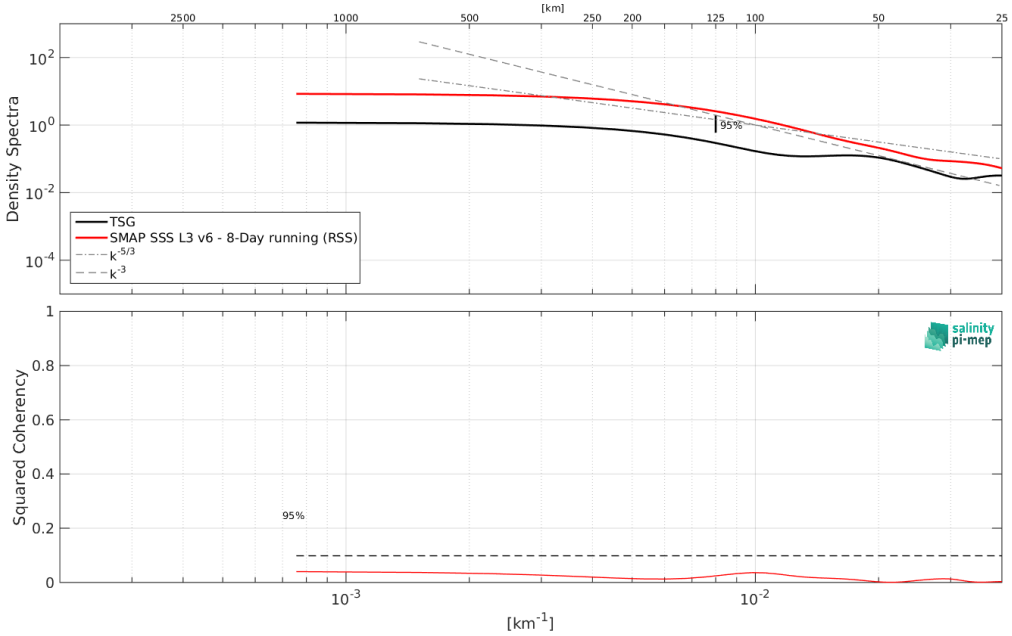

Figure 46: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smap-l3-rss-v6-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smap-l3-rss-v6-8dr.nc.

4.7.5 Southern Ocean region

Figure 47 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

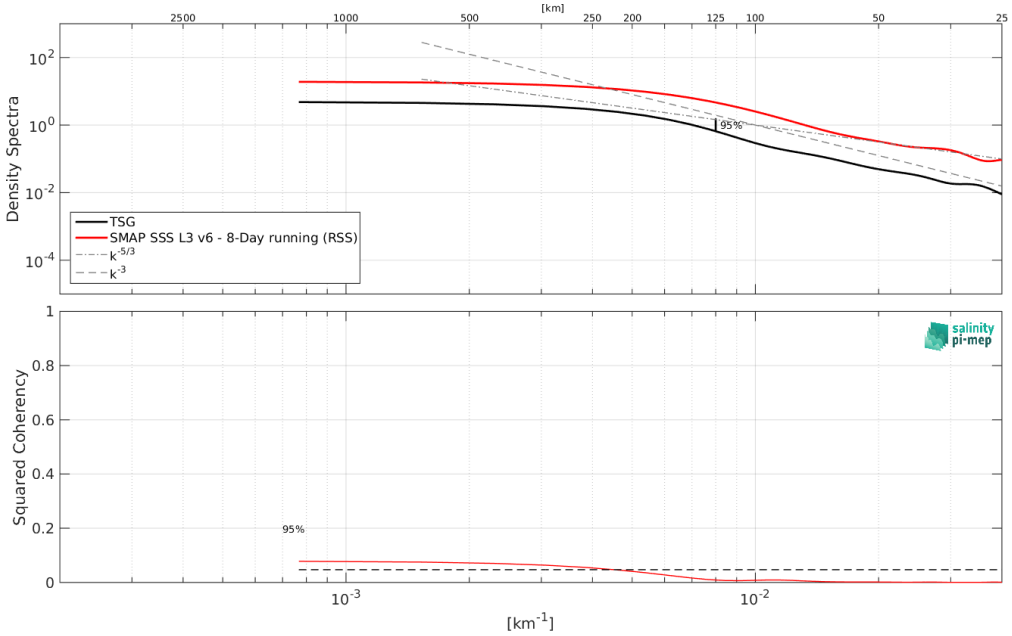

Figure 47: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smap-l3-rss-v6-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smap-l3-rss-v6-8dr.nc.

4.7.6 Western Pacific region

Figure 48 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

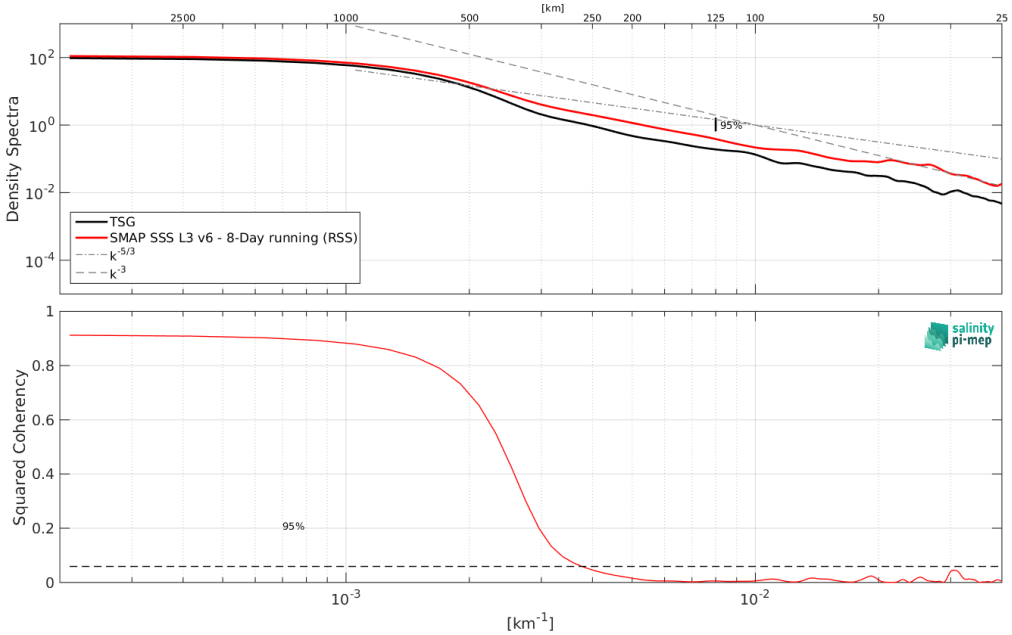

Figure 48: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - 8-Day running (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smap-l3-rss-v6-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smap-l3-rss-v6-8dr.nc.

4.8 SMAP SSS L3 v6 - Monthly (RSS)

4.8.1 North Atlantic region

Figure 49 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

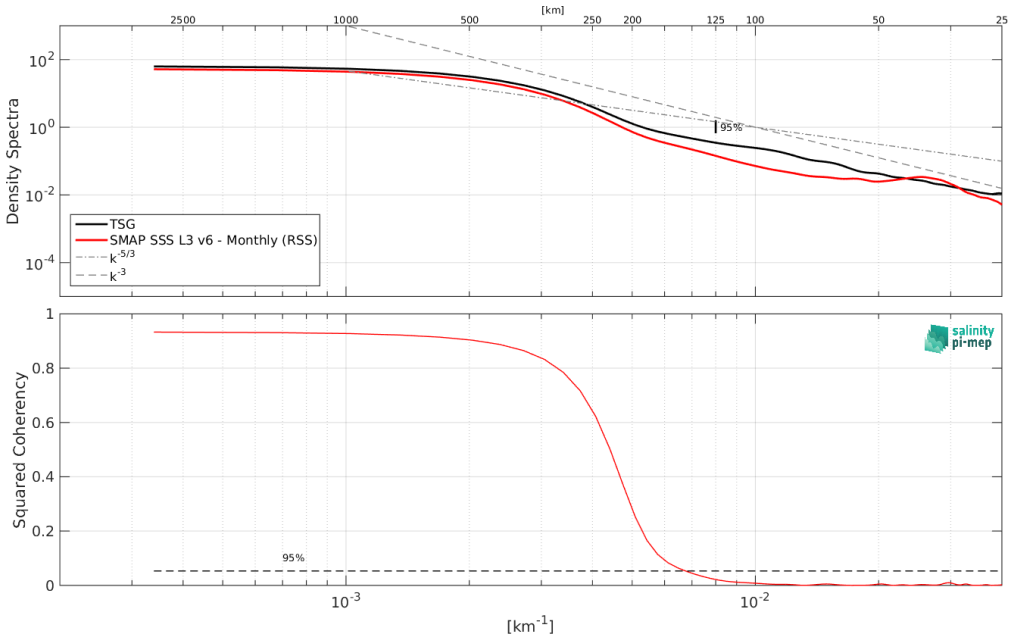

Figure 49: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smap-l3-rss-v6-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smap-l3-rss-v6-1m.nc.

4.8.2 Topical Atlantic region

Figure 50 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

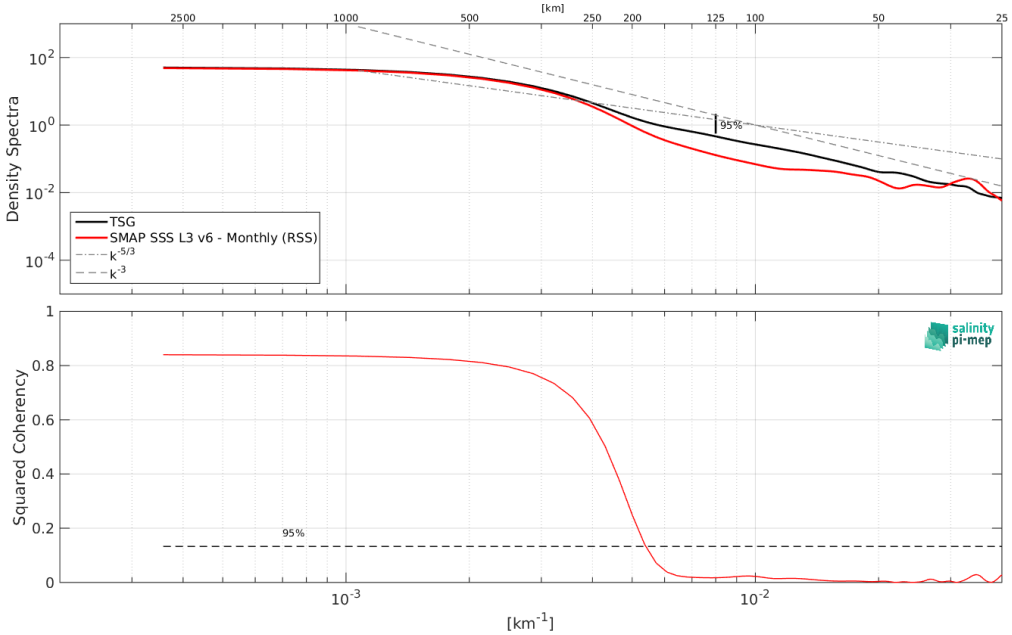

Figure 50: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smap-l3-rss-v6-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smap-l3-rss-v6-1m.nc.

4.8.3 Tropical Pacific region

Figure 51 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

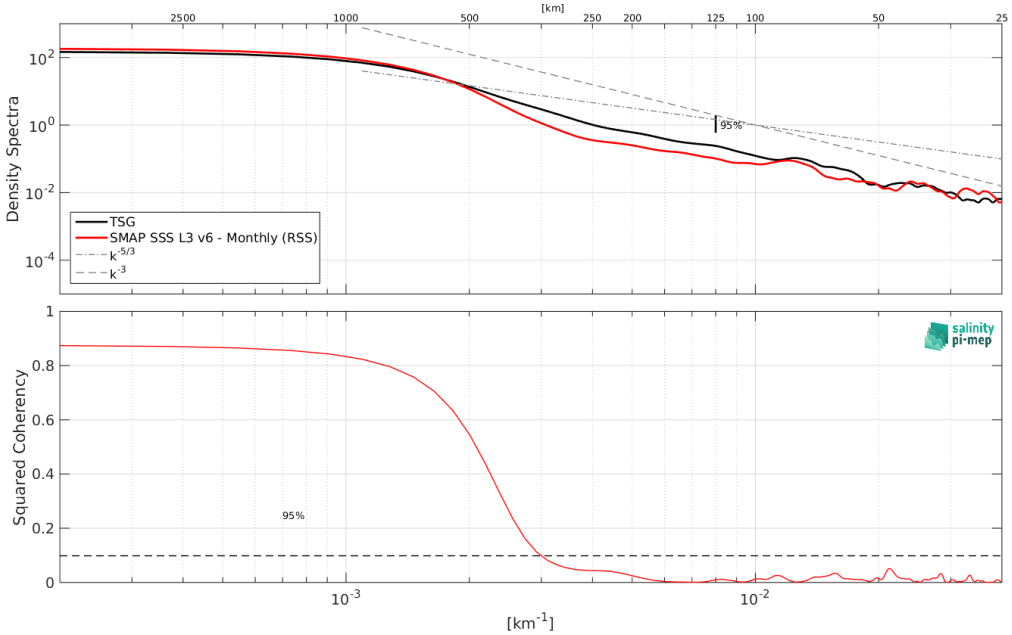

Figure 51: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smap-l3-rss-v6-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smap-l3-rss-v6-1m.nc.

4.8.4 Arctic region

Figure 52 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

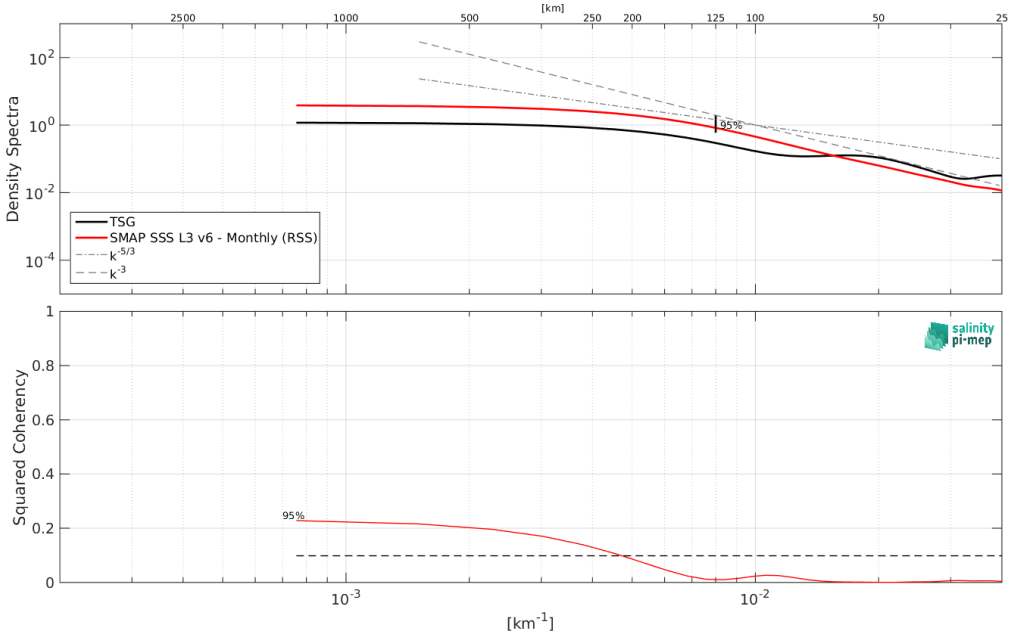

Figure 52: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smap-l3-rss-v6-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smap-l3-rss-v6-1m.nc.

4.8.5 Southern Ocean region

Figure 53 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

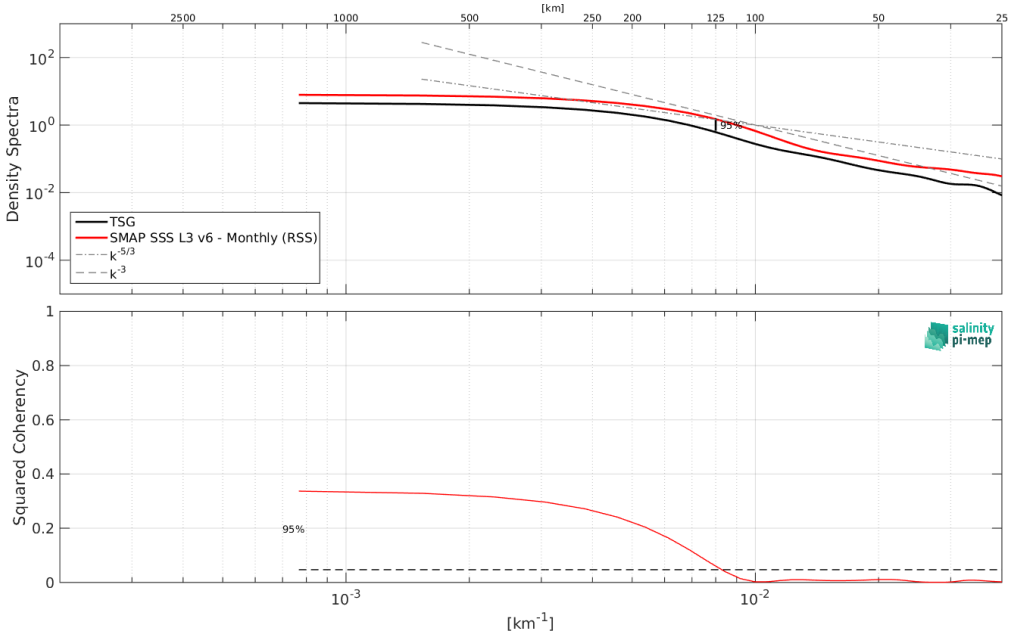

Figure 53: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smap-l3-rss-v6-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smap-l3-rss-v6-1m.nc.

4.8.6 Western Pacific region

Figure 54 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

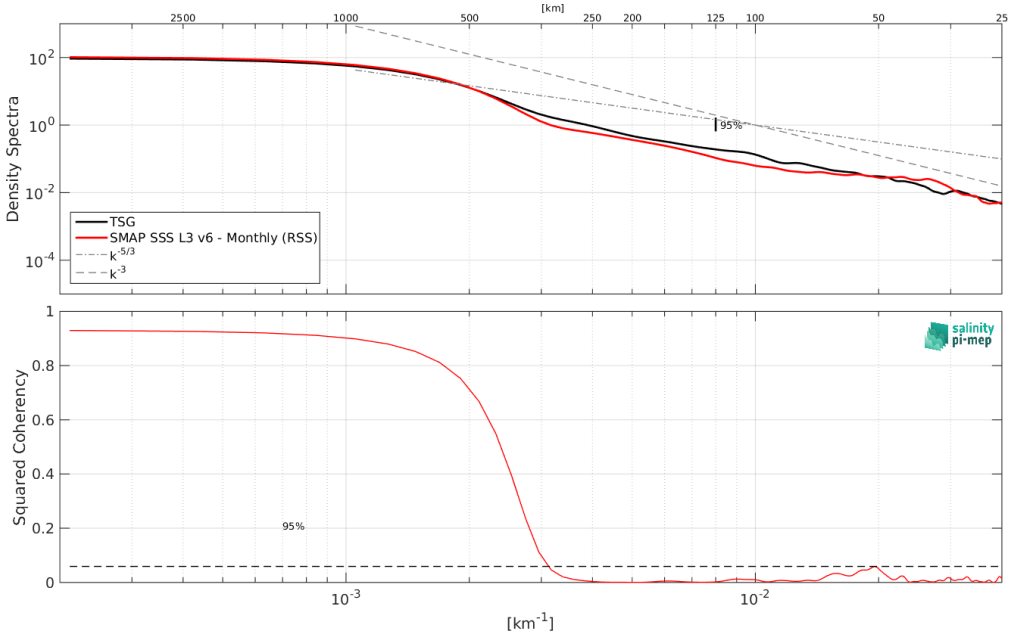

Figure 54: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v6 - Monthly (RSS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smap-l3-rss-v6-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smap-l3-rss-v6-1m.nc.

4.9 SMAP SSS L3 v5.0 - 8-Day running (JPL)

4.9.1 North Atlantic region

Figure 55 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

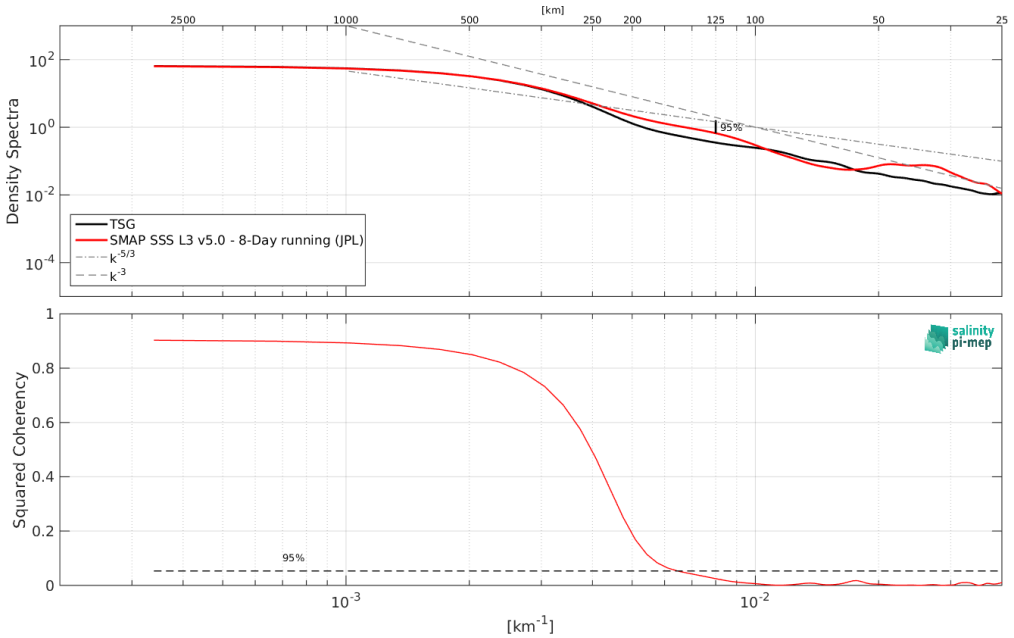

Figure 55: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smap-l3-jpl-v5.0-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smap-l3-jpl-v5.0-8dr.nc.

4.9.2 Topical Atlantic region

Figure 56 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

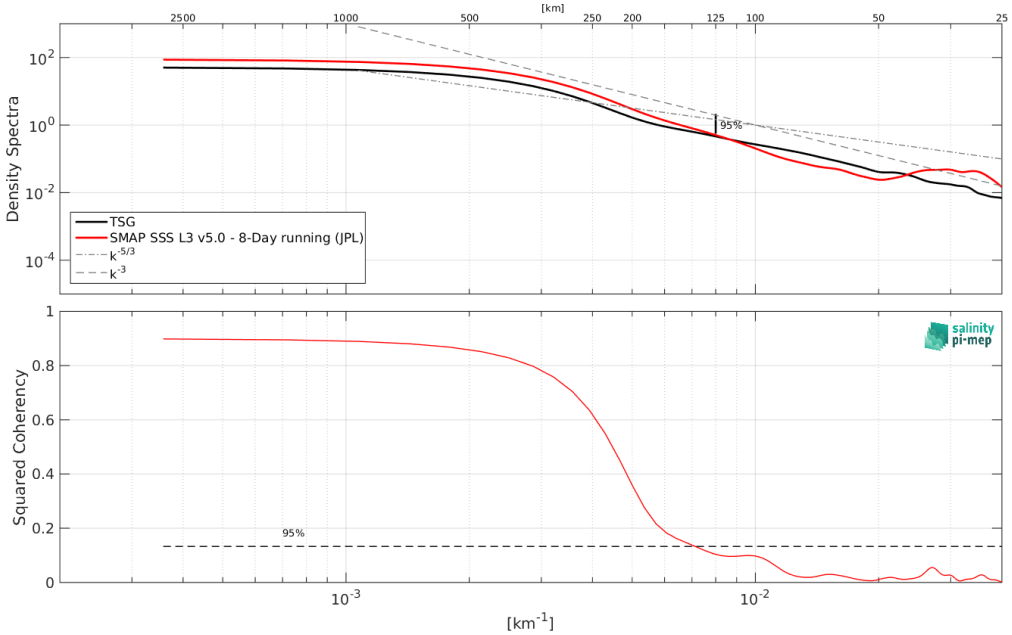

Figure 56: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smap-l3-jpl-v5.0-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smap-l3-jpl-v5.0-8dr.nc.

4.9.3 Tropical Pacific region

Figure 57 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

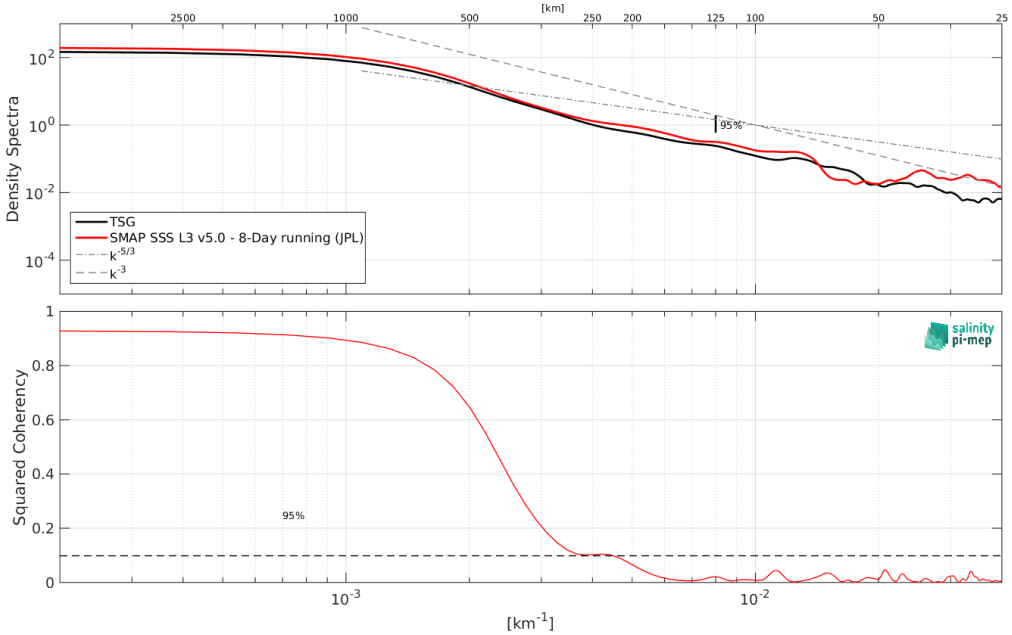

Figure 57: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smap-l3-jpl-v5.0-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smap-l3-jpl-v5.0-8dr.nc.

4.9.4 Arctic region

Figure 58 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

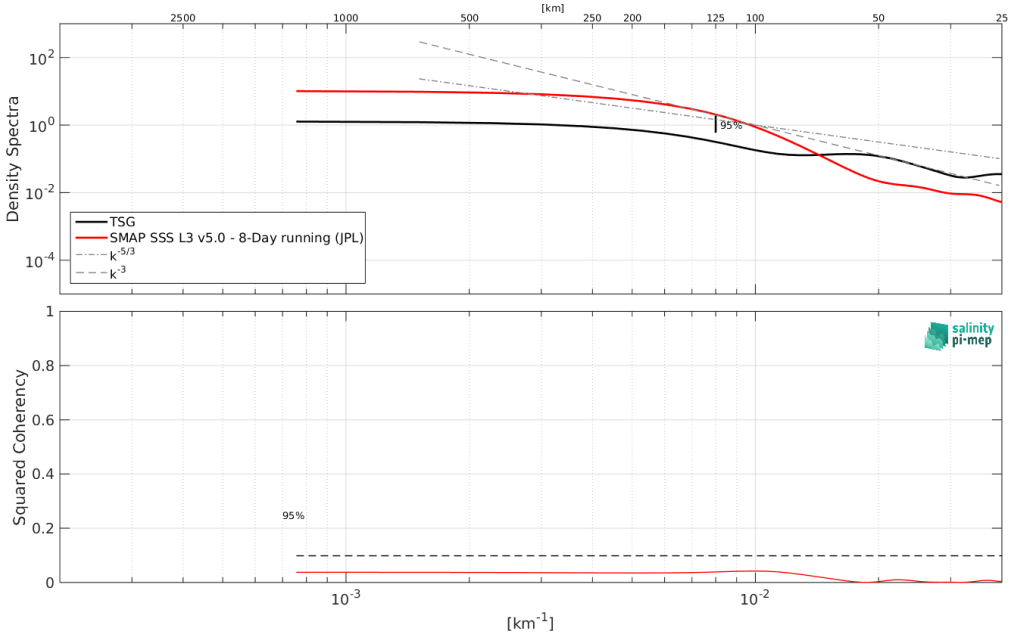

Figure 58: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smap-l3-jpl-v5.0-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smap-l3-jpl-v5.0-8dr.nc.

4.9.5 Southern Ocean region

Figure 59 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

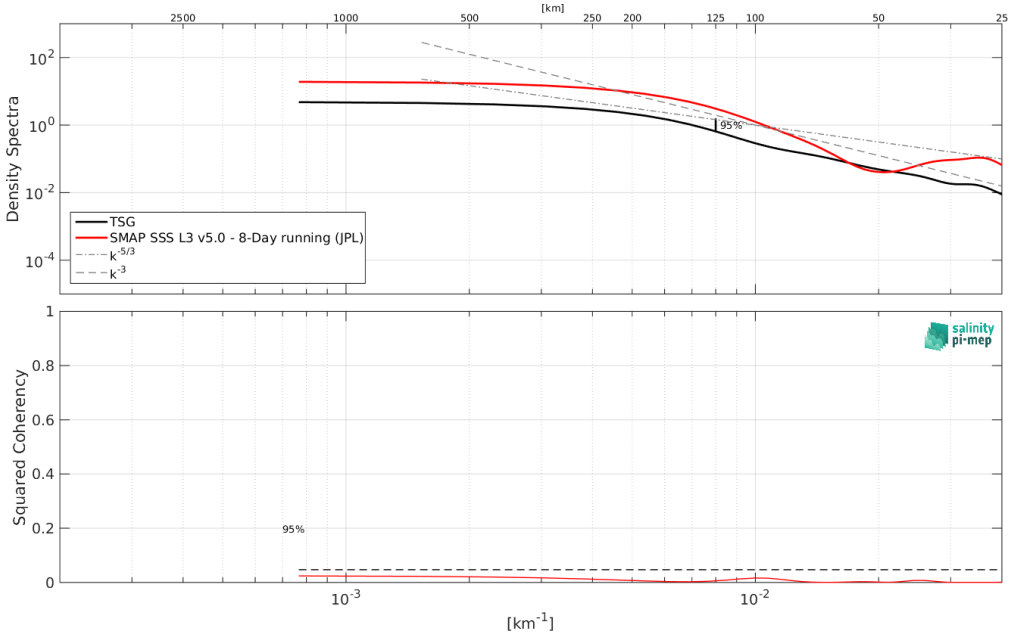

Figure 59: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smap-l3-jpl-v5.0-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smap-l3-jpl-v5.0-8dr.nc.

4.9.6 Western Pacific region

Figure 60 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

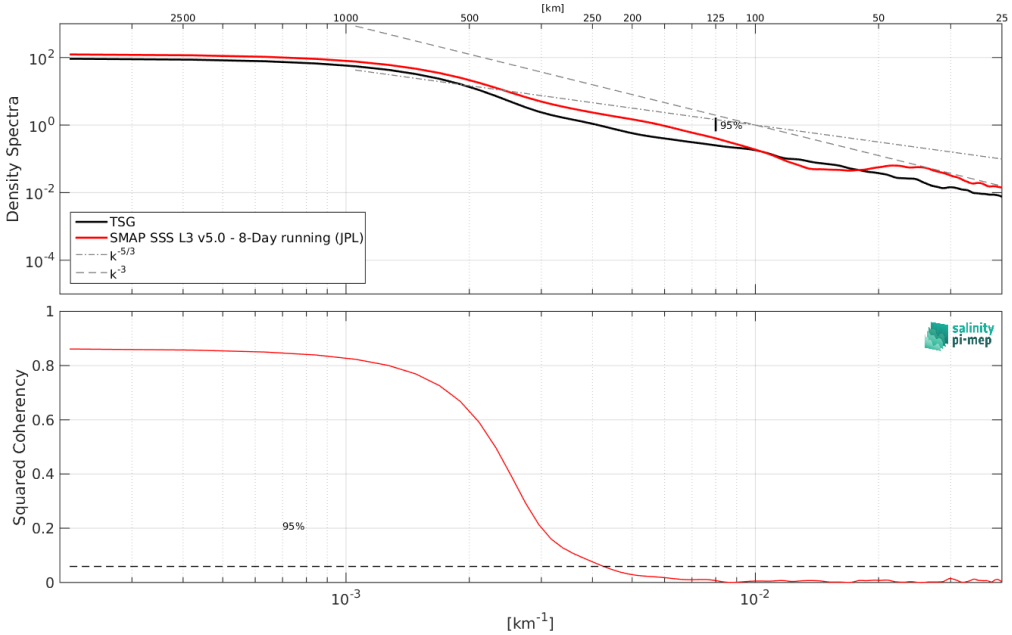

Figure 60: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - 8-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smap-l3-jpl-v5.0-8dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smap-l3-jpl-v5.0-8dr.nc.

4.10 SMAP SSS L3 v5.0 - Monthly (JPL)

4.10.1 North Atlantic region

Figure 61 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

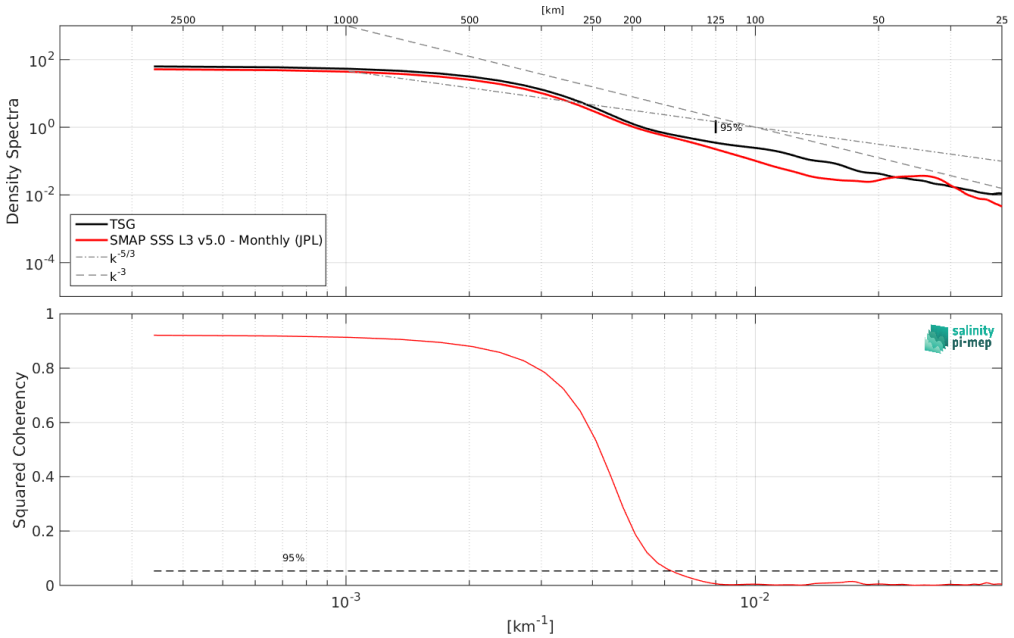

Figure 61: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smap-l3-jpl-v5.0-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smap-l3-jpl-v5.0-1m.nc.

4.10.2 Topical Atlantic region

Figure 62 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

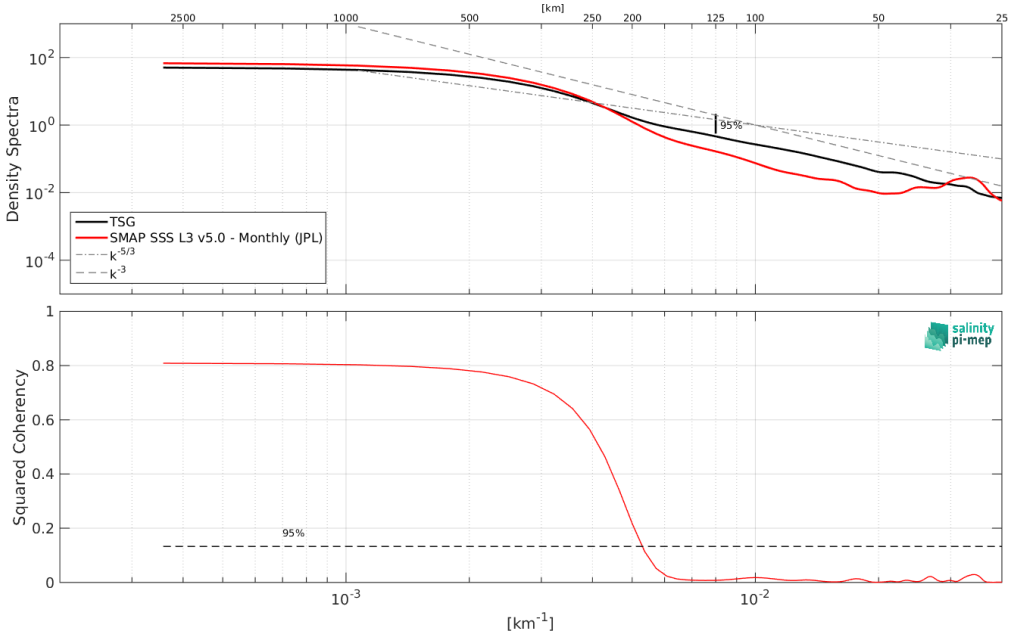

Figure 62: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smap-l3-jpl-v5.0-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smap-l3-jpl-v5.0-1m.nc.

4.10.3 Tropical Pacific region

Figure 63 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

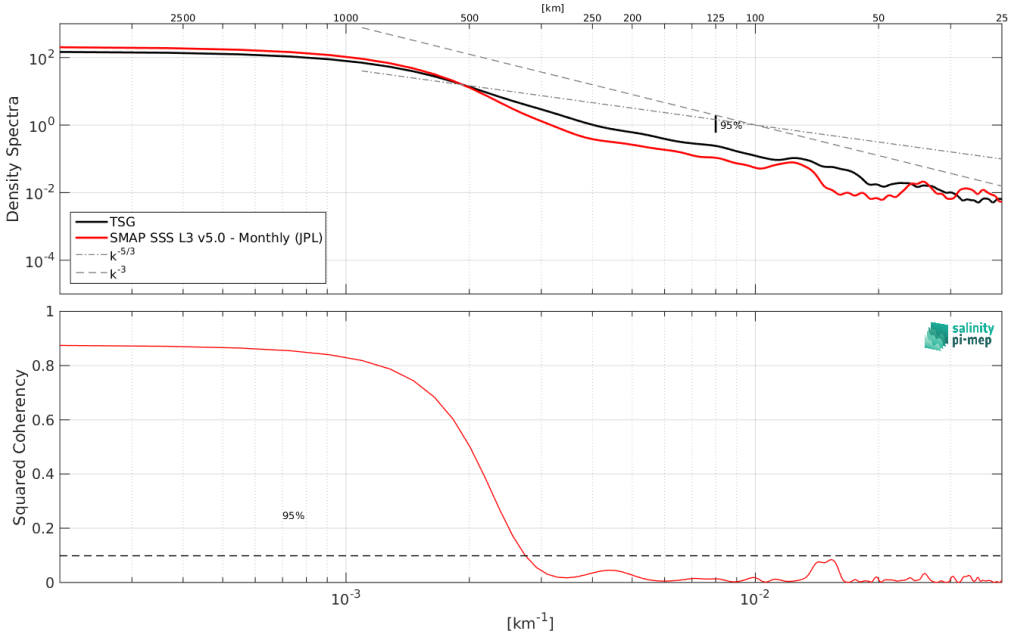

Figure 63: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smap-l3-jpl-v5.0-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smap-l3-jpl-v5.0-1m.nc.

4.10.4 Arctic region

Figure 64 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

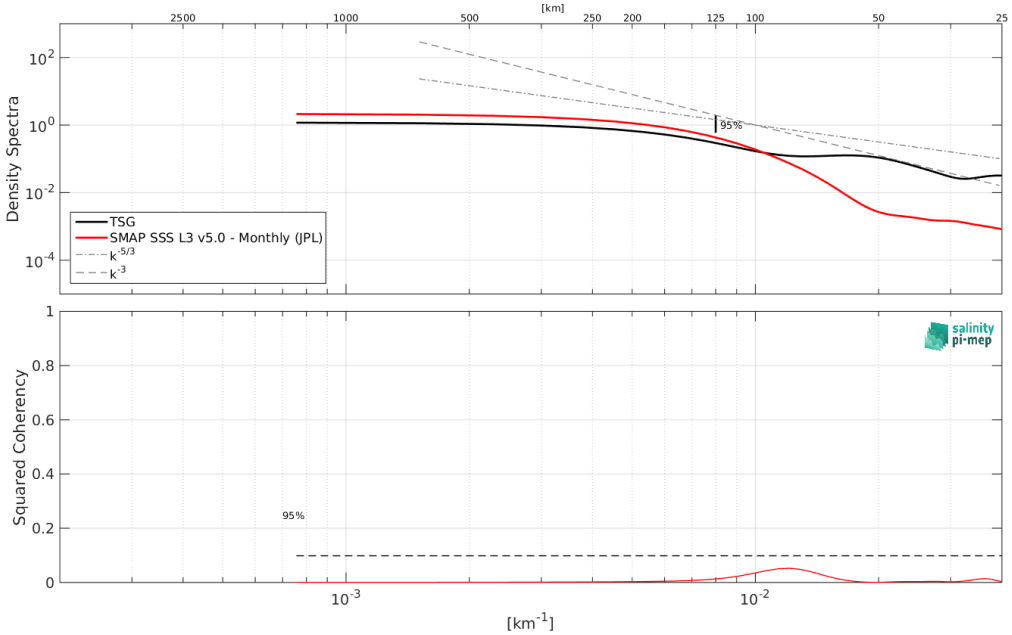

Figure 64: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smap-l3-jpl-v5.0-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smap-l3-jpl-v5.0-1m.nc.

4.10.5 Southern Ocean region

Figure 65 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

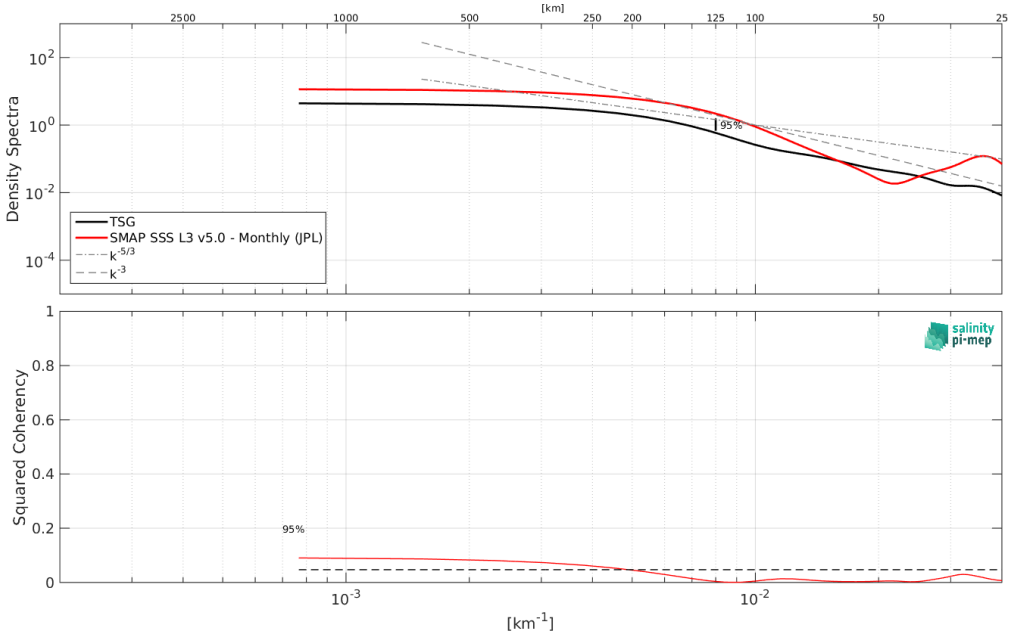

Figure 65: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smap-l3-jpl-v5.0-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smap-l3-jpl-v5.0-1m.nc.

4.10.6 Western Pacific region

Figure 66 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

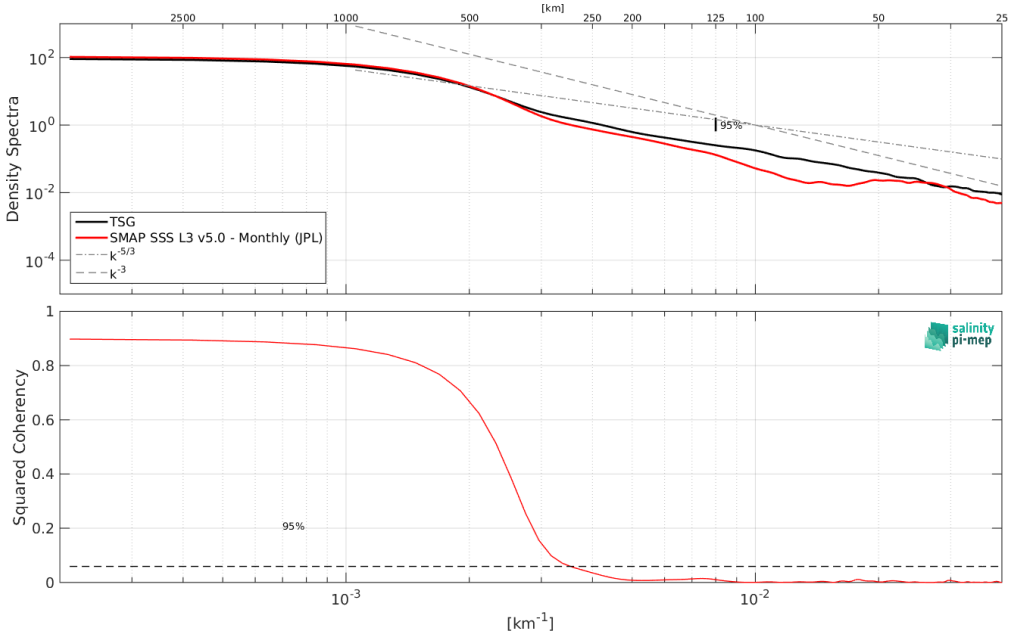

Figure 66: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L3 v5.0 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smap-l3-jpl-v5.0-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smap-l3-jpl-v5.0-1m.nc.

4.11 Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)

4.11.1 North Atlantic region

Figure 67 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

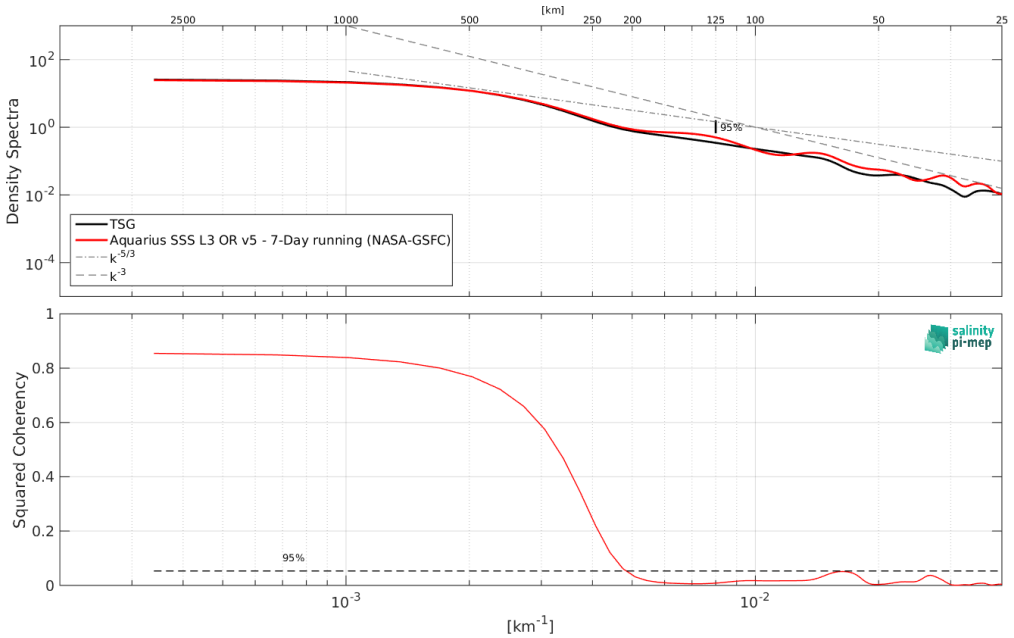

Figure 67: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l3-or-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l3-or-v5-7dr.nc.

4.11.2 Topical Atlantic region

Figure 68 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

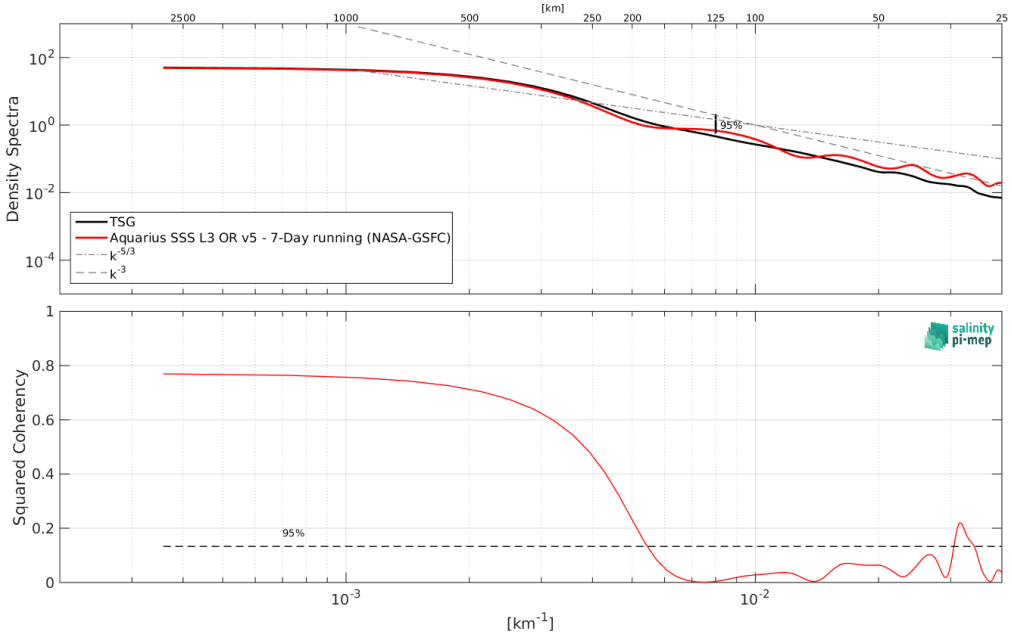

Figure 68: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l3-or-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l3-or-v5-7dr.nc.

4.11.3 Tropical Pacific region

Figure 69 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

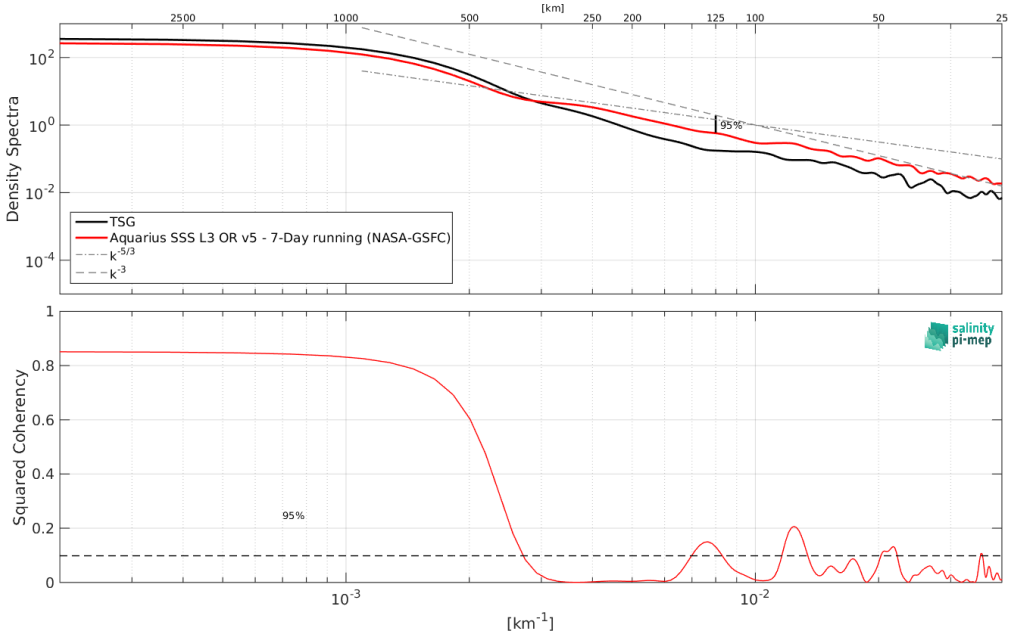

Figure 69: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l3-or-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l3-or-v5-7dr.nc.

4.11.4 Arctic region

Figure 70 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

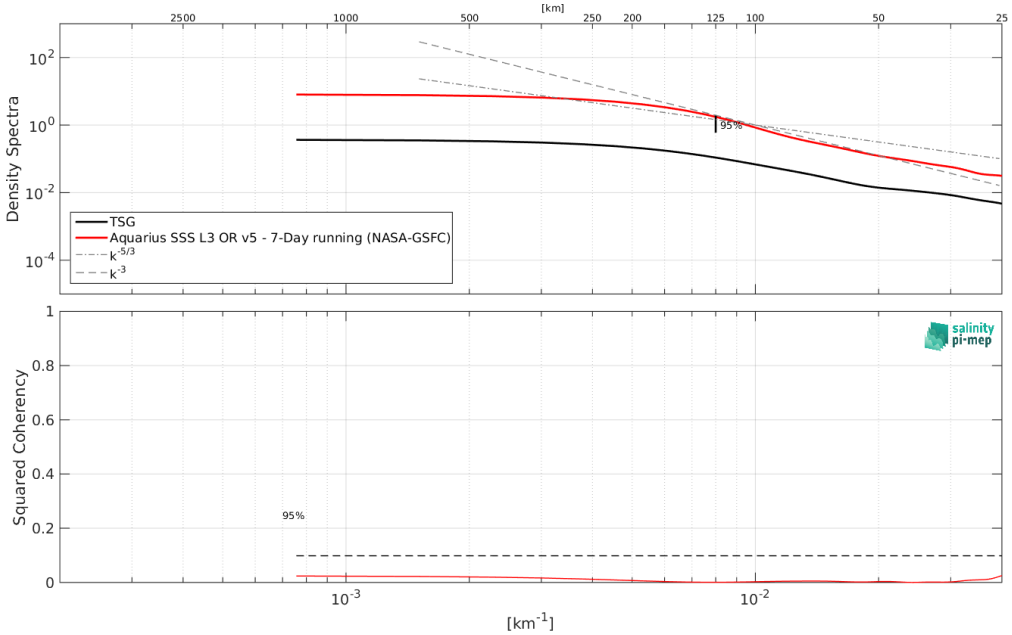

Figure 70: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l3-or-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l3-or-v5-7dr.nc.

4.11.5 Southern Ocean region

Figure 71 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

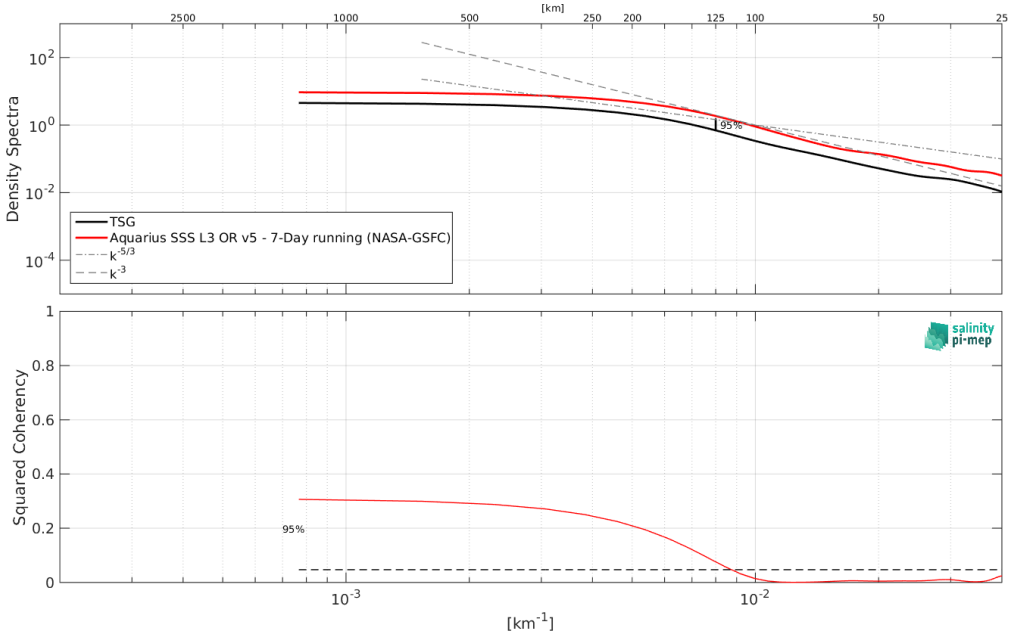

Figure 71: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l3-or-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l3-or-v5-7dr.nc.

4.11.6 Western Pacific region

Figure 72 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

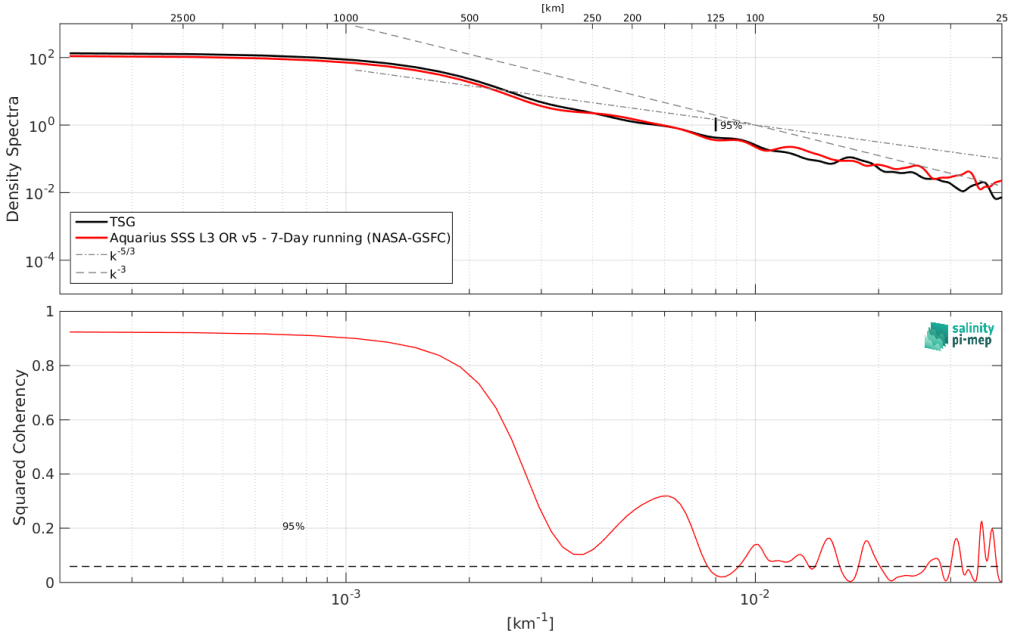

Figure 72: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l3-or-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l3-or-v5-7dr.nc.

4.12 Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)

4.12.1 North Atlantic region

Figure 73 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

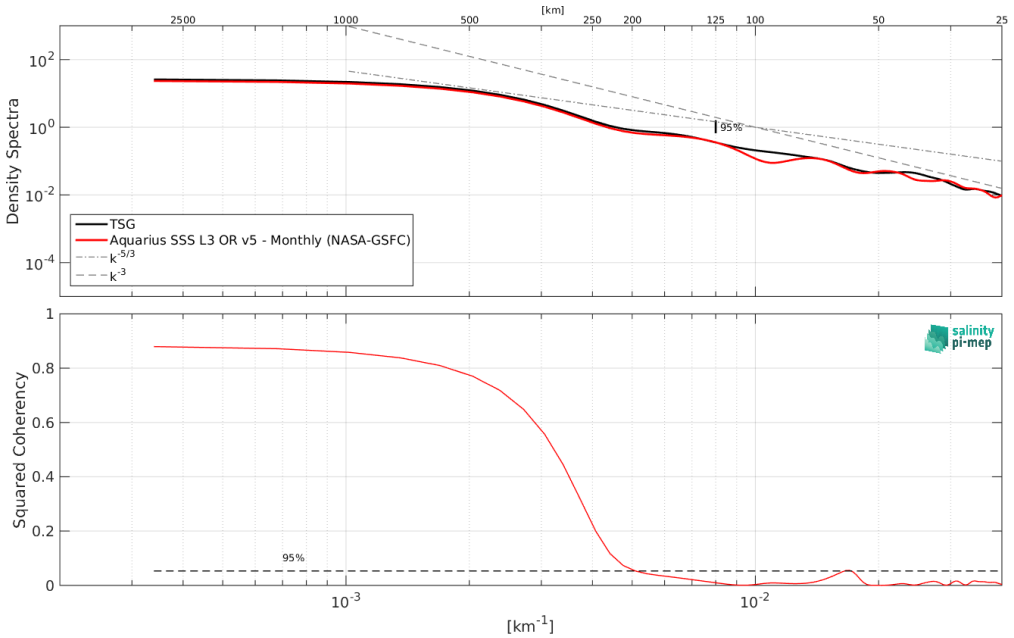

Figure 73: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l3-or-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l3-or-v5-1m.nc.

4.12.2 Topical Atlantic region

Figure 74 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

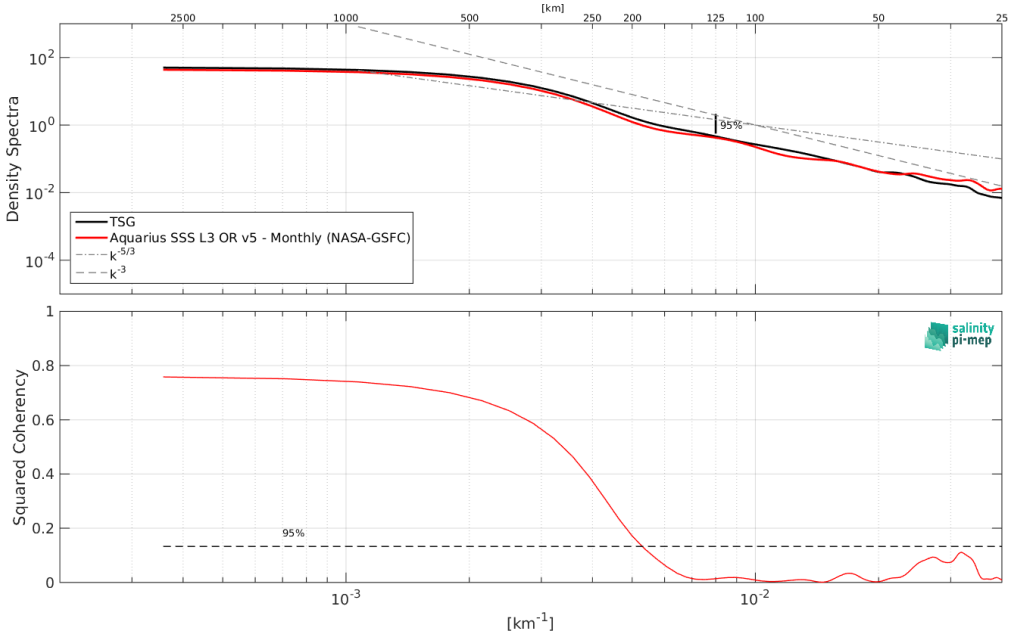

Figure 74: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l3-or-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l3-or-v5-1m.nc.

4.12.3 Tropical Pacific region

Figure 75 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

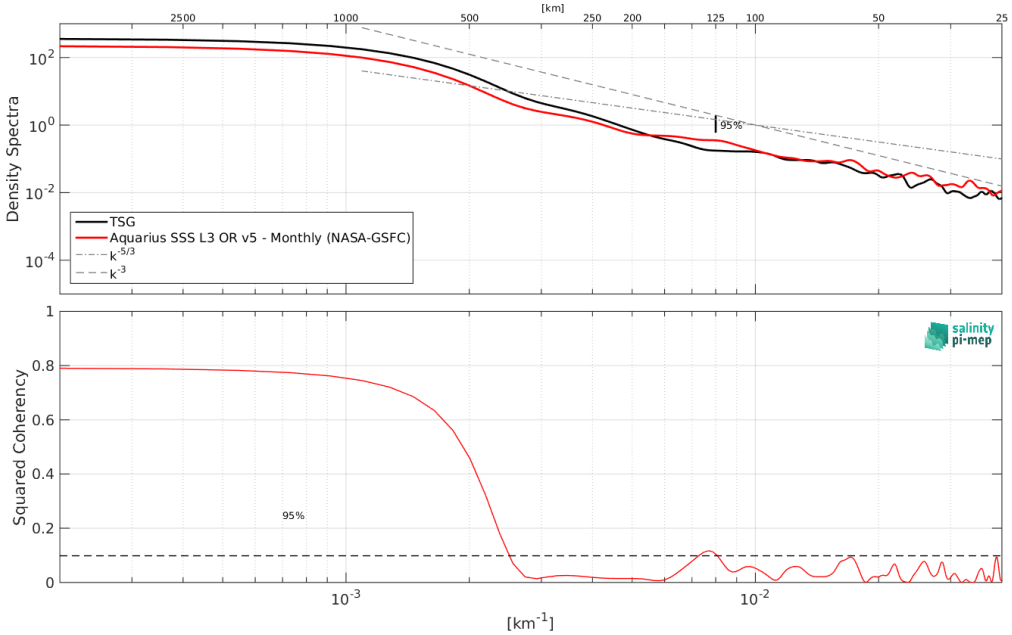

Figure 75: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l3-or-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l3-or-v5-1m.nc.

4.12.4 Arctic region

Figure 76 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

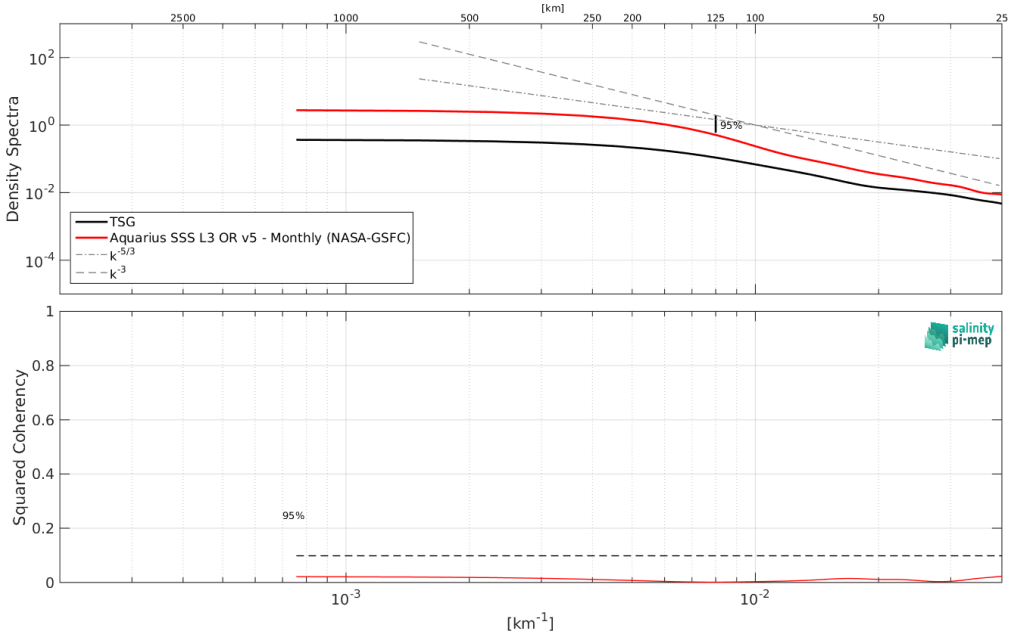

Figure 76: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l3-or-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l3-or-v5-1m.nc.

4.12.5 Southern Ocean region

Figure 77 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

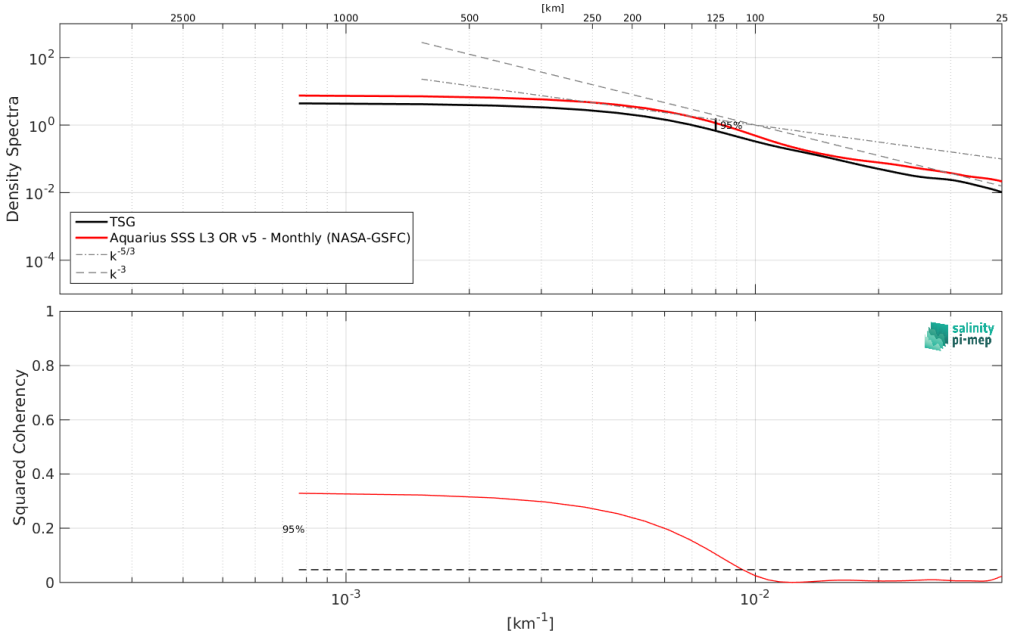

Figure 77: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l3-or-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l3-or-v5-1m.nc.

4.12.6 Western Pacific region

Figure 78 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

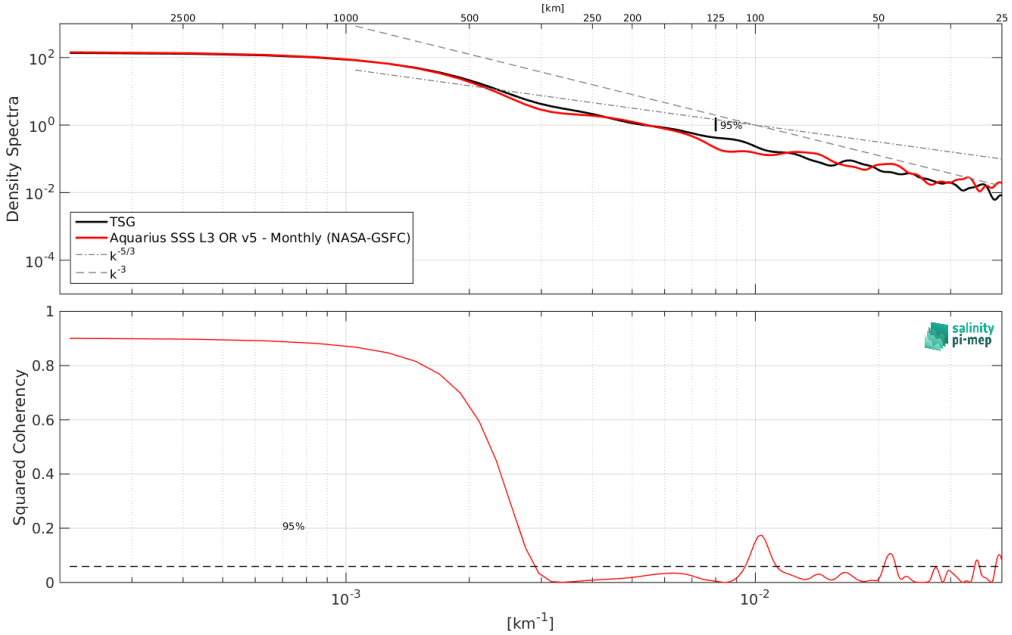

Figure 78: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l3-or-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l3-or-v5-1m.nc.

4.13 Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)

4.13.1 North Atlantic region

Figure 79 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

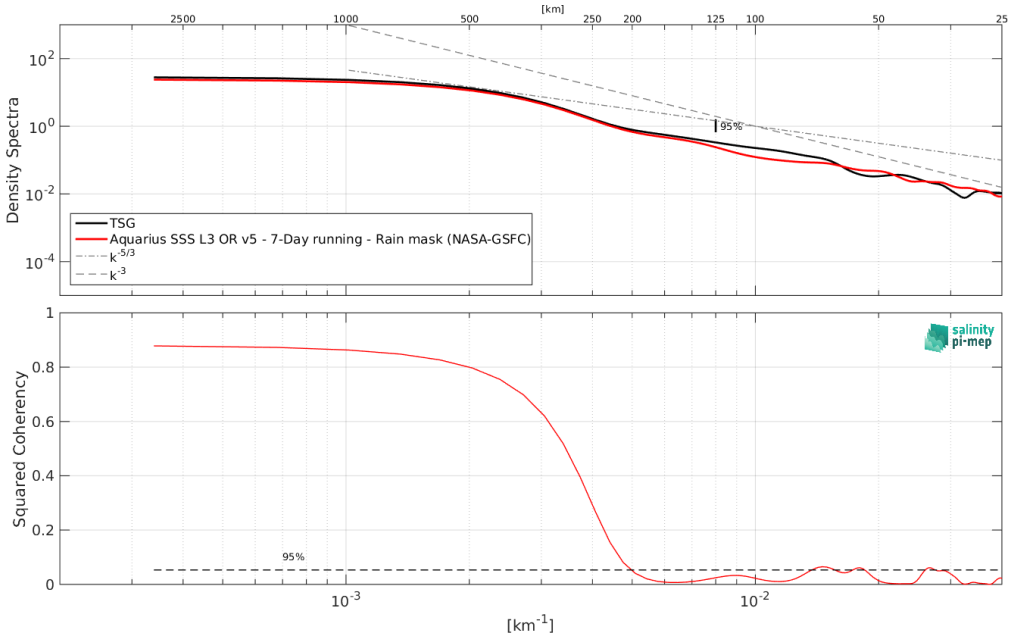

Figure 79: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l3-or-v5-7dr-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l3-or-v5-7dr-rain-mask.nc.

4.13.2 Topical Atlantic region

Figure 80 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

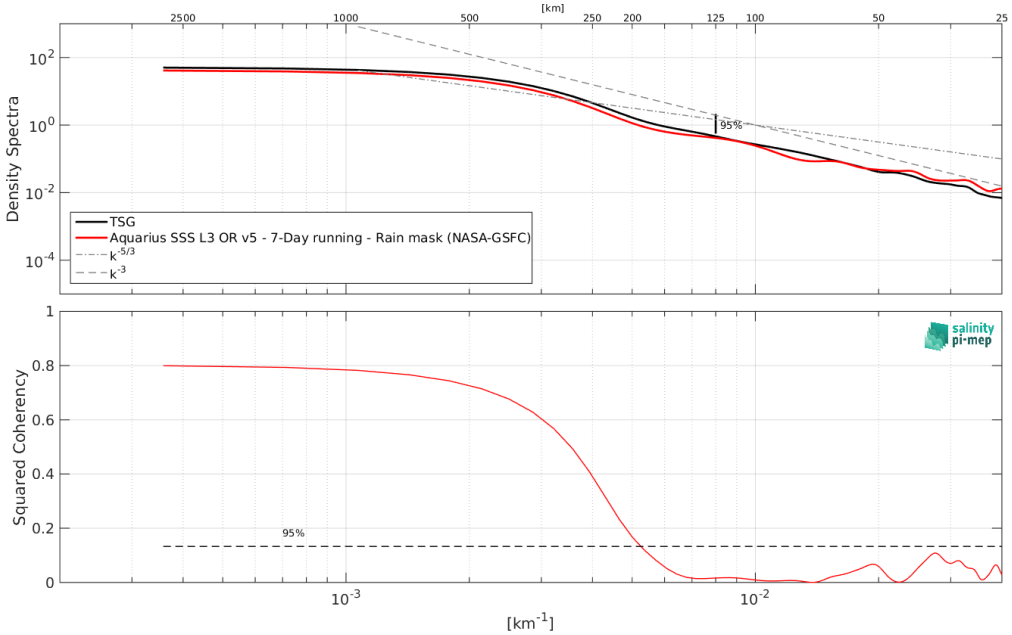

Figure 80: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l3-or-v5-7dr-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l3-or-v5-7dr-rain-mask.nc.

4.13.3 Tropical Pacific region

Figure 81 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

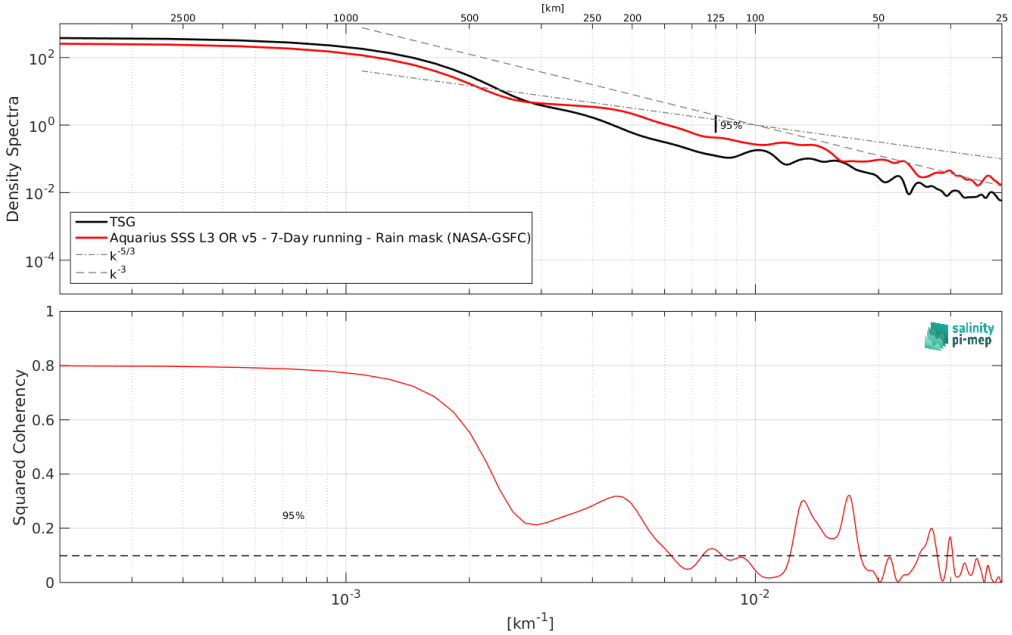

Figure 81: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l3-or-v5-7dr-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l3-or-v5-7dr-rain-mask.nc.

4.13.4 Arctic region

Figure 82 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

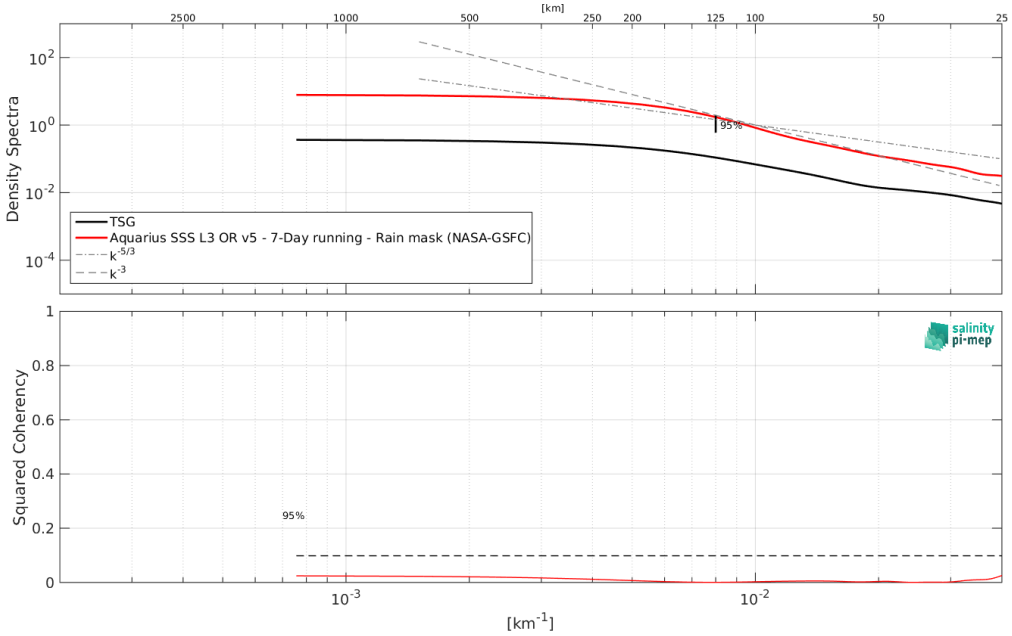

Figure 82: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l3-or-v5-7dr-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l3-or-v5-7dr-rain-mask.nc.

4.13.5 Southern Ocean region

Figure 83 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

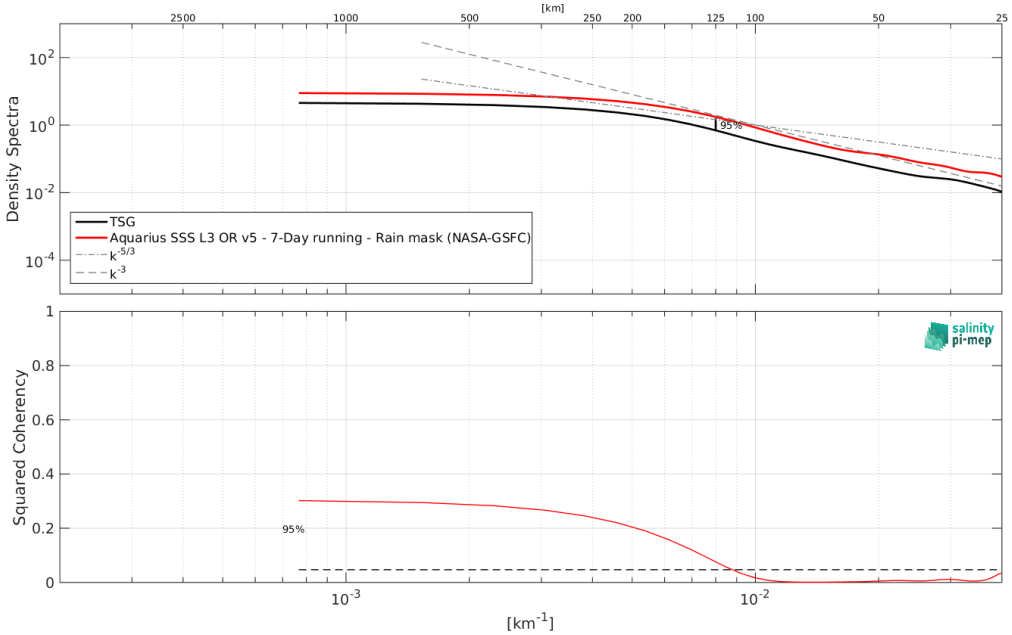

Figure 83: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l3-or-v5-7dr-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l3-or-v5-7dr-rain-mask.nc.

4.13.6 Western Pacific region

Figure 84 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

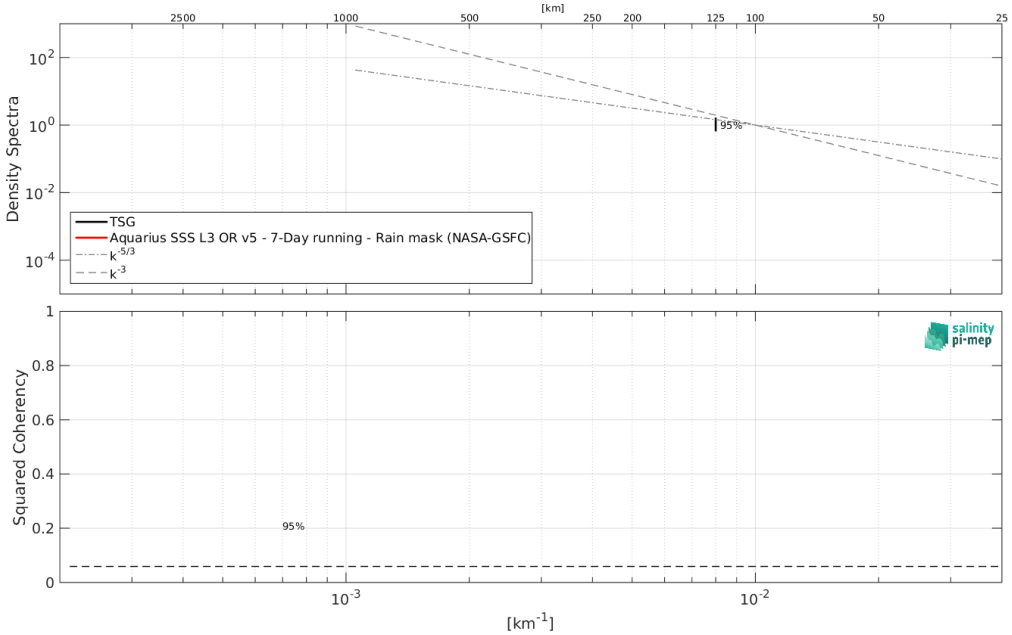

Figure 84: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l3-or-v5-7dr-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l3-or-v5-7dr-rain-mask.nc.

4.14 Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)

4.14.1 North Atlantic region

Figure 85 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

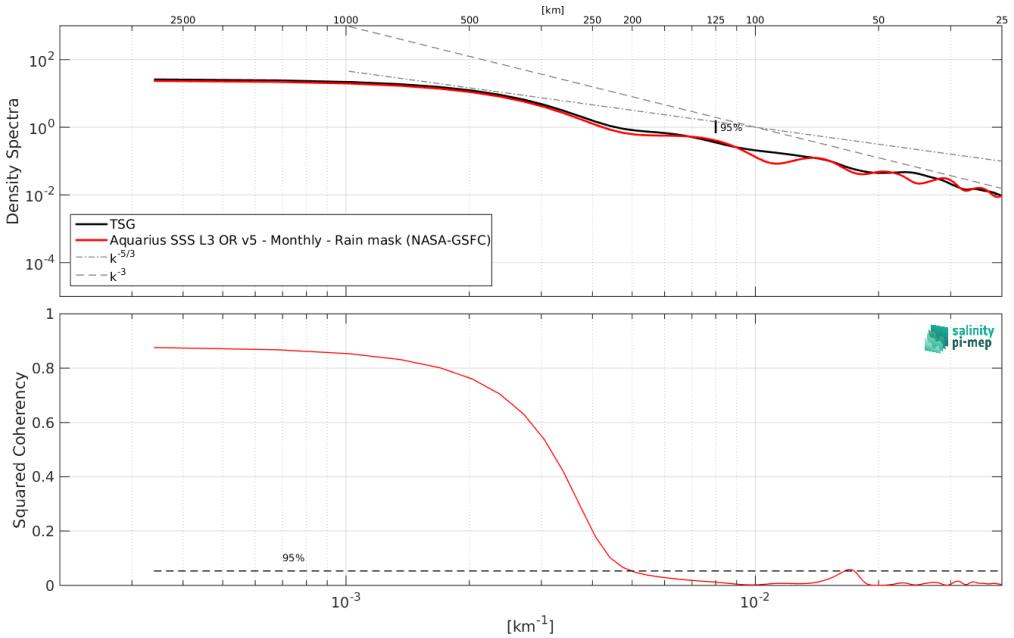

Figure 85: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l3-or-v5-1m-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l3-or-v5-1m-rain-mask.nc.

4.14.2 Topical Atlantic region

Figure 86 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

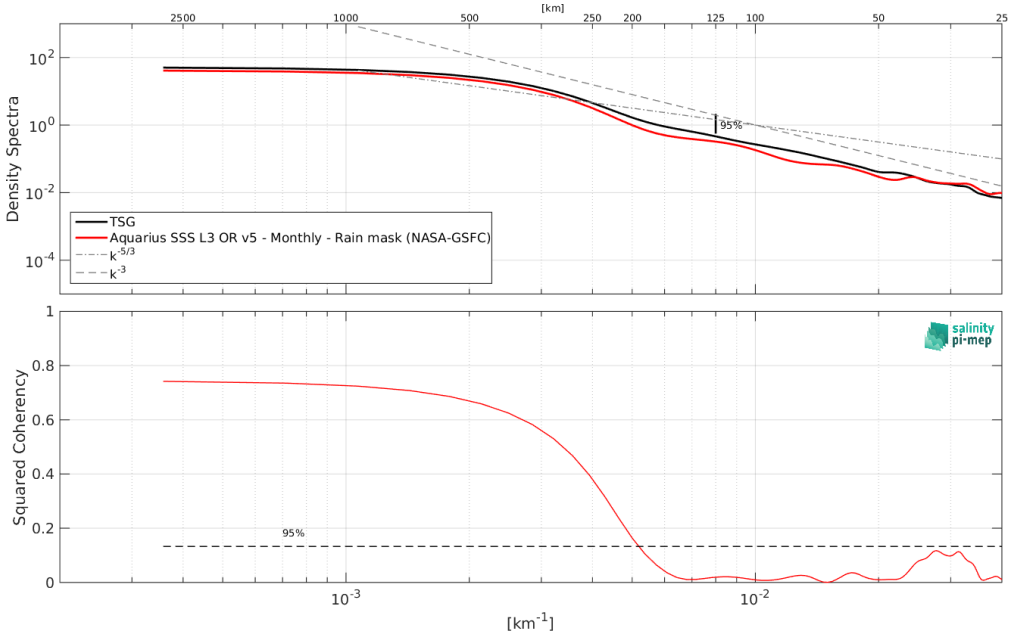

Figure 86: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l3-or-v5-1m-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l3-or-v5-1m-rain-mask.nc.

4.14.3 Tropical Pacific region

Figure 87 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

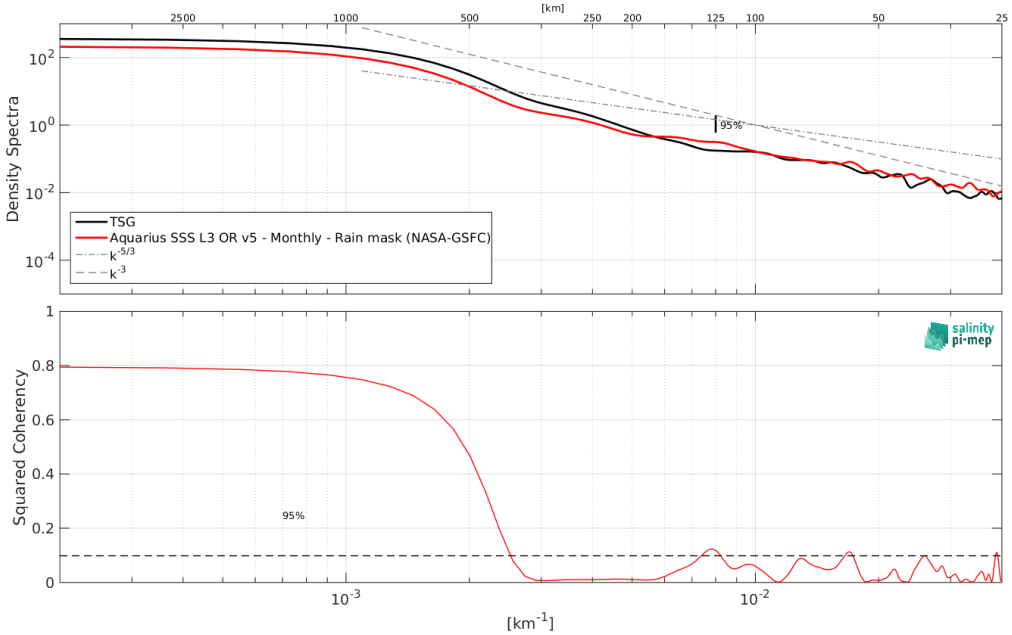

Figure 87: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l3-or-v5-1m-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l3-or-v5-1m-rain-mask.nc.

4.14.4 Arctic region

Figure 88 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

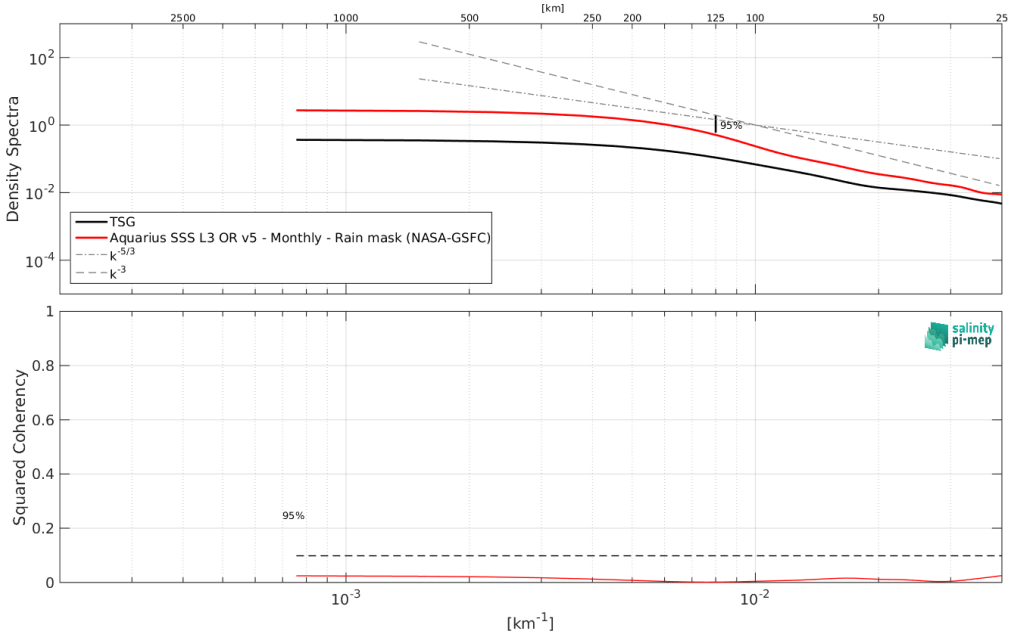

Figure 88: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l3-or-v5-1m-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l3-or-v5-1m-rain-mask.nc.

4.14.5 Southern Ocean region

Figure 89 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

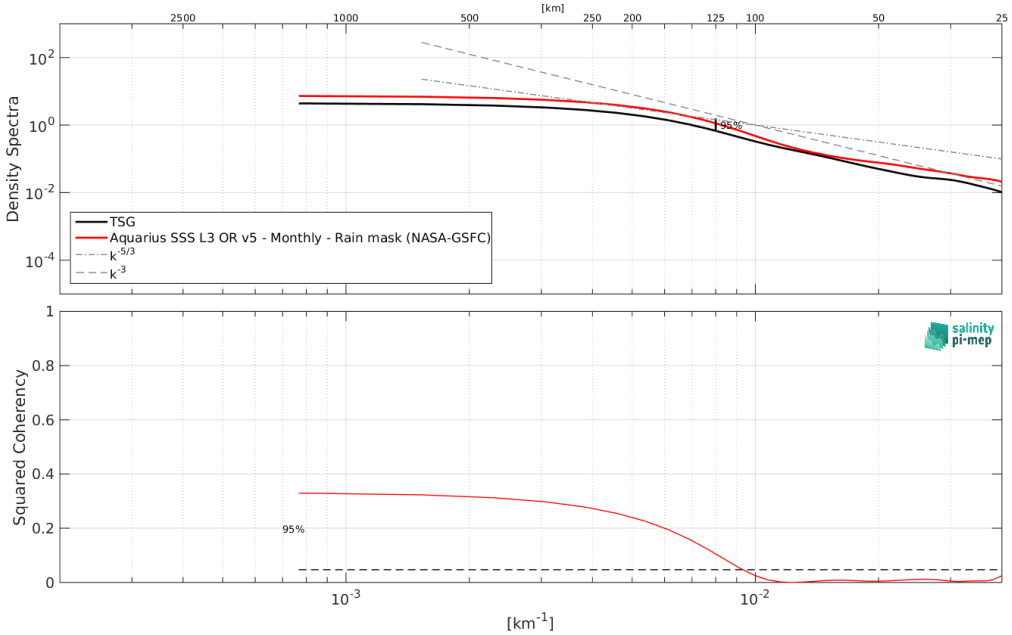

Figure 89: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l3-or-v5-1m-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l3-or-v5-1m-rain-mask.nc.

4.14.6 Western Pacific region

Figure 90 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

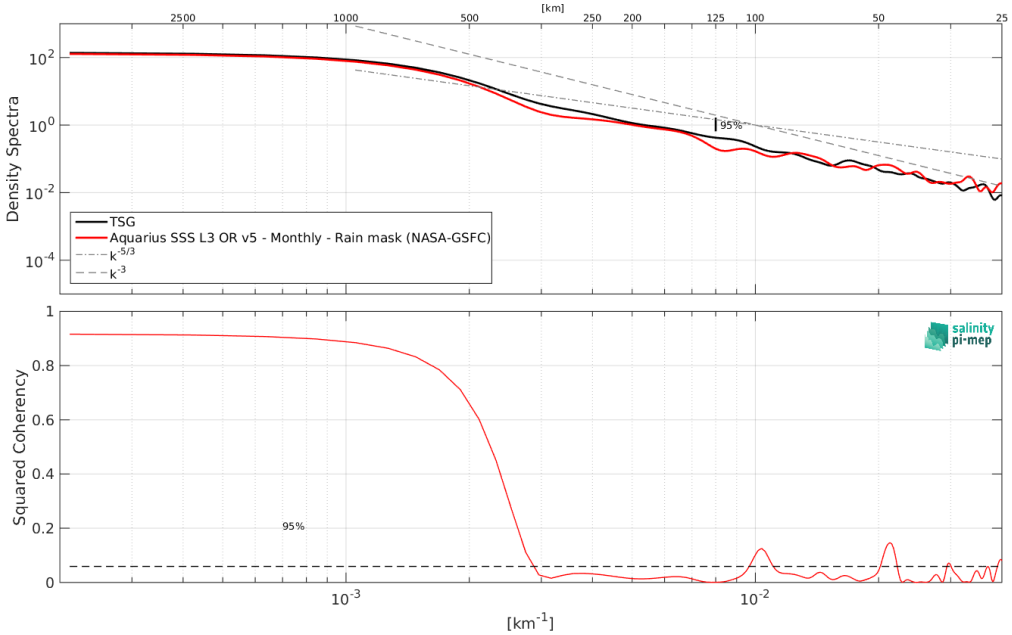

Figure 90: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l3-or-v5-1m-rain-mask.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l3-or-v5-1m-rain-mask.nc.

4.15 Aquarius SSS L3 CAP v5 - 7-Day running (JPL)

4.15.1 North Atlantic region

Figure 91 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

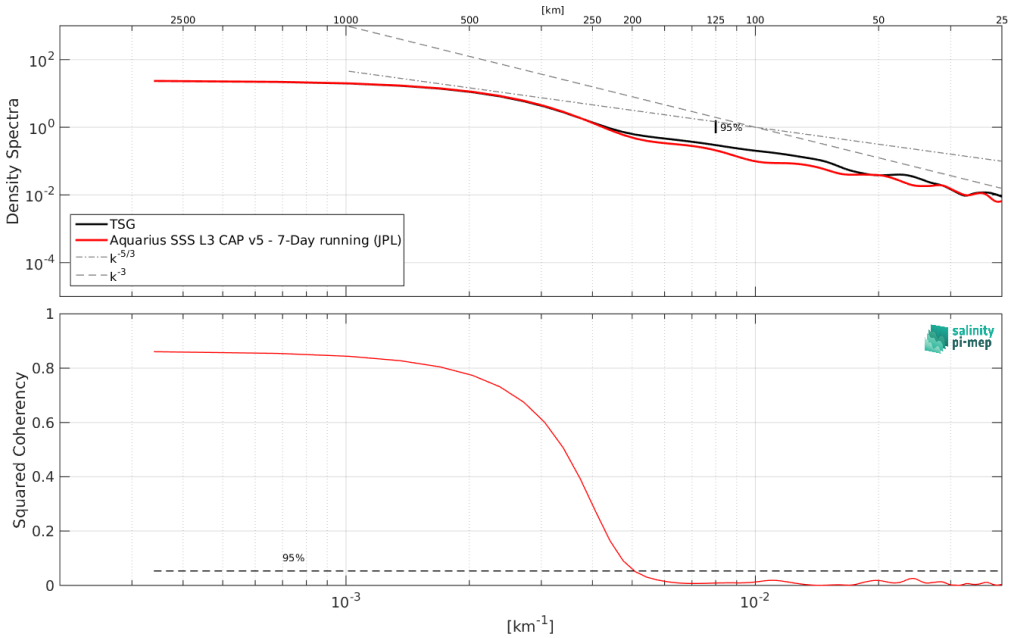

Figure 91: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l3-jpl-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l3-jpl-v5-7dr.nc.

4.15.2 Topical Atlantic region

Figure 92 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

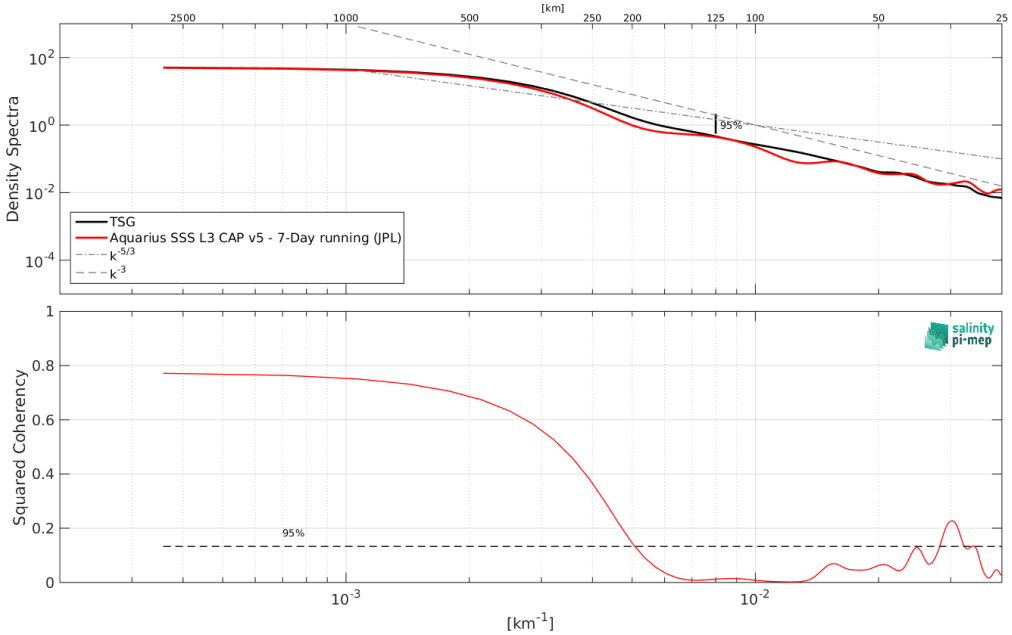

Figure 92: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l3-jpl-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l3-jpl-v5-7dr.nc.

4.15.3 Tropical Pacific region

Figure 93 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

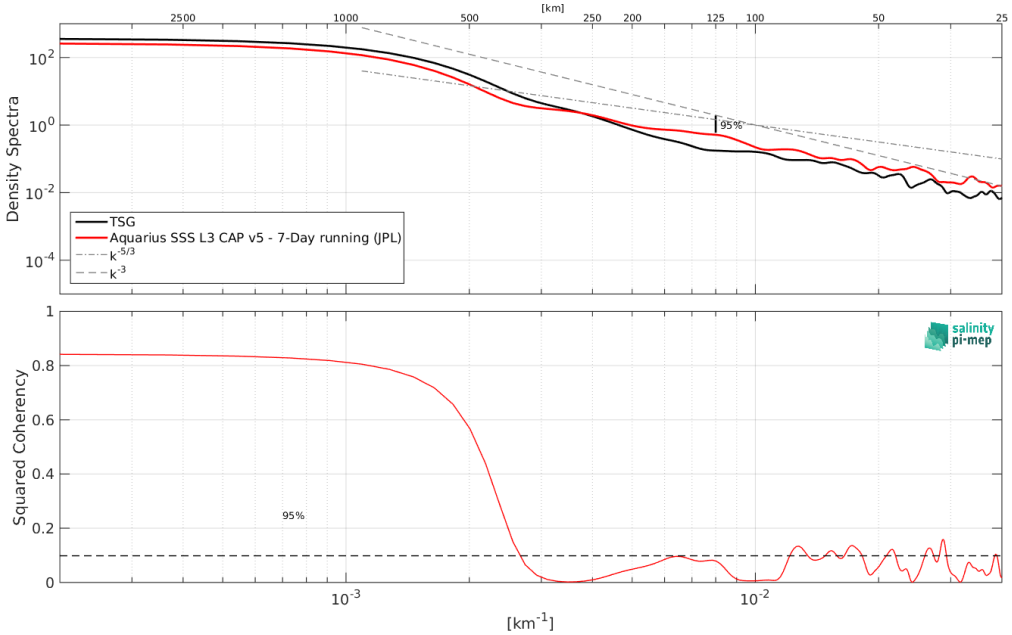

Figure 93: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l3-jpl-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l3-jpl-v5-7dr.nc.

4.15.4 Arctic region

Figure 94 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

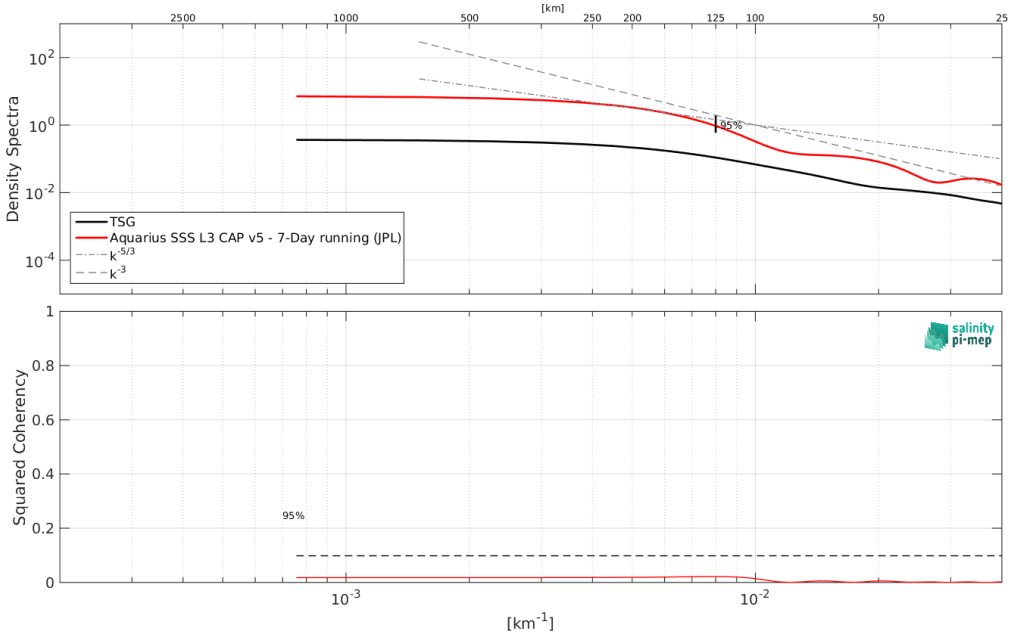

Figure 94: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l3-jpl-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l3-jpl-v5-7dr.nc.

4.15.5 Southern Ocean region

Figure 95 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

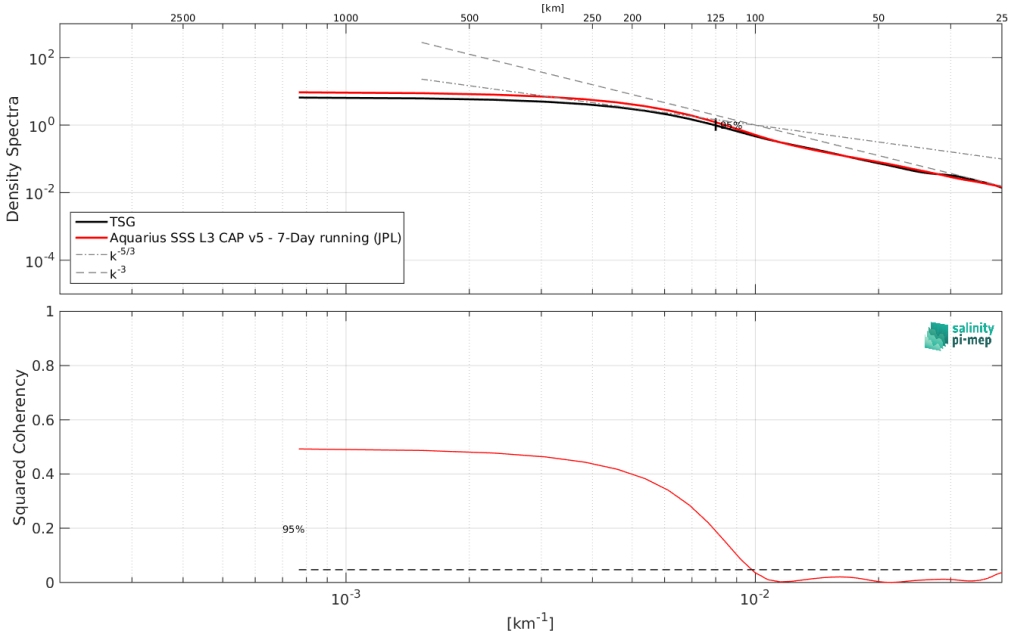

Figure 95: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l3-jpl-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l3-jpl-v5-7dr.nc.

4.15.6 Western Pacific region

Figure 96 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

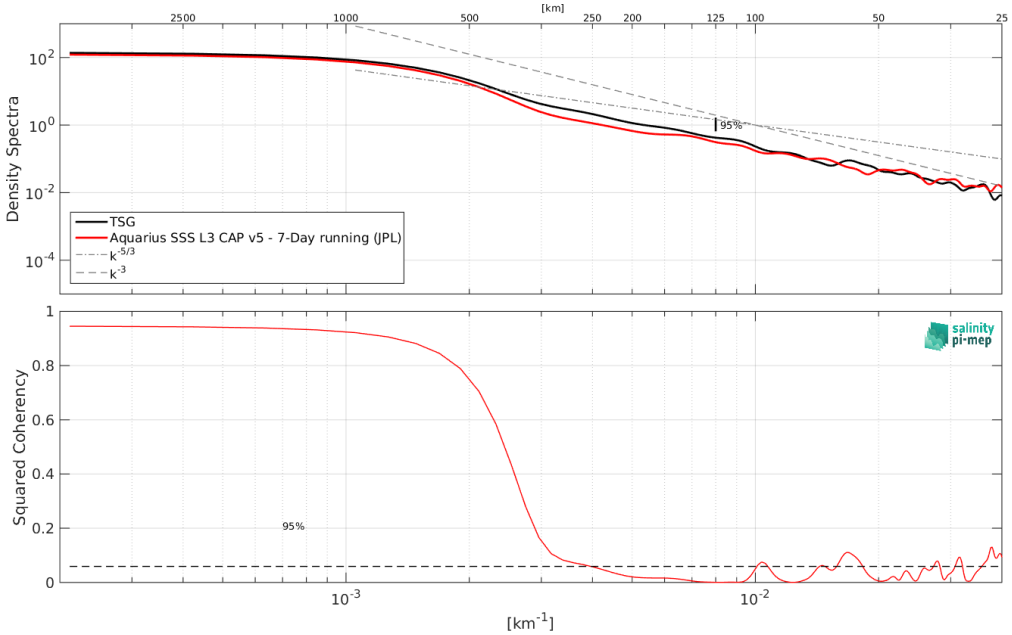

Figure 96: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - 7-Day running (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l3-jpl-v5-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l3-jpl-v5-7dr.nc.

4.16 Aquarius SSS L3 CAP v5 - Monthly (JPL)

4.16.1 North Atlantic region

Figure 97 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

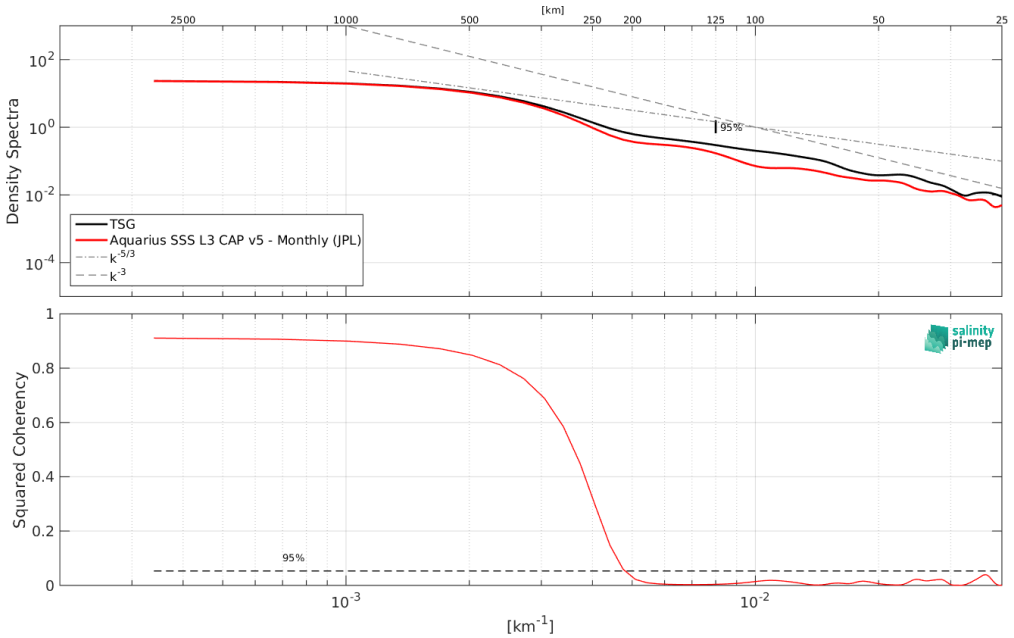

Figure 97: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l3-jpl-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l3-jpl-v5-1m.nc.

4.16.2 Topical Atlantic region

Figure 98 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

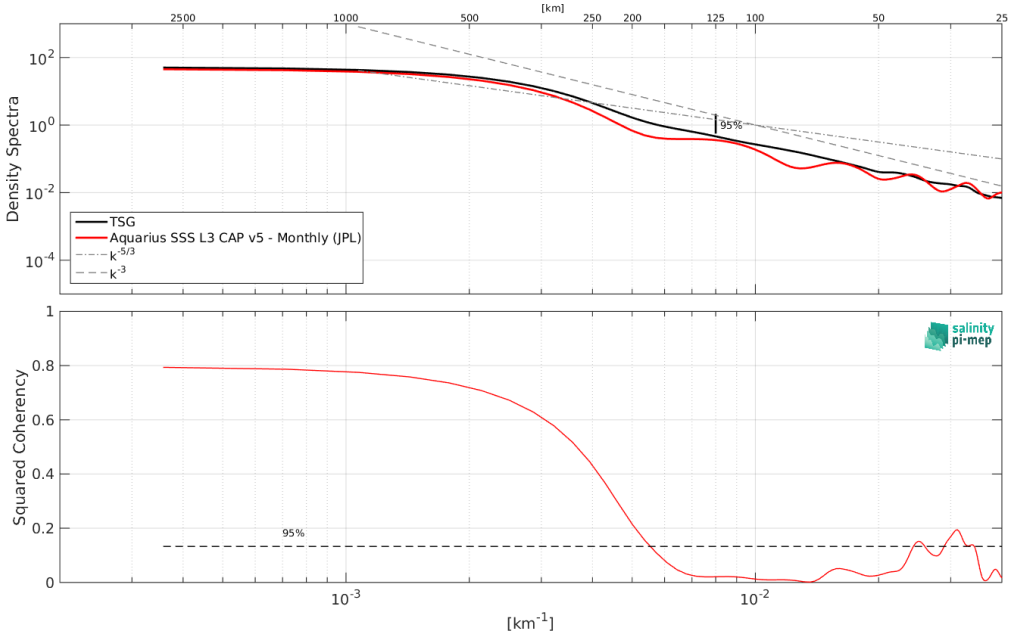

Figure 98: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l3-jpl-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l3-jpl-v5-1m.nc.

4.16.3 Tropical Pacific region

Figure 99 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

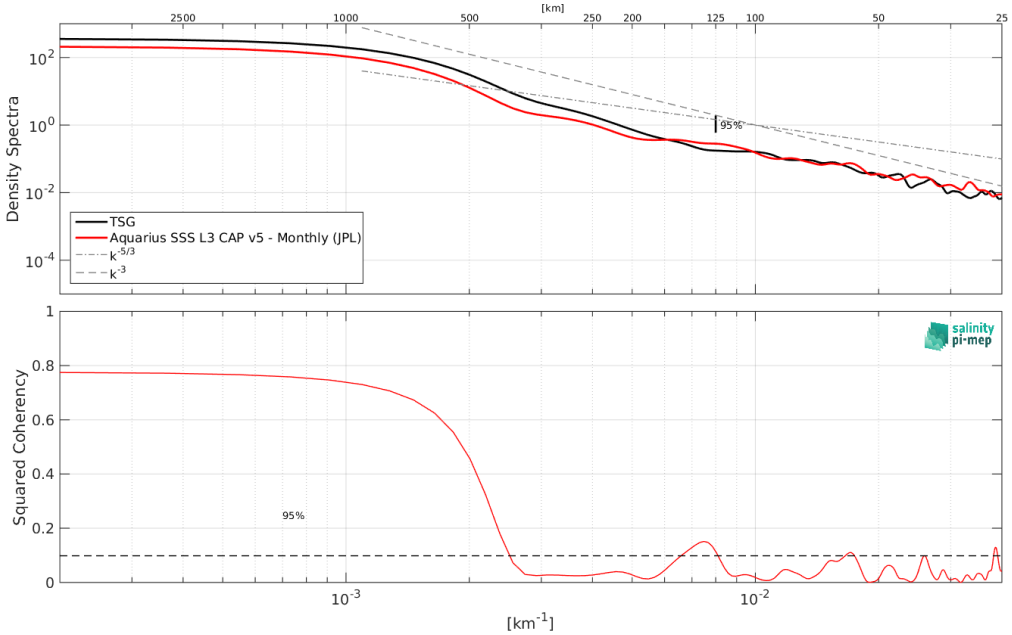

Figure 99: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l3-jpl-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l3-jpl-v5-1m.nc.

4.16.4 Arctic region

Figure 100 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

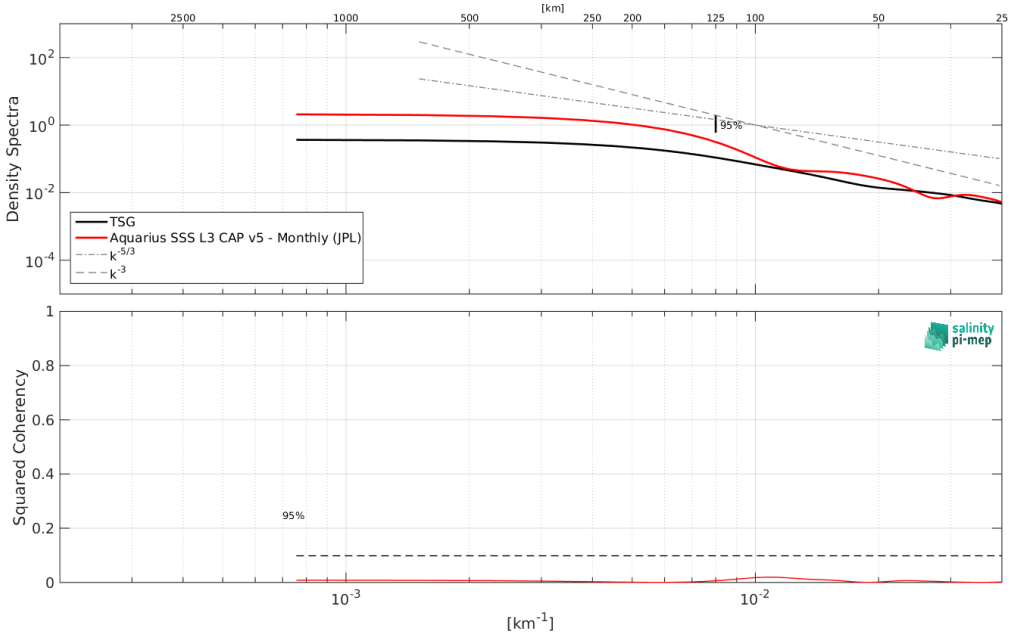

Figure 100: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l3-jpl-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l3-jpl-v5-1m.nc.

4.16.5 Southern Ocean region

Figure 101 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

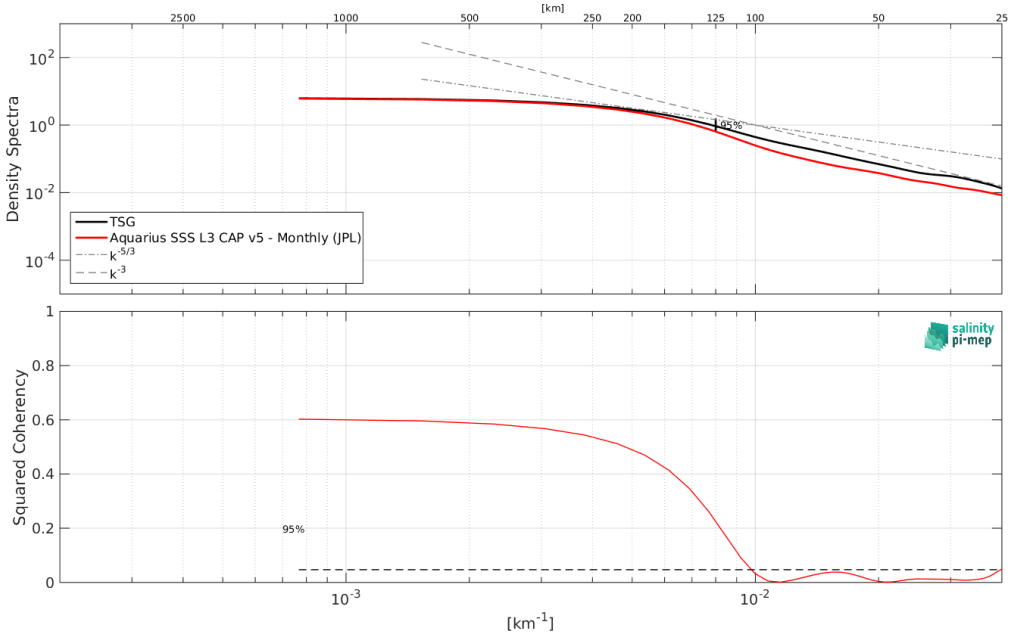

Figure 101: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l3-jpl-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l3-jpl-v5-1m.nc.

4.16.6 Western Pacific region

Figure 102 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

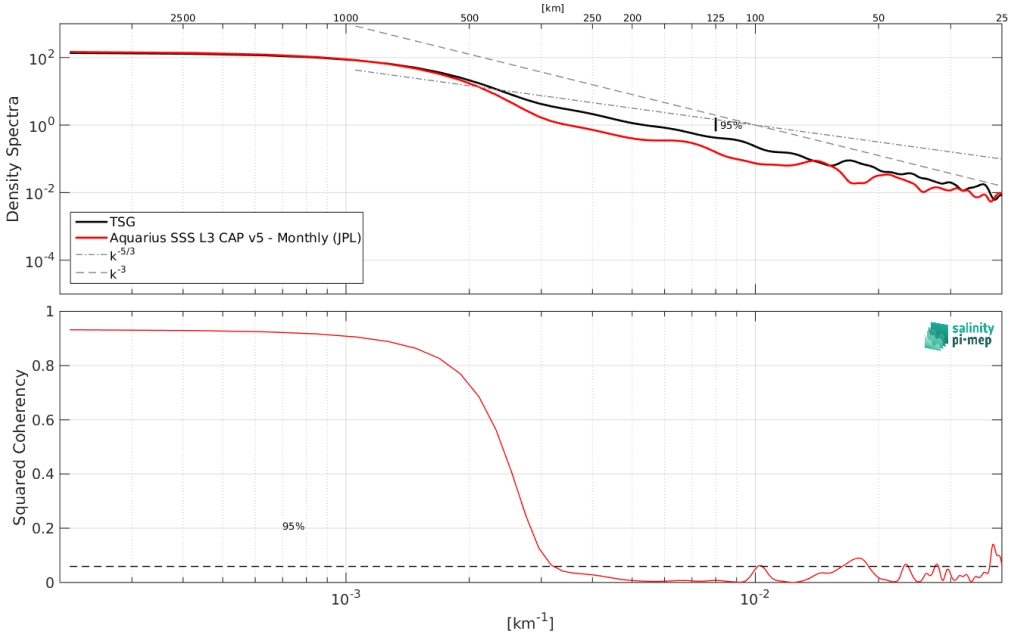

Figure 102: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L3 CAP v5 - Monthly (JPL) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l3-jpl-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l3-jpl-v5-1m.nc.

4.17 SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)

4.17.1 North Atlantic region

Figure 103 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

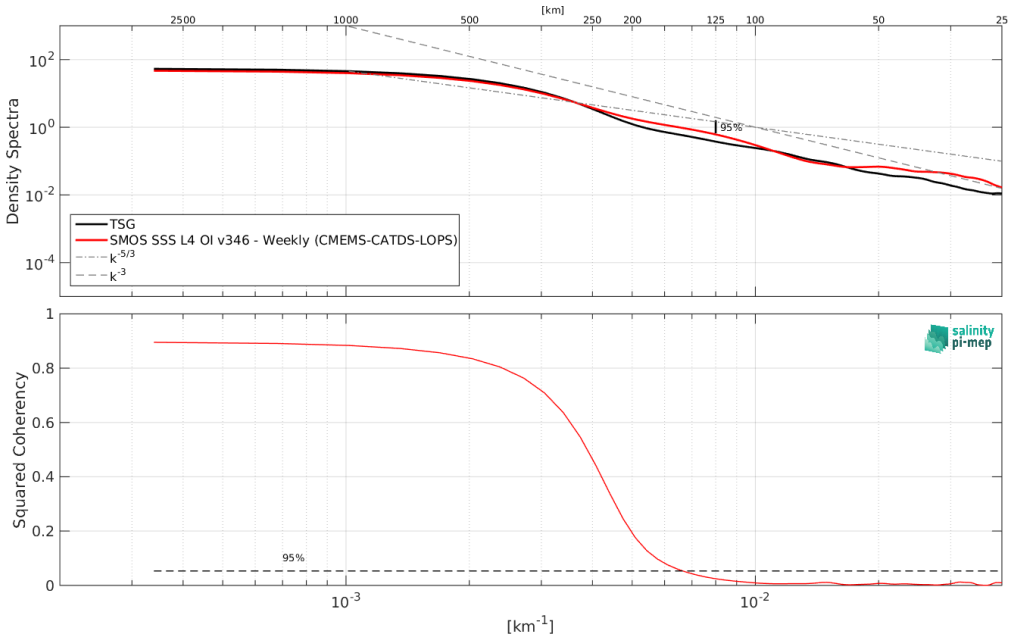

Figure 103: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l4-cmems-catds-lops-oi-v346-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l4-cmems-catds-lops-oi-v346-1w.nc.

4.17.2 Topical Atlantic region

Figure 104 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

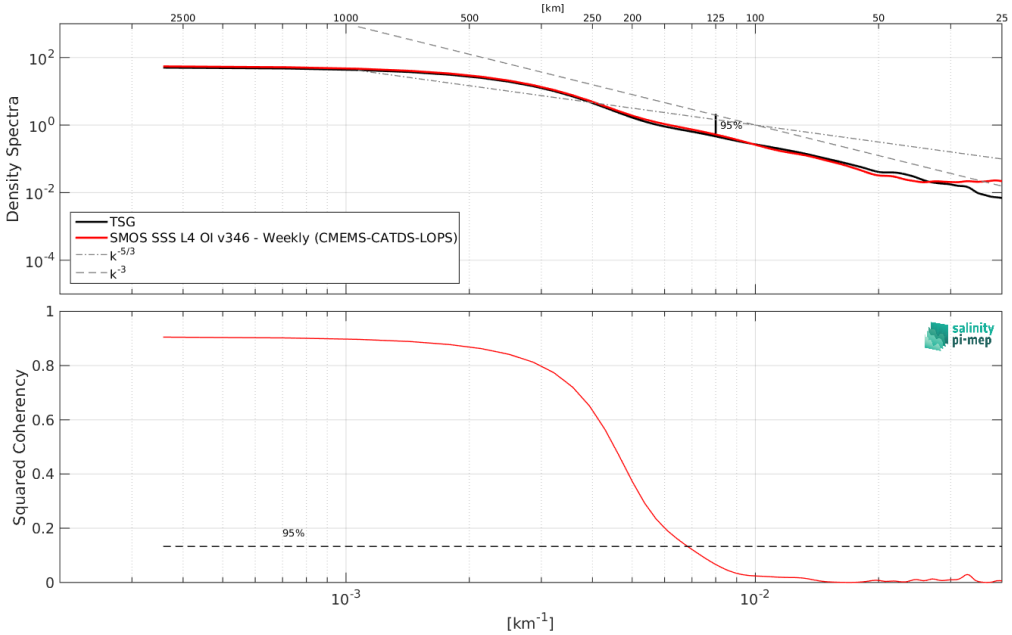

Figure 104: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l4-cmems-catds-lops-oi-v346-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l4-cmems-catds-lops-oi-v346-1w.nc.

4.17.3 Tropical Pacific region

Figure 105 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

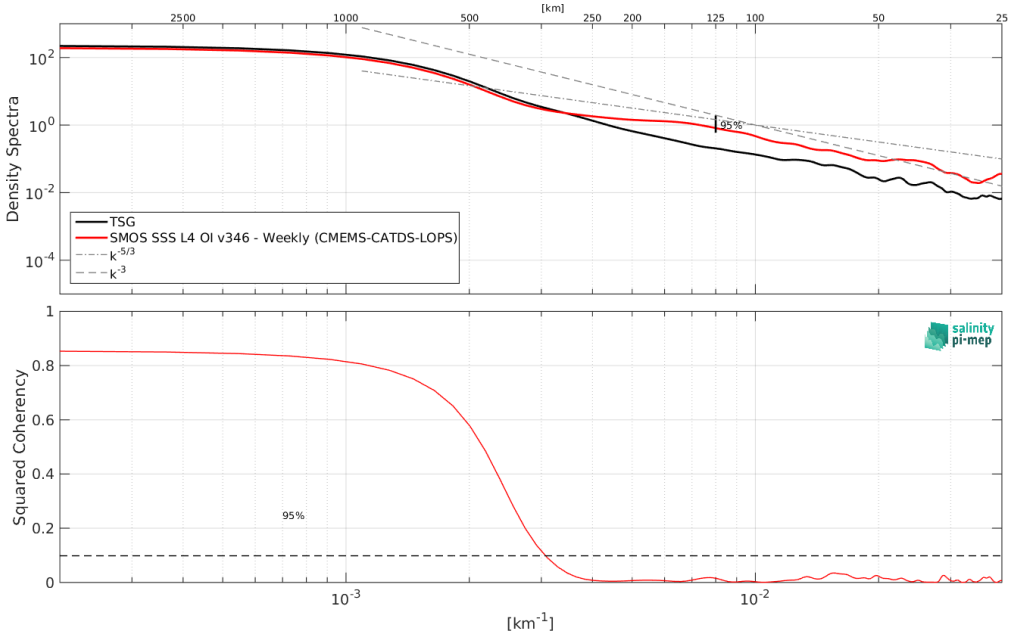

Figure 105: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l4-cmems-catds-lops-oi-v346-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l4-cmems-catds-lops-oi-v346-1w.nc.

4.17.4 Arctic region

Figure 106 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

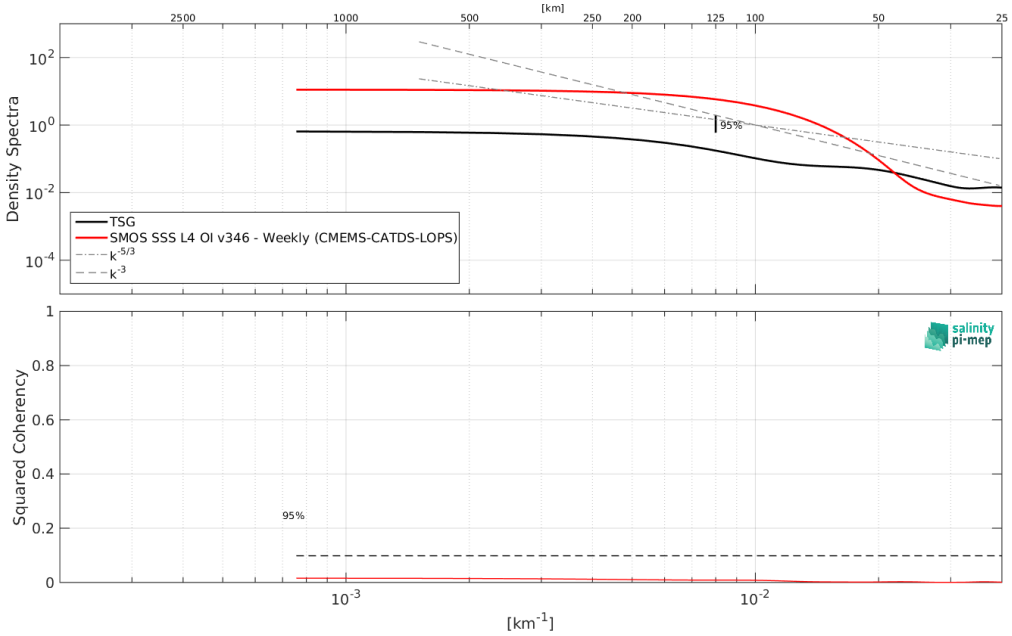

Figure 106: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l4-cmems-catds-lops-oi-v346-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l4-cmems-catds-lops-oi-v346-1w.nc.

4.17.5 Southern Ocean region

Figure 107 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

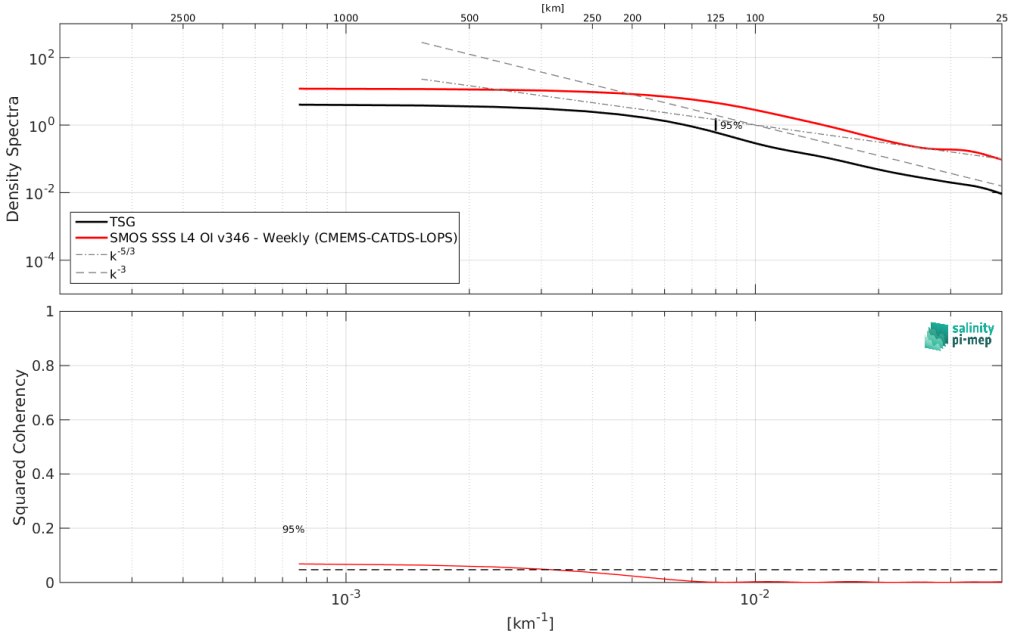

Figure 107: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l4-cmems-catds-lops-oi-v346-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l4-cmems-catds-lops-oi-v346-1w.nc.

4.17.6 Western Pacific region

Figure 108 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

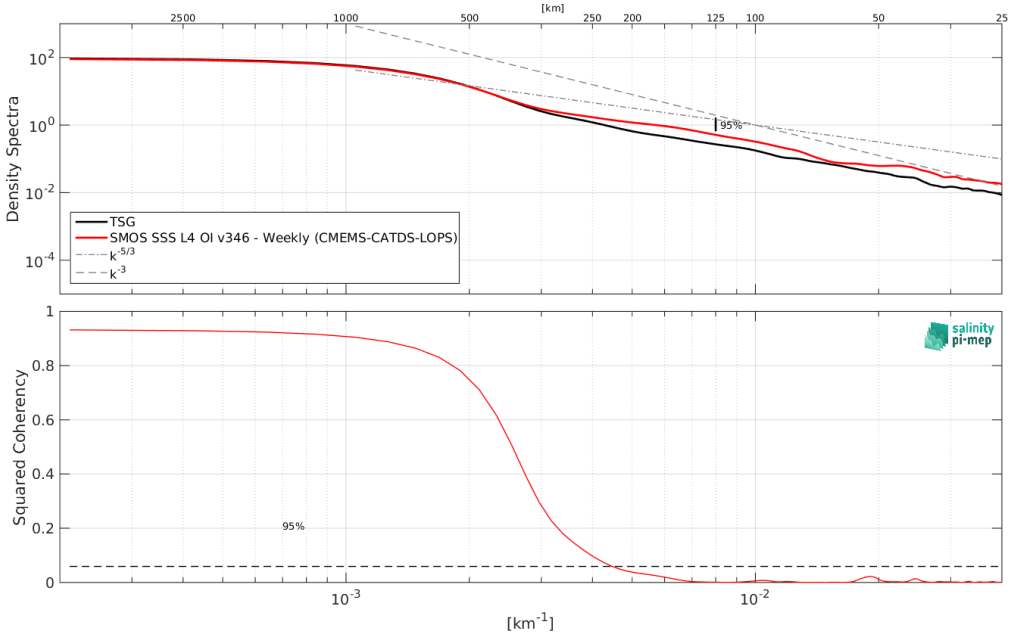

Figure 108: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l4-cmems-catds-lops-oi-v346-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l4-cmems-catds-lops-oi-v346-1w.nc.

4.18 SMOS SSS L4 v1 - Daily (CMEMS-CNR)

4.18.1 North Atlantic region

Figure 109 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

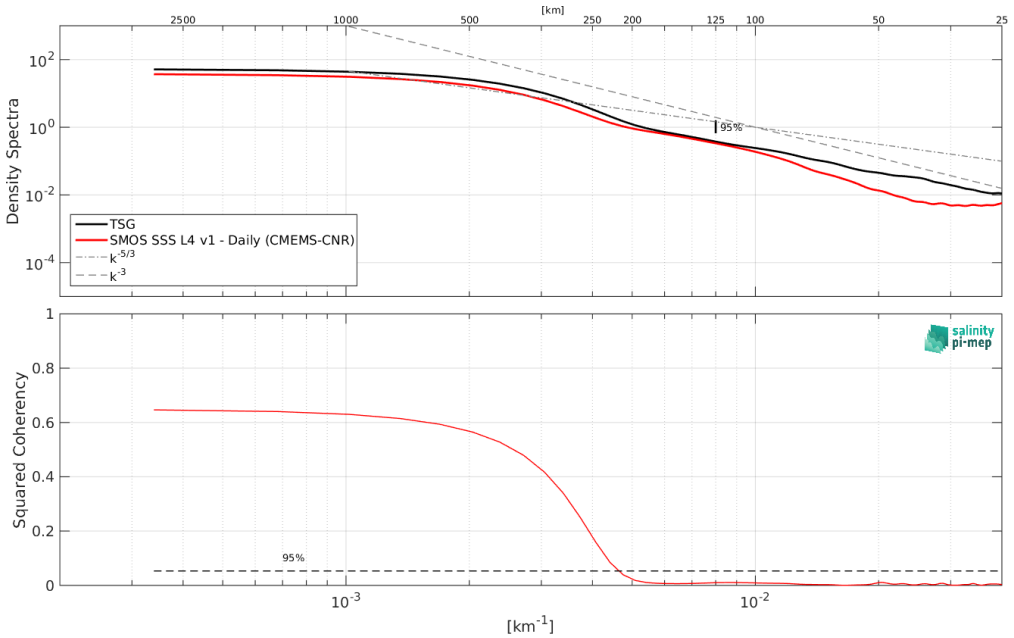

Figure 109: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l4-cmems-cnr-v1-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l4-cmems-cnr-v1-1d.nc.

4.18.2 Topical Atlantic region

Figure 110 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

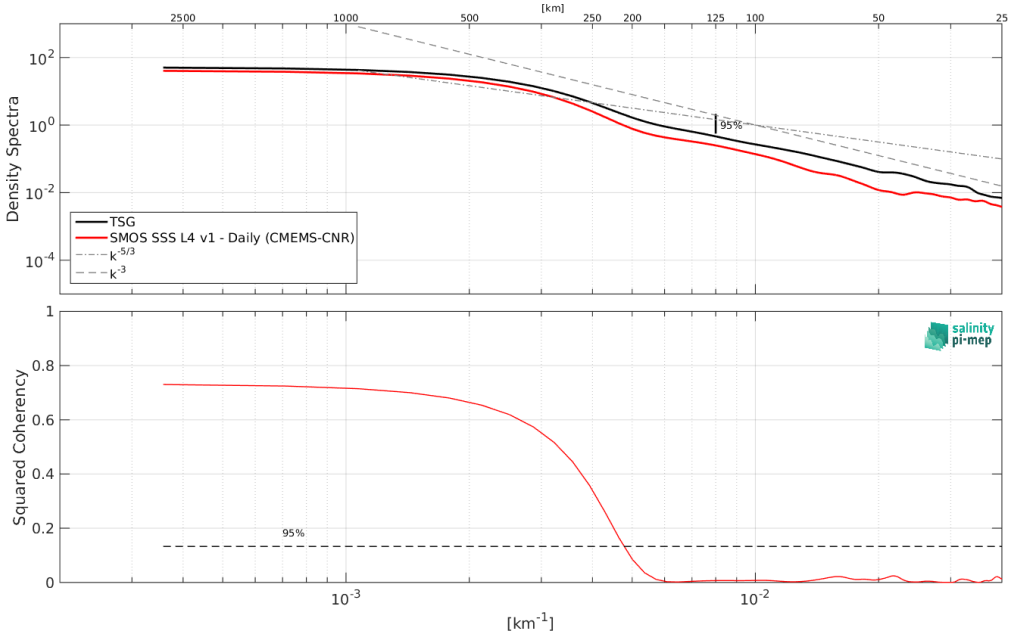

Figure 110: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l4-cmems-cnr-v1-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l4-cmems-cnr-v1-1d.nc.

4.18.3 Tropical Pacific region

Figure 111 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

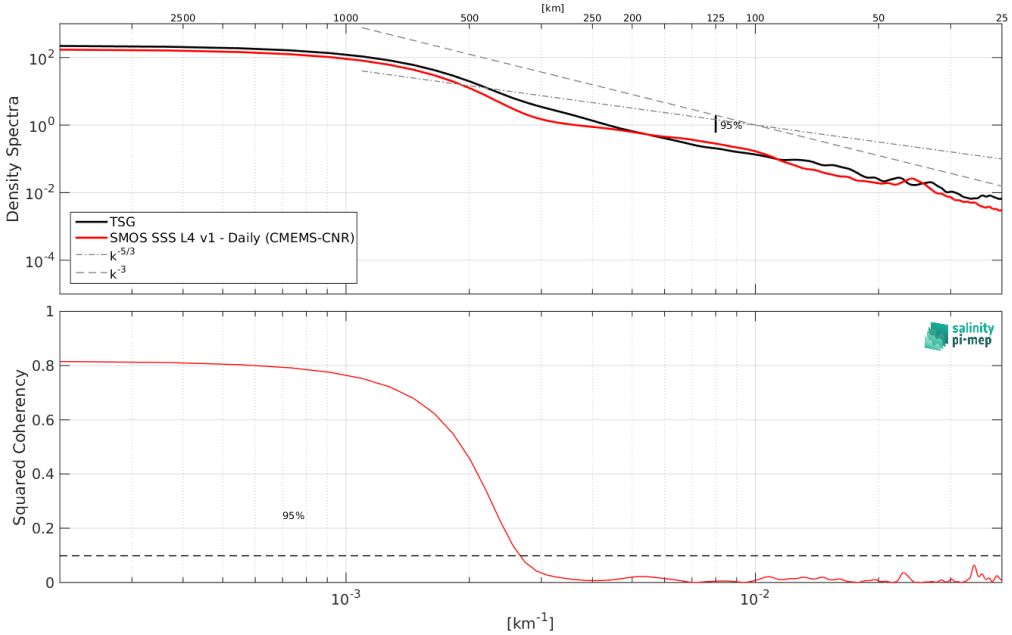

Figure 111: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l4-cmems-cnr-v1-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l4-cmems-cnr-v1-1d.nc.

4.18.4 Arctic region

Figure 112 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

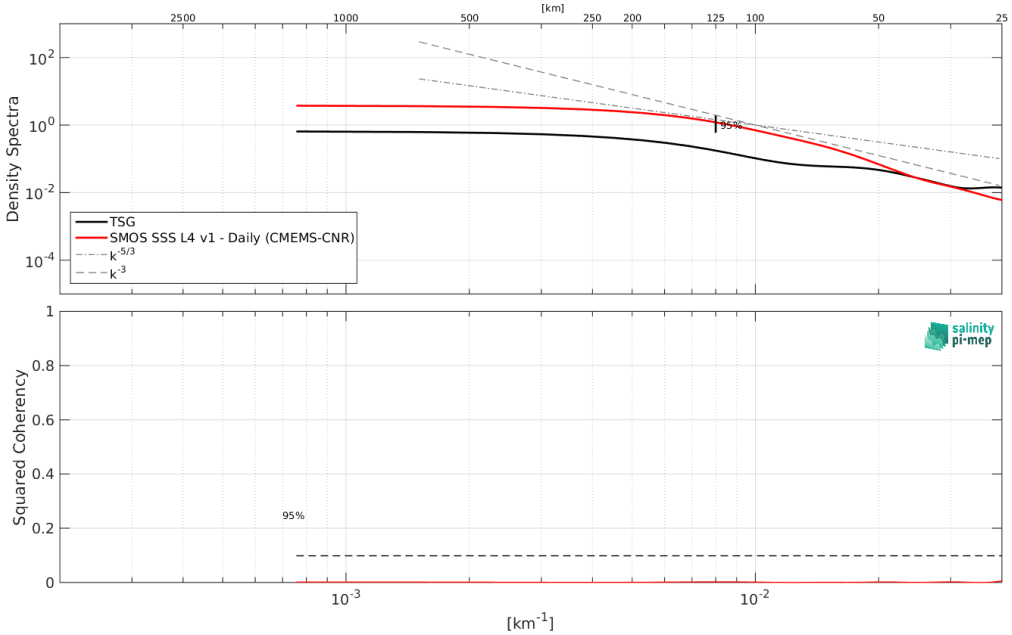

Figure 112: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l4-cmems-cnr-v1-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l4-cmems-cnr-v1-1d.nc.

4.18.5 Southern Ocean region

Figure 113 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

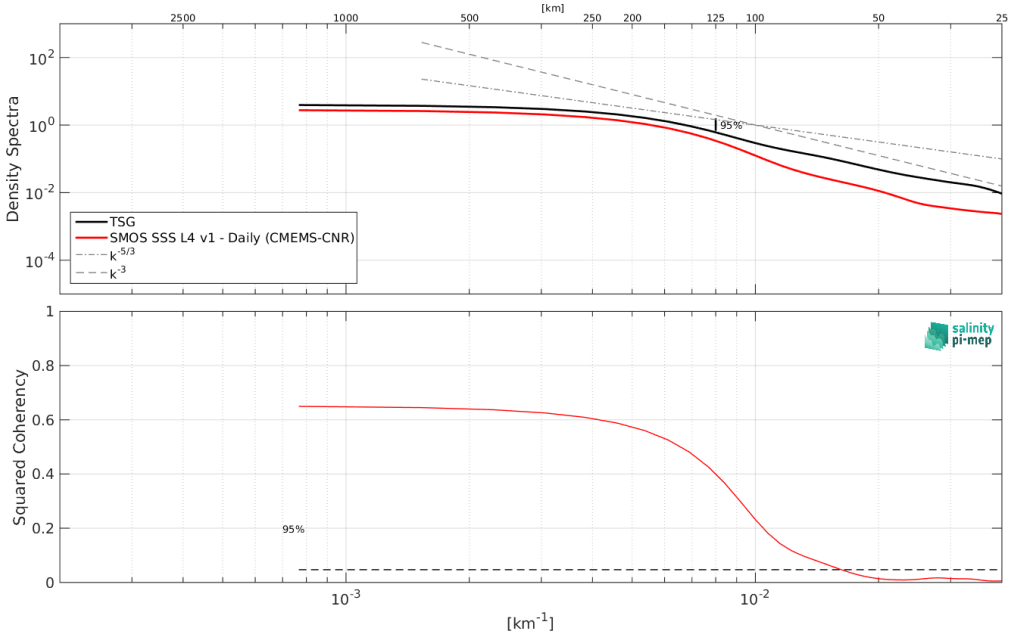

Figure 113: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l4-cmems-cnr-v1-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l4-cmems-cnr-v1-1d.nc.

4.18.6 Western Pacific region

Figure 114 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

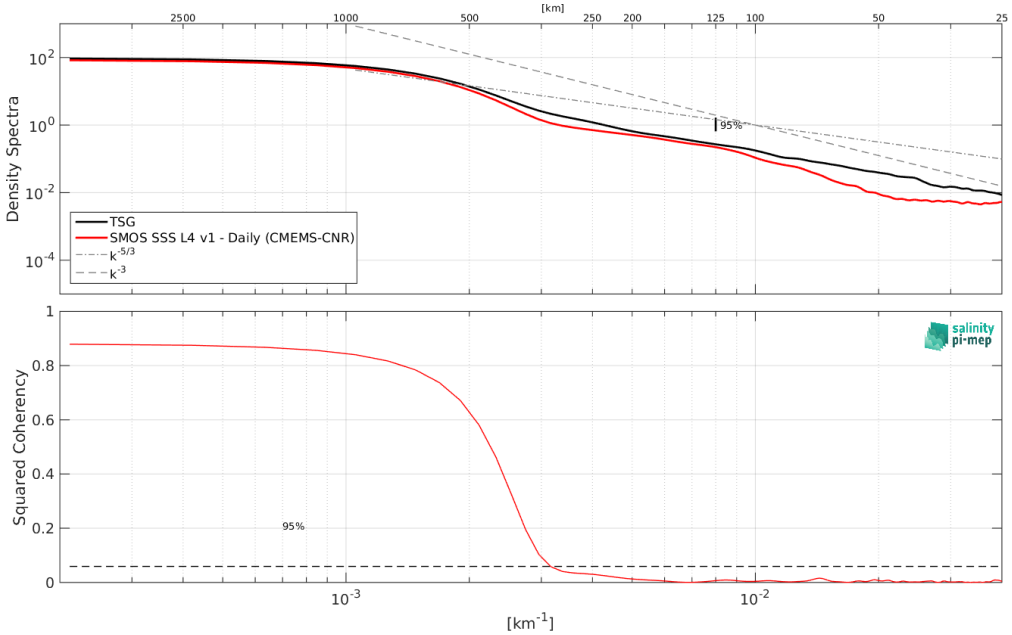

Figure 114: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Daily (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l4-cmems-cnr-v1-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l4-cmems-cnr-v1-1d.nc.

4.19 SMOS SSS L4 v1 - Monthly (CMEMS-CNR)

4.19.1 North Atlantic region

Figure 115 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

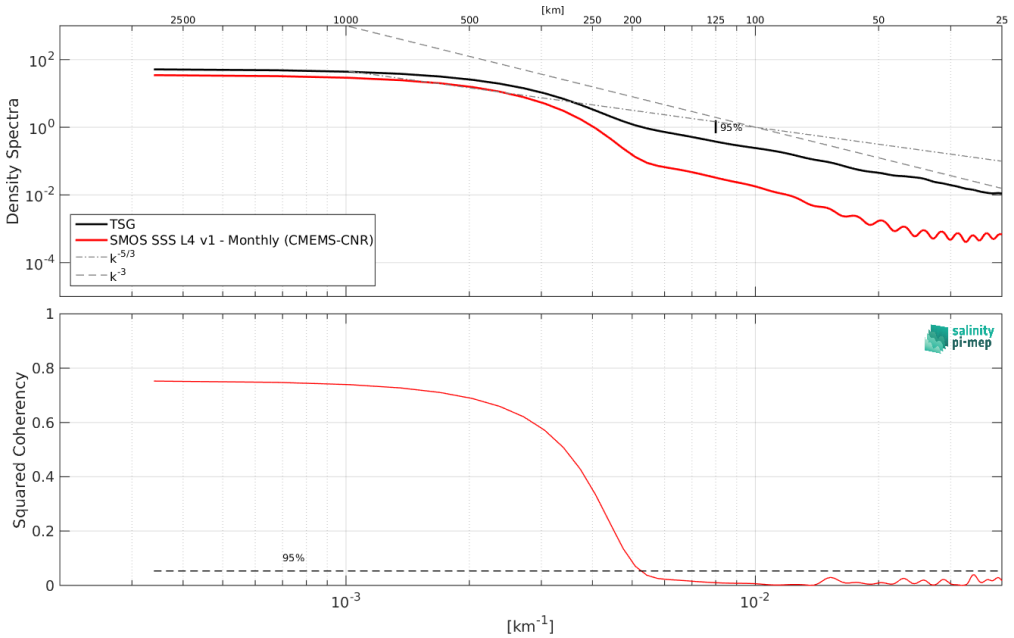

Figure 115: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smos-l4-cmems-cnr-v1-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smos-l4-cmems-cnr-v1-1m.nc.

4.19.2 Topical Atlantic region

Figure 116 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

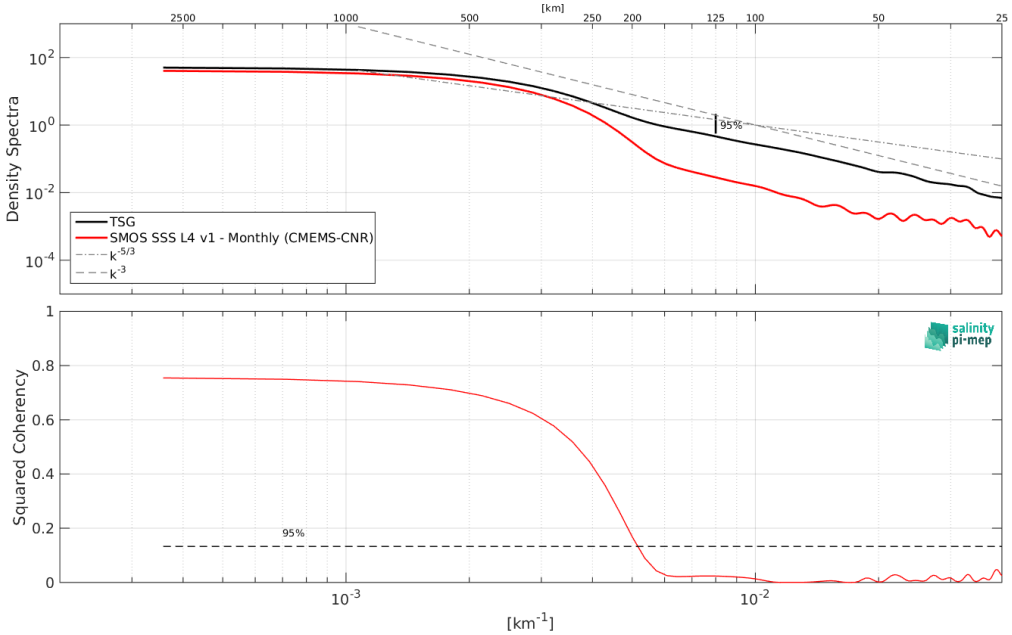

Figure 116: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smos-l4-cmems-cnr-v1-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smos-l4-cmems-cnr-v1-1m.nc.

4.19.3 Tropical Pacific region

Figure 117 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

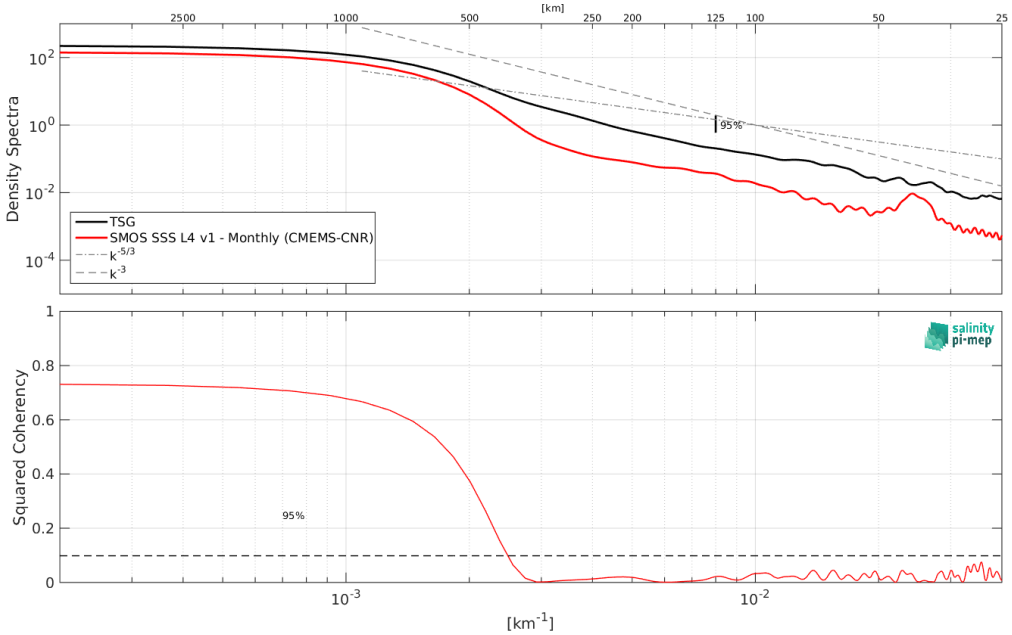

Figure 117: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smos-l4-cmems-cnr-v1-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smos-l4-cmems-cnr-v1-1m.nc.

4.19.4 Arctic region

Figure 118 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

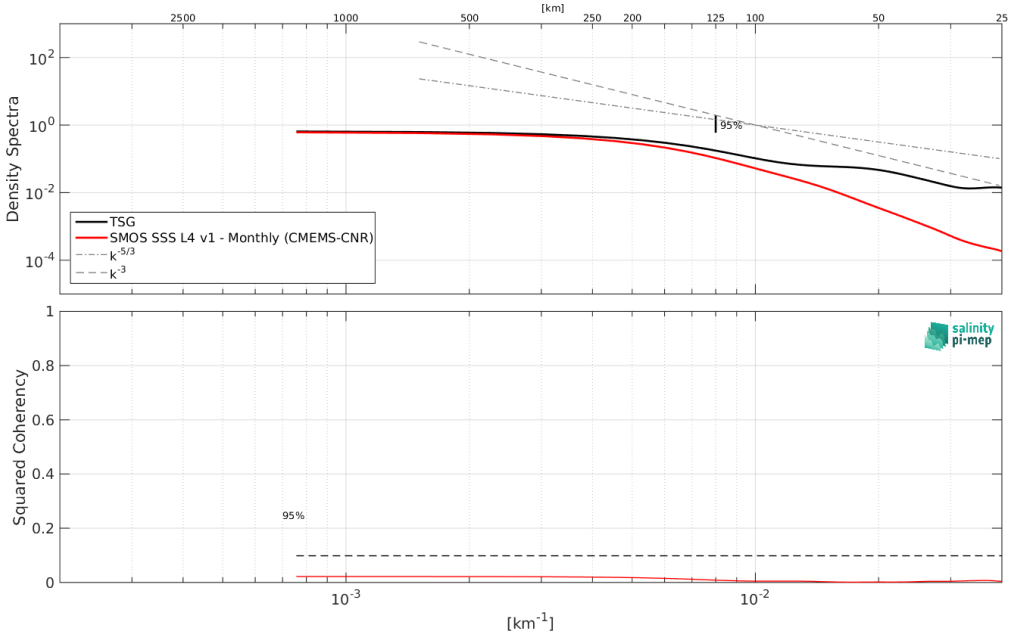

Figure 118: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smos-l4-cmems-cnr-v1-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smos-l4-cmems-cnr-v1-1m.nc.

4.19.5 Southern Ocean region

Figure 119 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

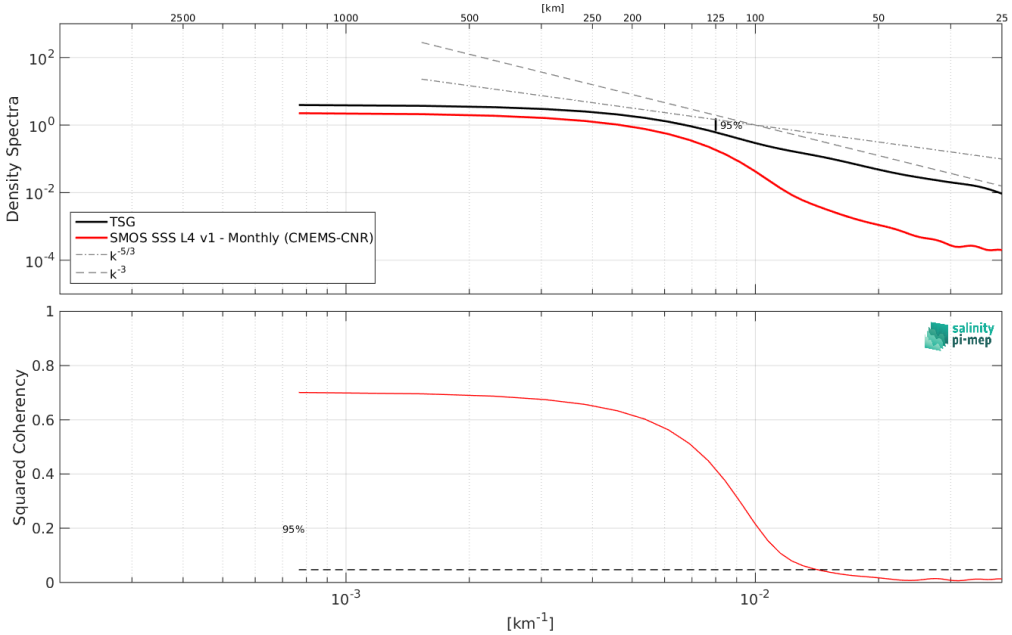

Figure 119: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smos-l4-cmems-cnr-v1-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smos-l4-cmems-cnr-v1-1m.nc.

4.19.6 Western Pacific region

Figure 120 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

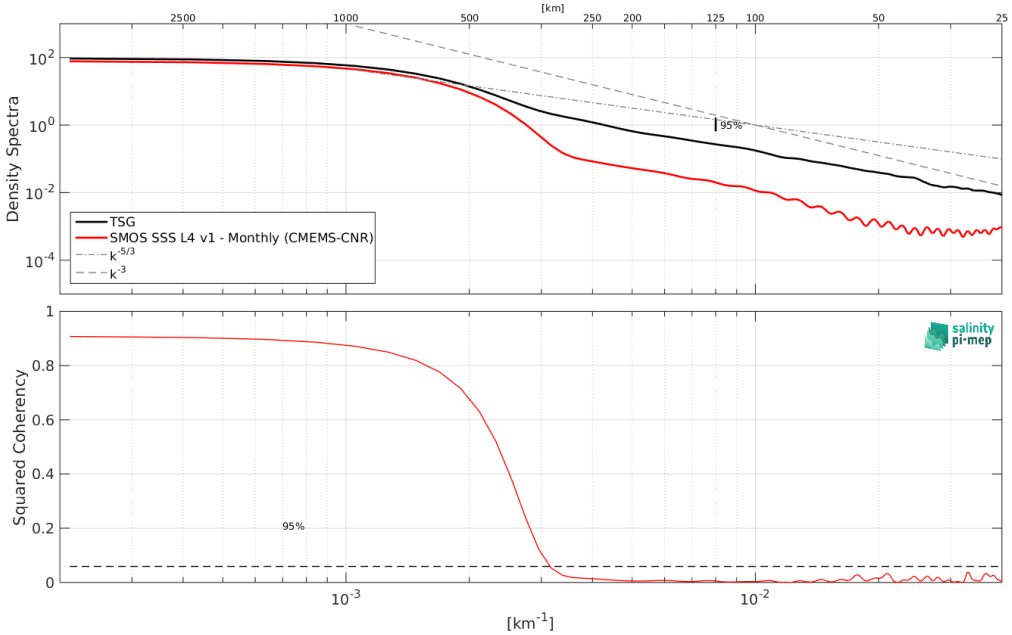

Figure 120: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMOS SSS L4 v1 - Monthly (CMEMS-CNR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smos-l4-cmems-cnr-v1-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smos-l4-cmems-cnr-v1-1m.nc.

4.20 CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)

4.20.1 North Atlantic region

Figure 121 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

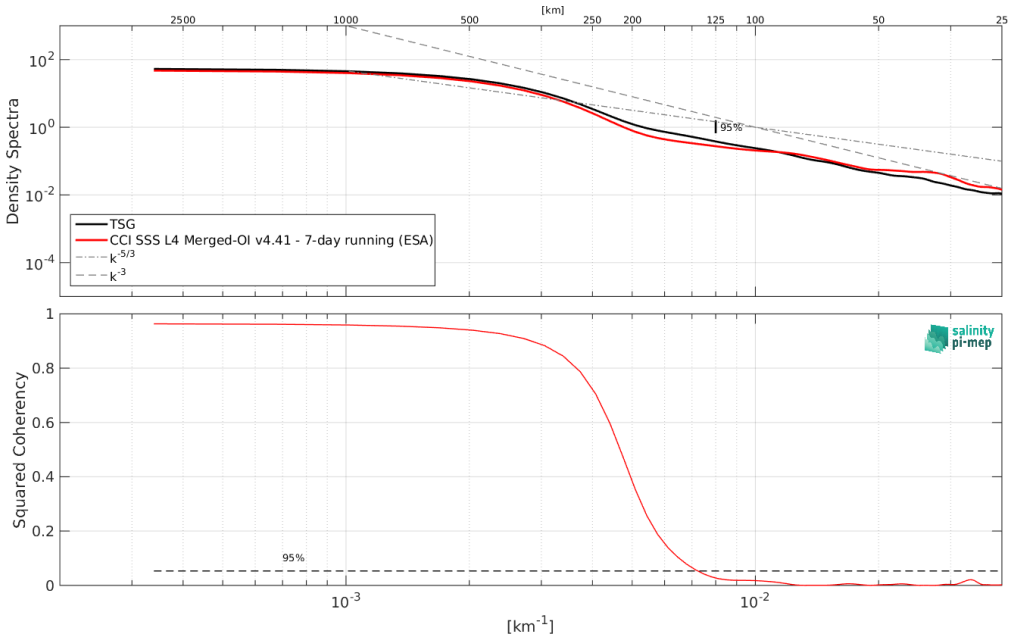

Figure 121: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_cci-l4-esa-merged-oi-v4.41-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_cci-l4-esa-merged-oi-v4.41-7dr.nc.

4.20.2 Topical Atlantic region

Figure 122 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

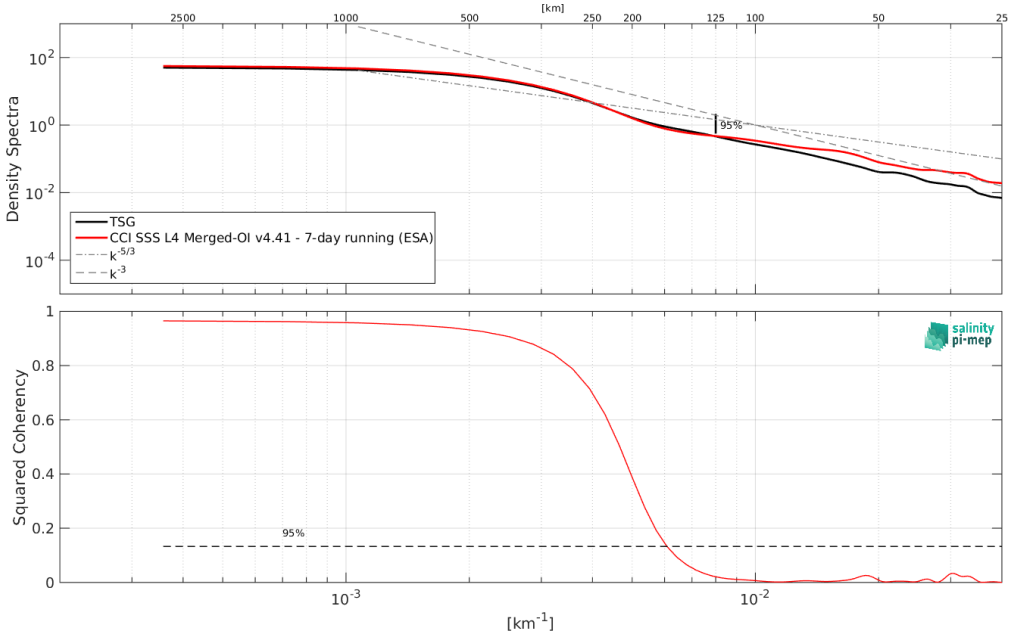

Figure 122: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_cci-l4-esa-merged-oi-v4.41-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_cci-l4-esa-merged-oi-v4.41-7dr.nc.

4.20.3 Tropical Pacific region

Figure 123 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

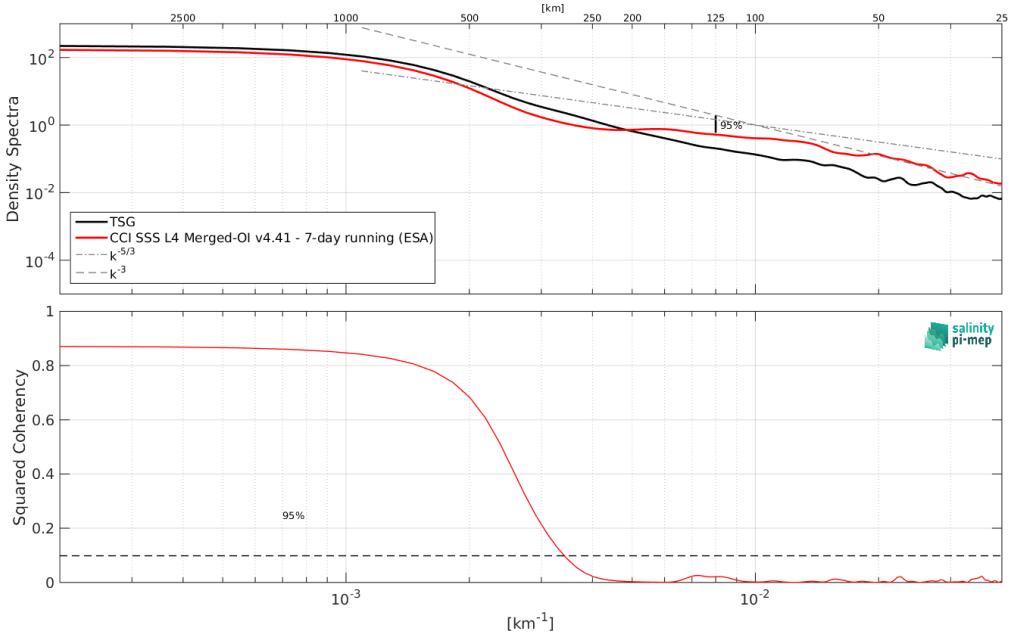

Figure 123: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_cci-l4-esa-merged-oi-v4.41-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_cci-l4-esa-merged-oi-v4.41-7dr.nc.

4.20.4 Arctic region

Figure 124 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

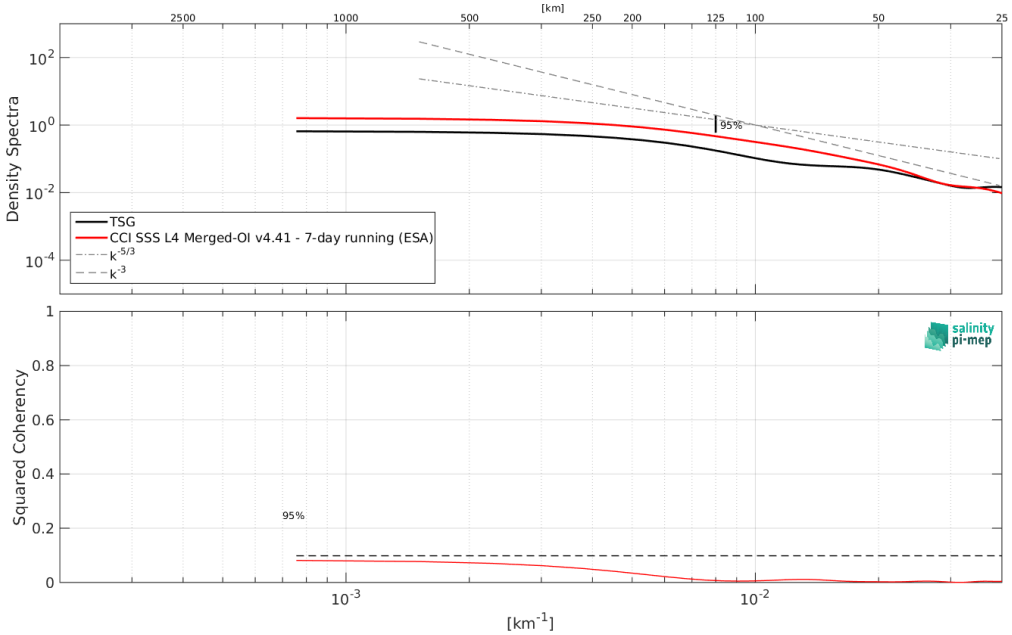

Figure 124: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_cci-l4-esa-merged-oi-v4.41-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_cci-l4-esa-merged-oi-v4.41-7dr.nc.

4.20.5 Southern Ocean region

Figure 125 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

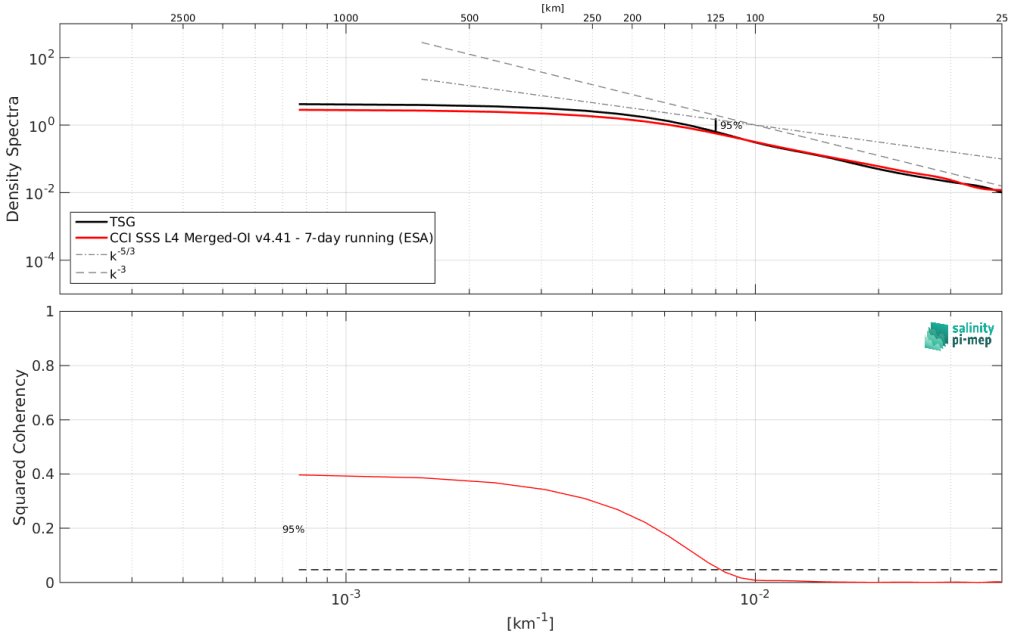

Figure 125: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_cci-l4-esa-merged-oi-v4.41-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_cci-l4-esa-merged-oi-v4.41-7dr.nc.

4.20.6 Western Pacific region

Figure 126 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

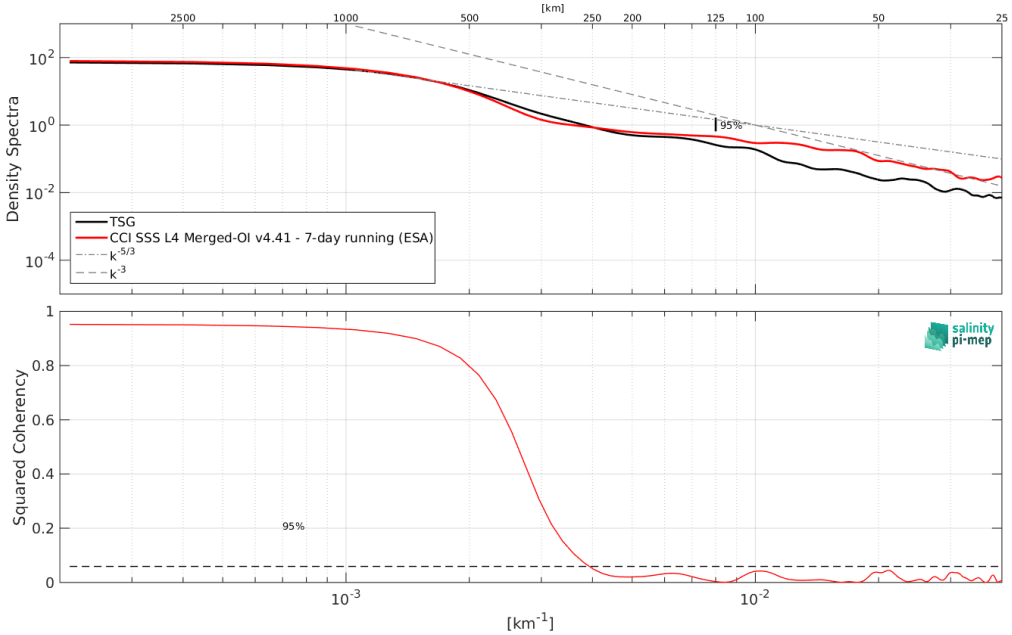

Figure 126: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_cci-l4-esa-merged-oi-v4.41-7dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_cci-l4-esa-merged-oi-v4.41-7dr.nc.

4.21 CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)

4.21.1 North Atlantic region

Figure 127 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

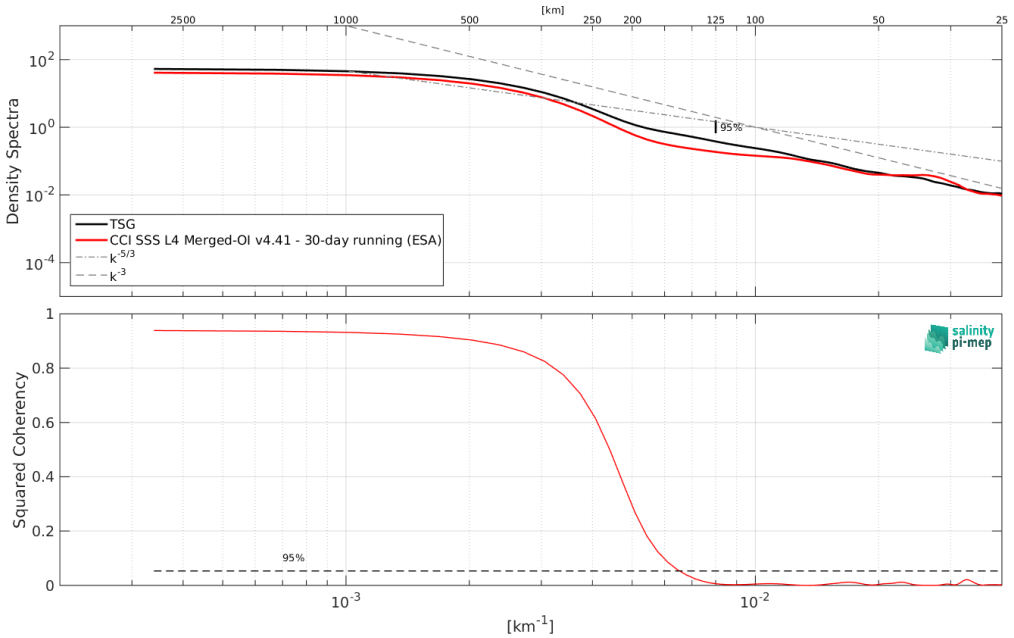

Figure 127: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_cci-l4-esa-merged-oi-v4.41-30dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_cci-l4-esa-merged-oi-v4.41-30dr.nc.

4.21.2 Topical Atlantic region

Figure 128 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

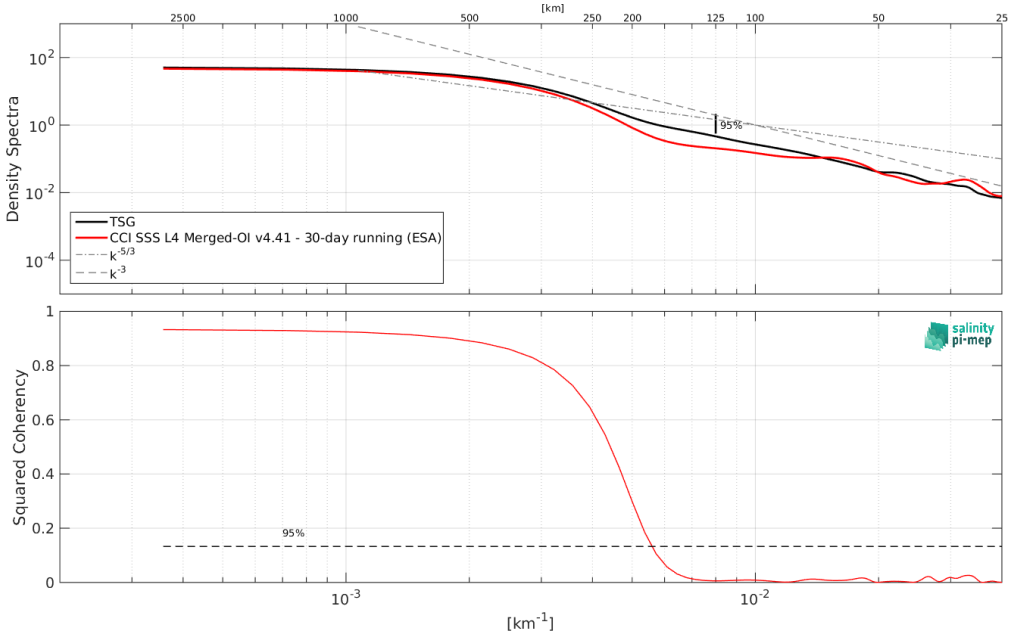

Figure 128: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_cci-l4-esa-merged-oi-v4.41-30dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_cci-l4-esa-merged-oi-v4.41-30dr.nc.

4.21.3 Tropical Pacific region

Figure 129 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

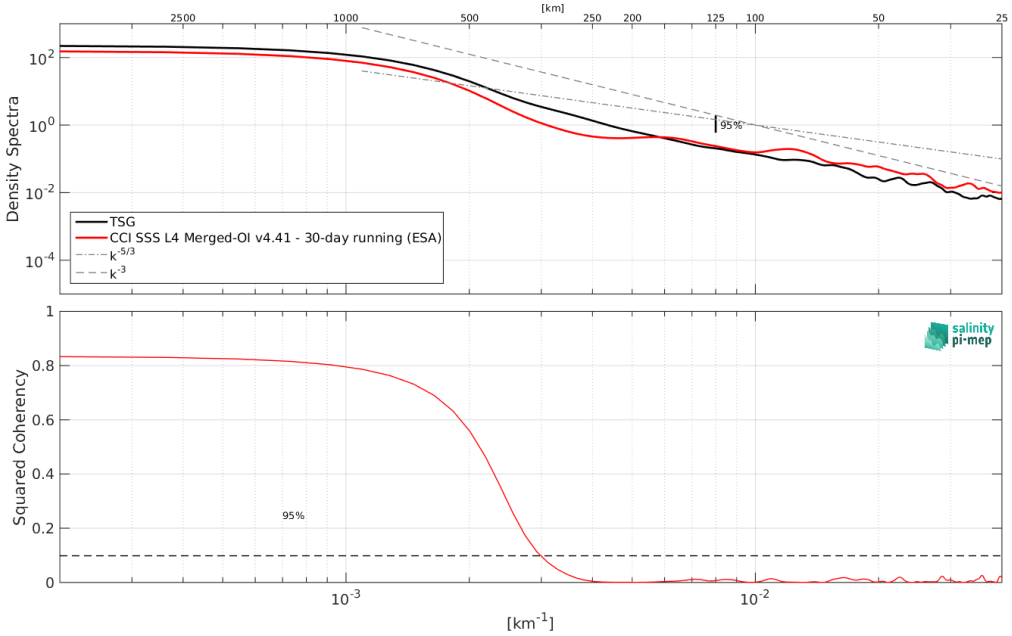

Figure 129: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_cci-l4-esa-merged-oi-v4.41-30dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_cci-l4-esa-merged-oi-v4.41-30dr.nc.

4.21.4 Arctic region

Figure 130 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

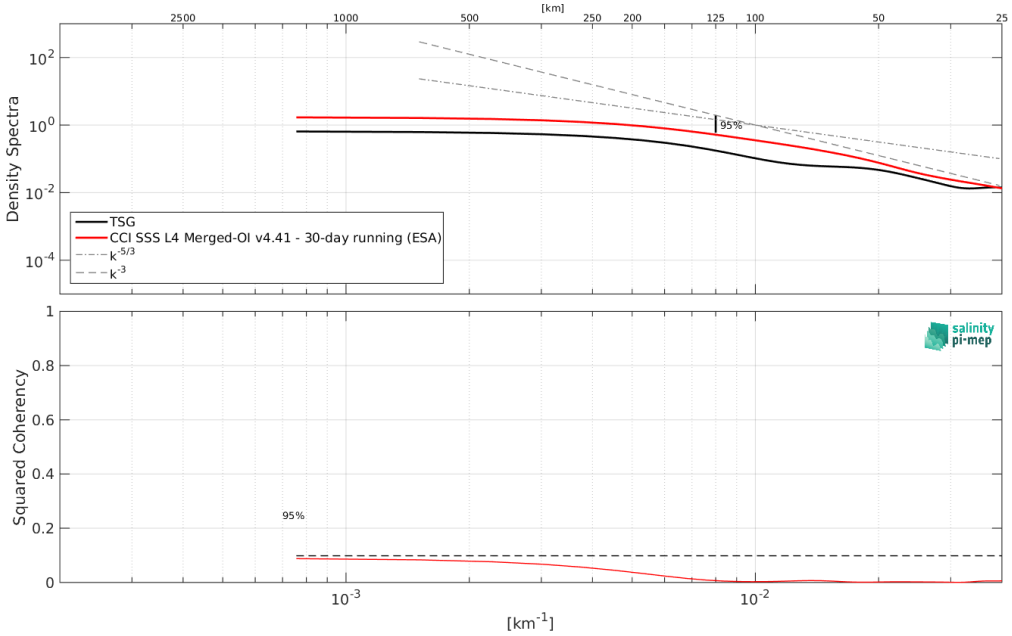

Figure 130: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_cci-l4-esa-merged-oi-v4.41-30dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_cci-l4-esa-merged-oi-v4.41-30dr.nc.

4.21.5 Southern Ocean region

Figure 131 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

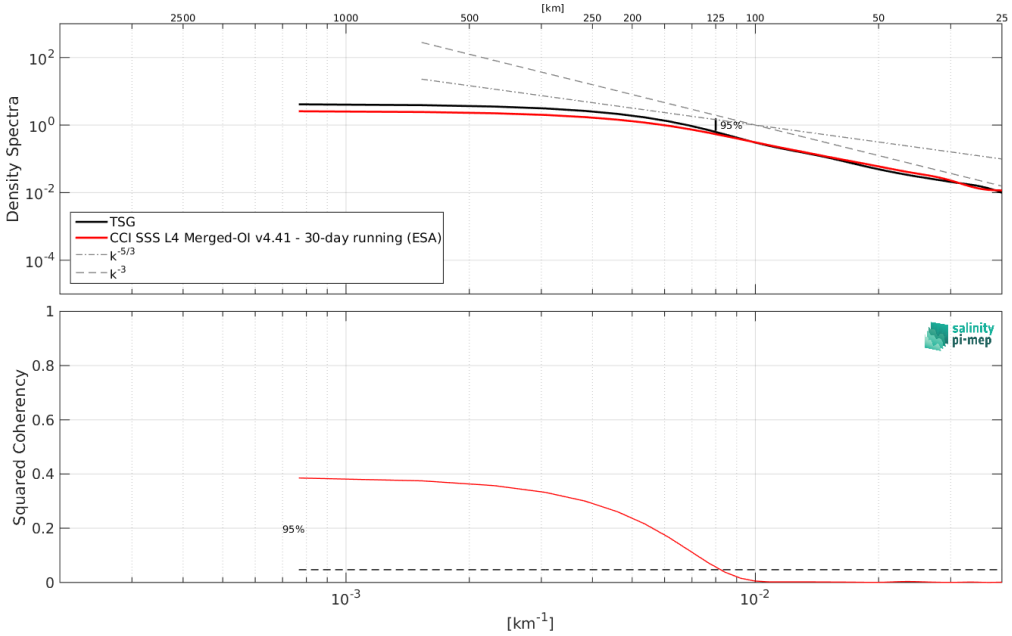

Figure 131: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_cci-l4-esa-merged-oi-v4.41-30dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_cci-l4-esa-merged-oi-v4.41-30dr.nc.

4.21.6 Western Pacific region

Figure 132 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

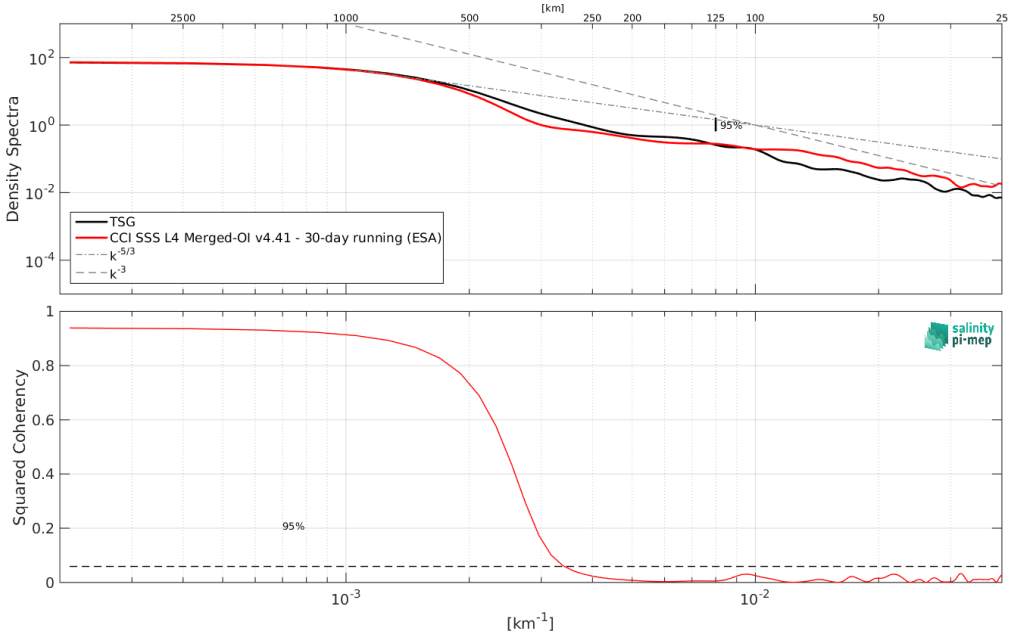

Figure 132: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_cci-l4-esa-merged-oi-v4.41-30dr.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_cci-l4-esa-merged-oi-v4.41-30dr.nc.

4.22 SMAP SSS L4 OI v3 - Daily (ESR)

4.22.1 North Atlantic region

Figure 133 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

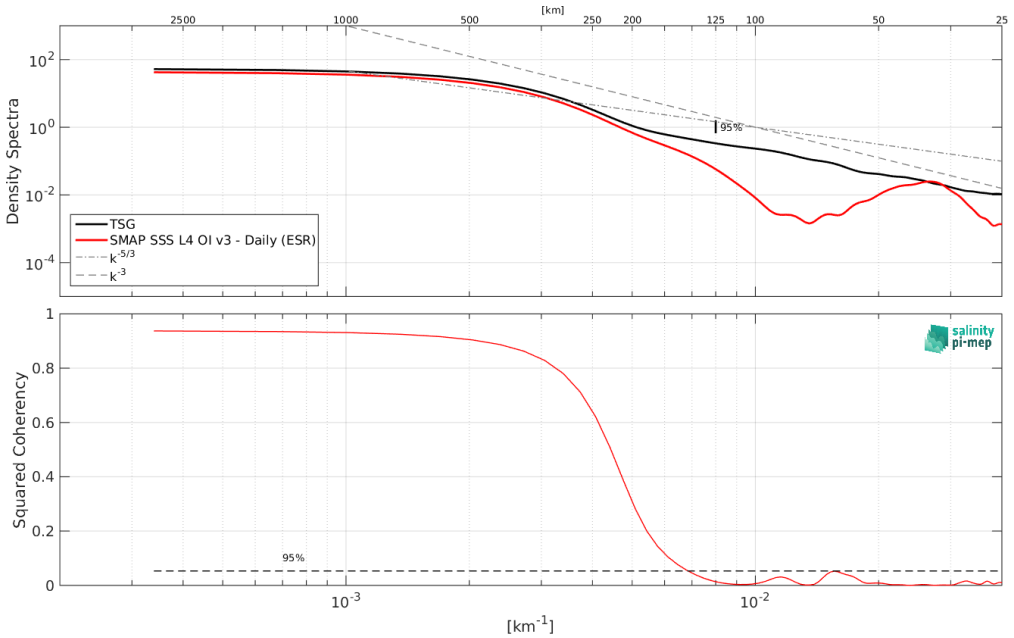

Figure 133: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smap-l4-esr-oi-v3-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smap-l4-esr-oi-v3-1d.nc.

4.22.2 Topical Atlantic region

Figure 134 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

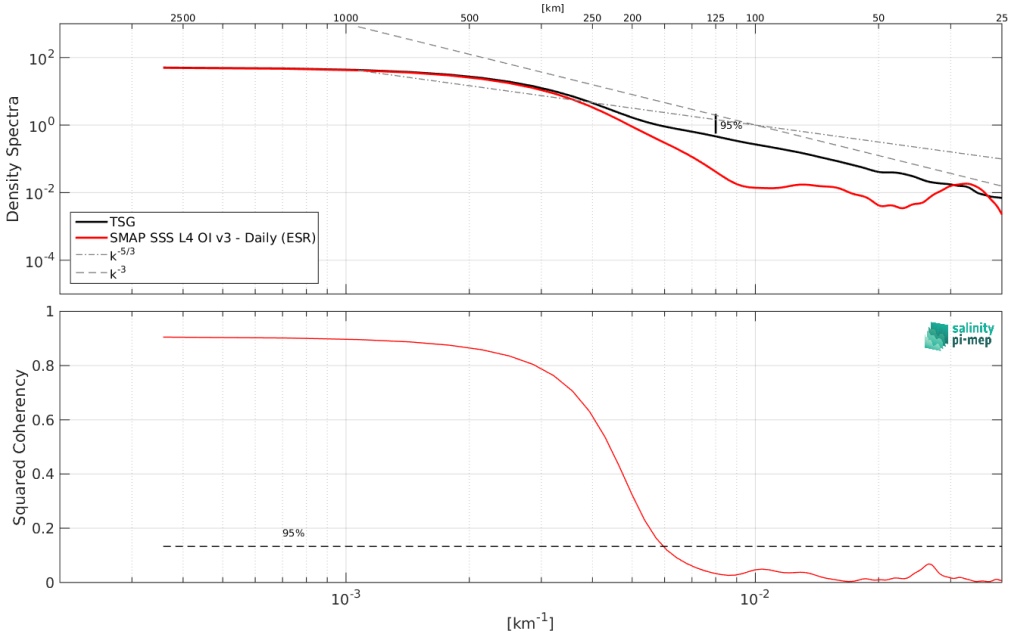

Figure 134: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smap-l4-esr-oi-v3-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smap-l4-esr-oi-v3-1d.nc.

4.22.3 Tropical Pacific region

Figure 135 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

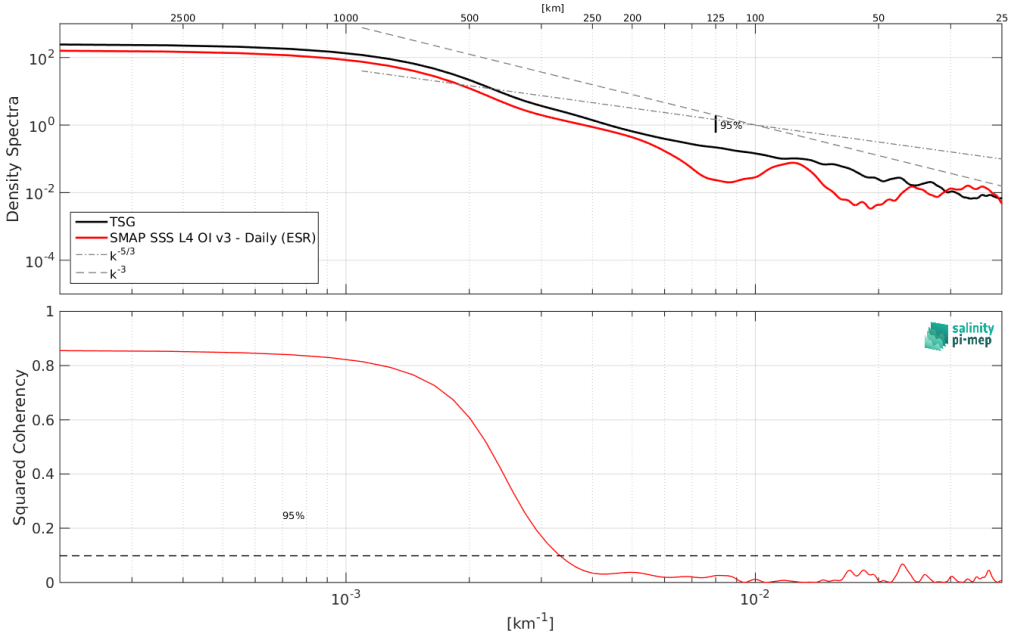

Figure 135: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smap-l4-esr-oi-v3-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smap-l4-esr-oi-v3-1d.nc.

4.22.4 Arctic region

Figure 136 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

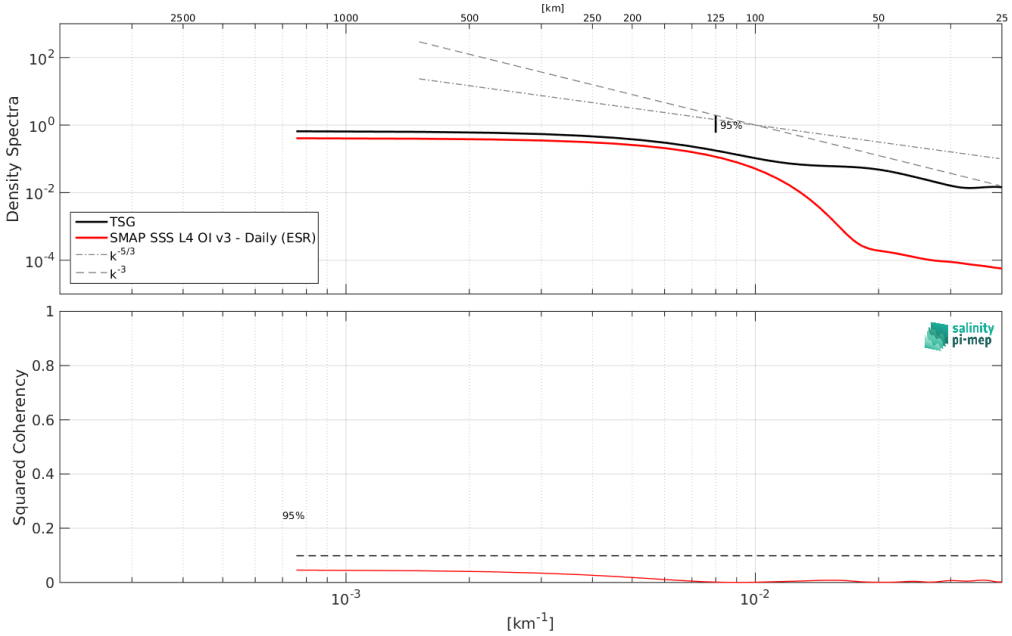

Figure 136: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smap-l4-esr-oi-v3-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smap-l4-esr-oi-v3-1d.nc.

4.22.5 Southern Ocean region

Figure 137 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

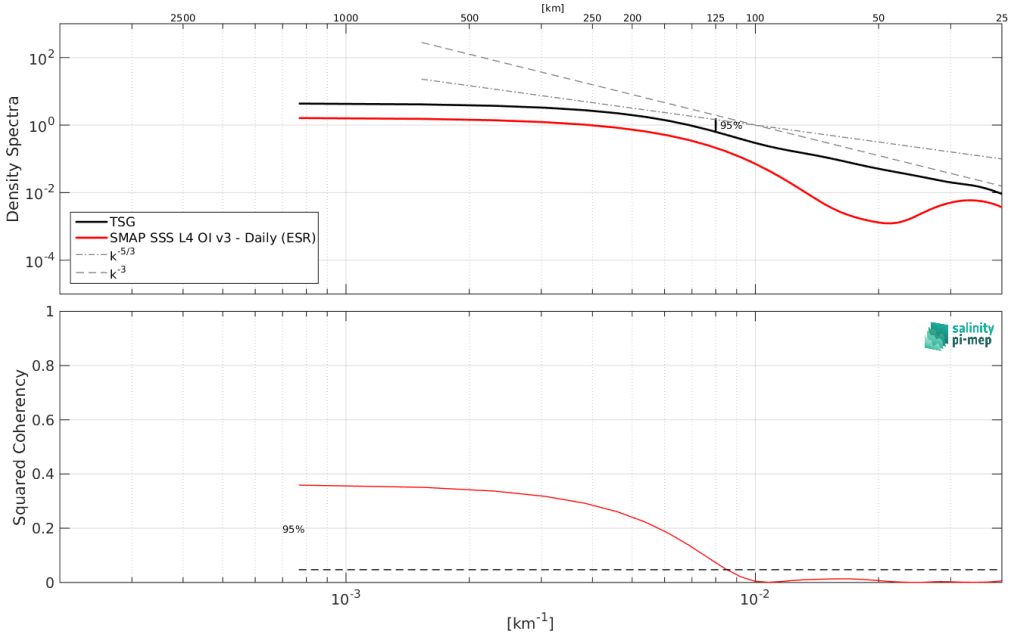

Figure 137: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smap-l4-esr-oi-v3-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smap-l4-esr-oi-v3-1d.nc.

4.22.6 Western Pacific region

Figure 138 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

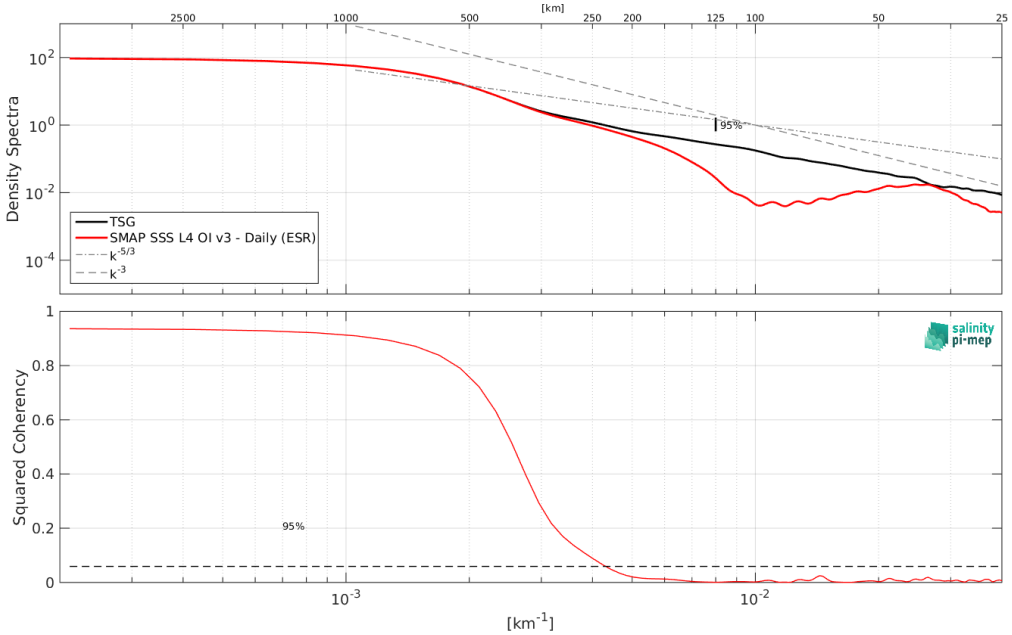

Figure 138: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Daily (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smap-l4-esr-oi-v3-1d.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smap-l4-esr-oi-v3-1d.nc.

4.23 SMAP SSS L4 OI v3 - Monthly (ESR)

4.23.1 North Atlantic region

Figure 139 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

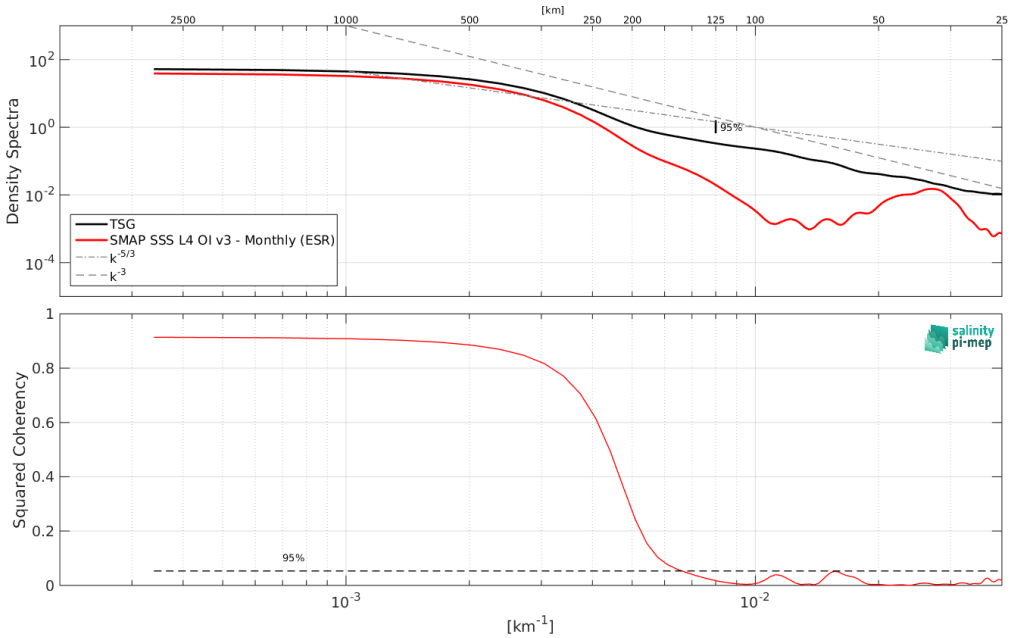

Figure 139: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_smap-l4-esr-oi-v3-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_smap-l4-esr-oi-v3-1m.nc.

4.23.2 Topical Atlantic region

Figure 140 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

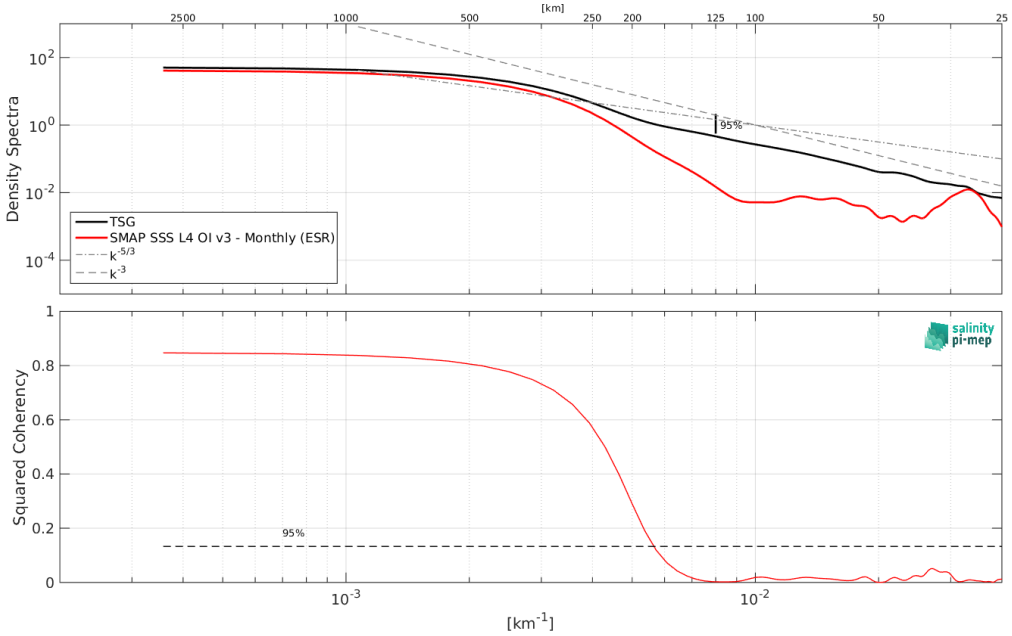

Figure 140: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_smap-l4-esr-oi-v3-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_smap-l4-esr-oi-v3-1m.nc.

4.23.3 Tropical Pacific region

Figure 141 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

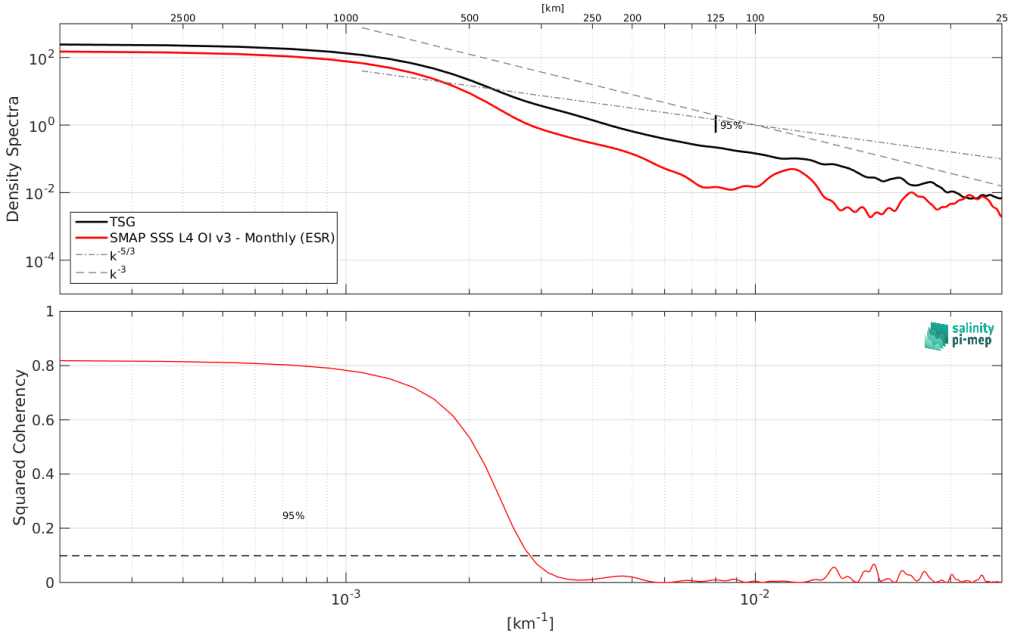

Figure 141: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_smap-l4-esr-oi-v3-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_smap-l4-esr-oi-v3-1m.nc.

4.23.4 Arctic region

Figure 142 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

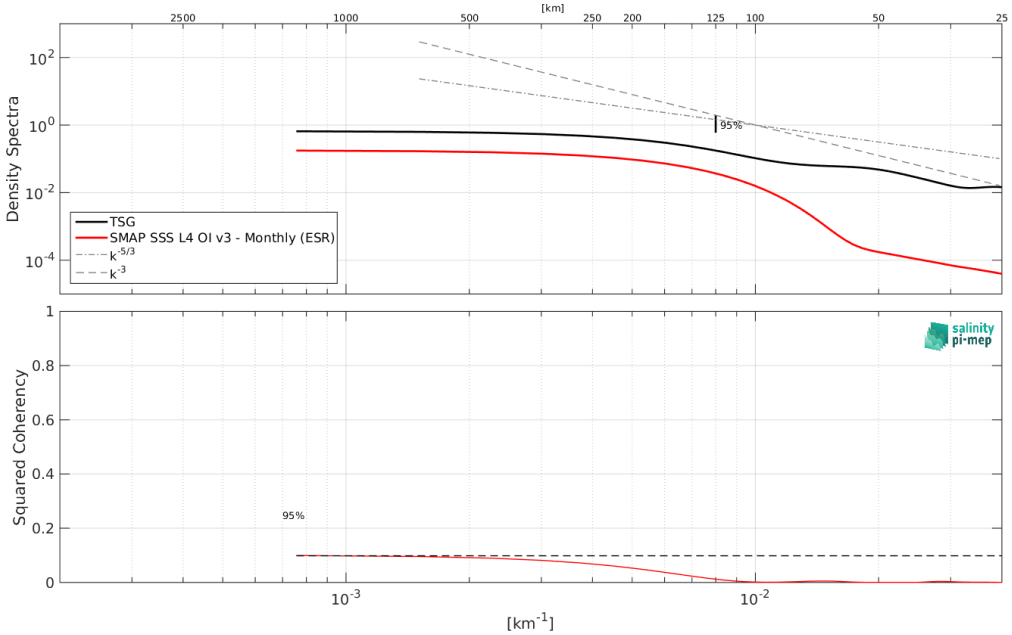

Figure 142: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_smap-l4-esr-oi-v3-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_smap-l4-esr-oi-v3-1m.nc.

4.23.5 Southern Ocean region

Figure 143 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

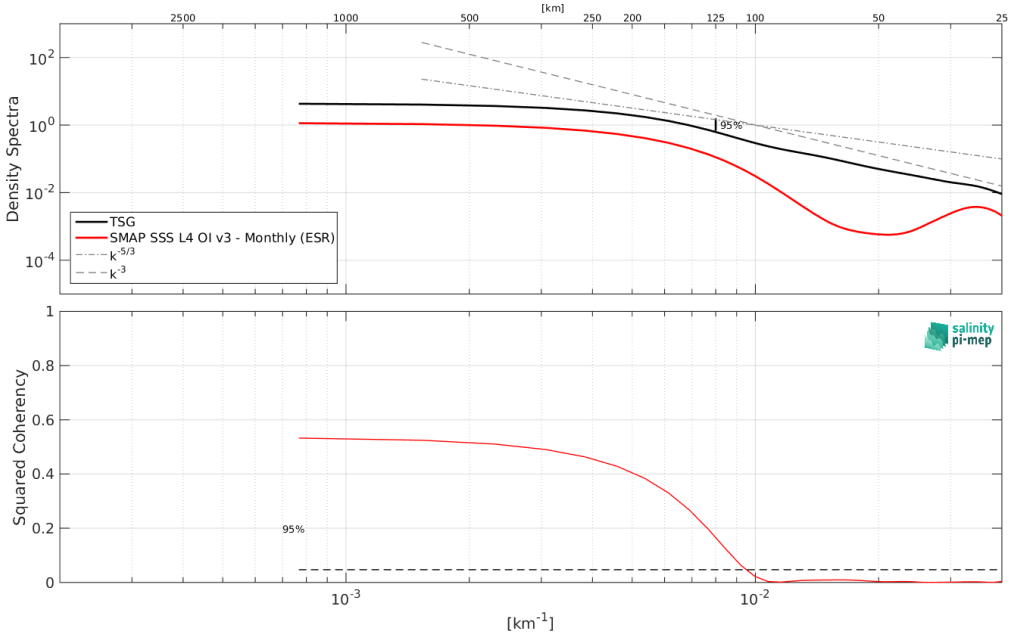

Figure 143: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_smap-l4-esr-oi-v3-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_smap-l4-esr-oi-v3-1m.nc.

4.23.6 Western Pacific region

Figure 144 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

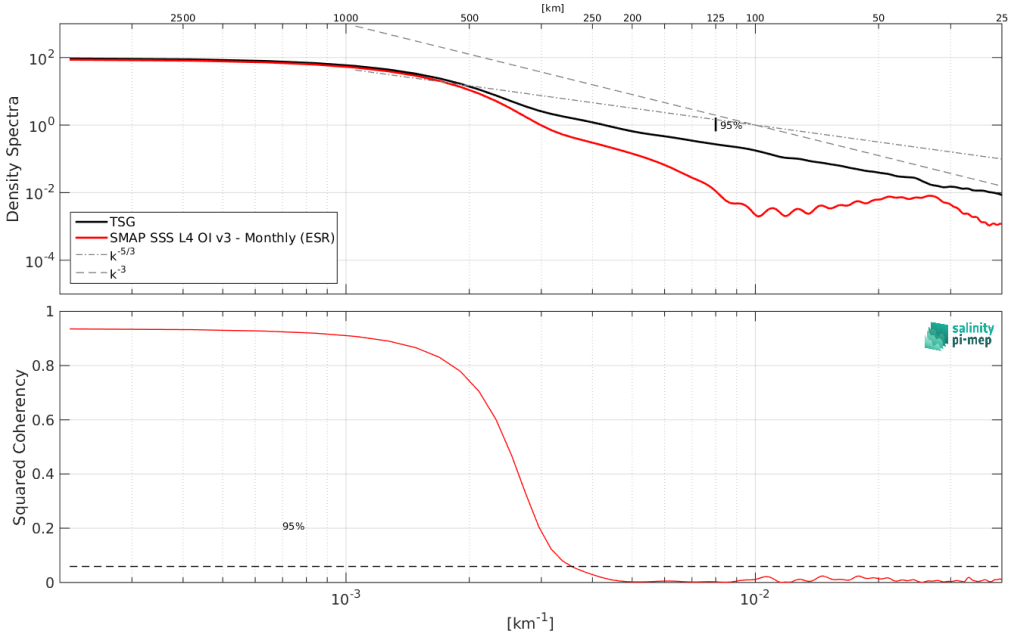

Figure 144: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated SMAP SSS L4 OI v3 - Monthly (ESR) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_smap-l4-esr-oi-v3-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_smap-l4-esr-oi-v3-1m.nc.

4.24 Aquarius SSS L4 OI v5 - Weekly (IPRC)

4.24.1 North Atlantic region

Figure 145 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

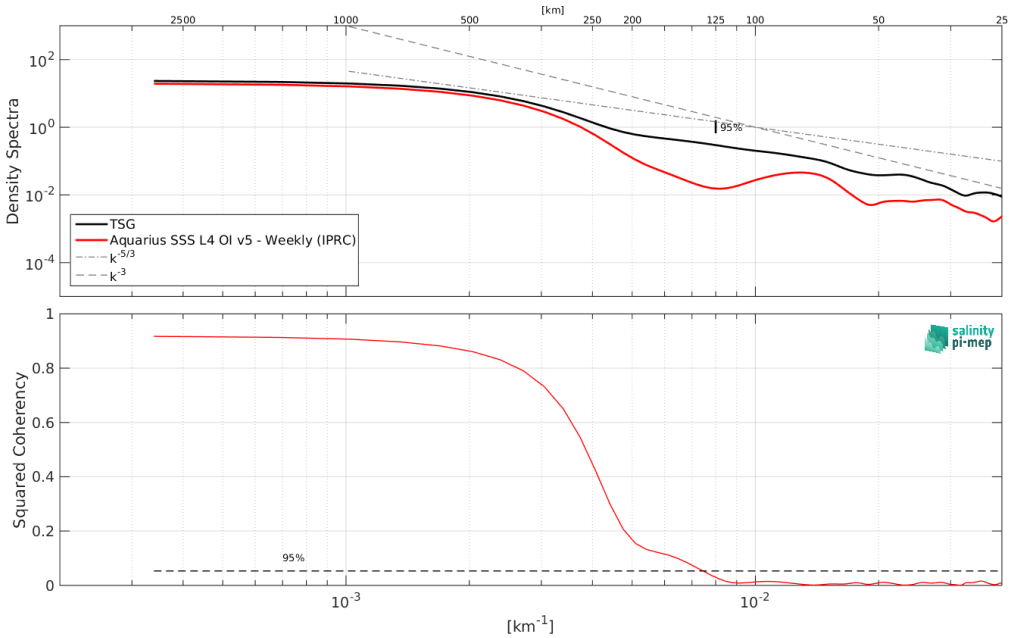

Figure 145: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l4-iprc-v5-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l4-iprc-v5-1w.nc.

4.24.2 Topical Atlantic region

Figure 146 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

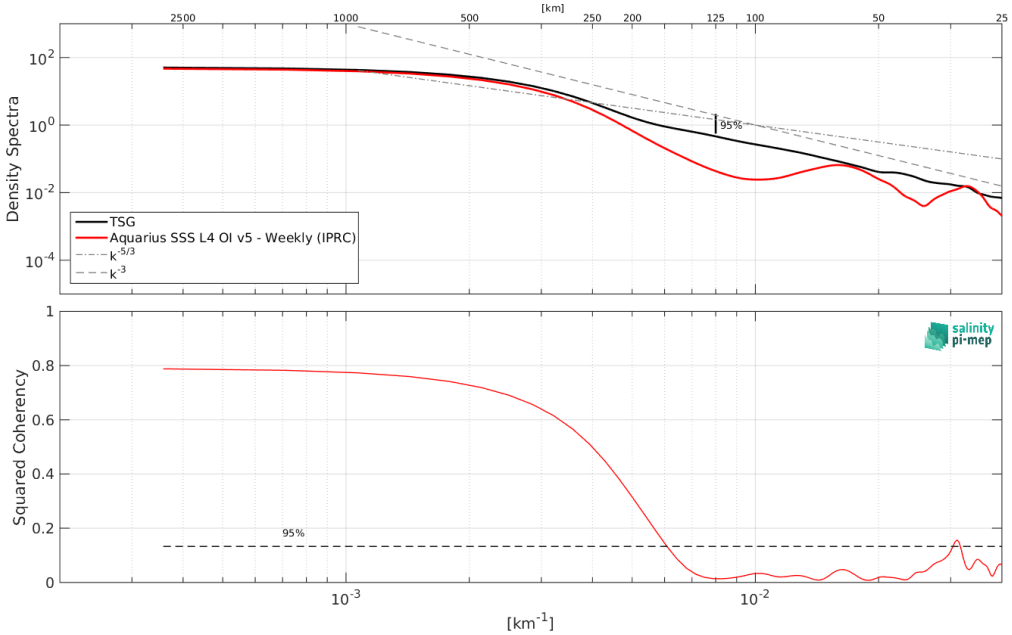

Figure 146: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l4-iprc-v5-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l4-iprc-v5-1w.nc.

4.24.3 Tropical Pacific region

Figure 147 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

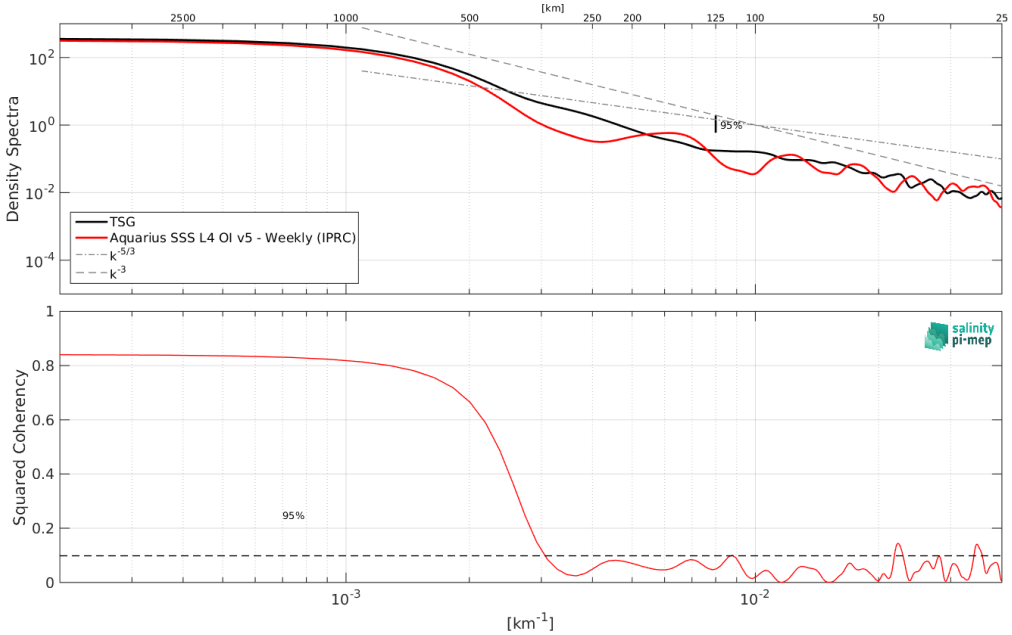

Figure 147: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l4-iprc-v5-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l4-iprc-v5-1w.nc.

4.24.4 Arctic region

Figure 148 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

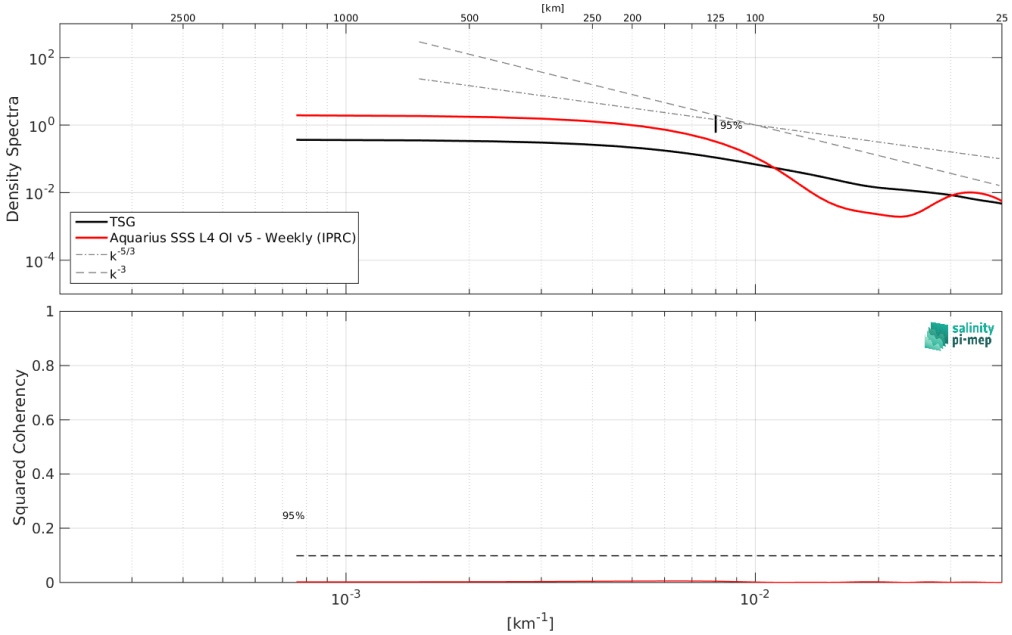

Figure 148: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l4-iprc-v5-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l4-iprc-v5-1w.nc.

4.24.5 Southern Ocean region

Figure 149 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

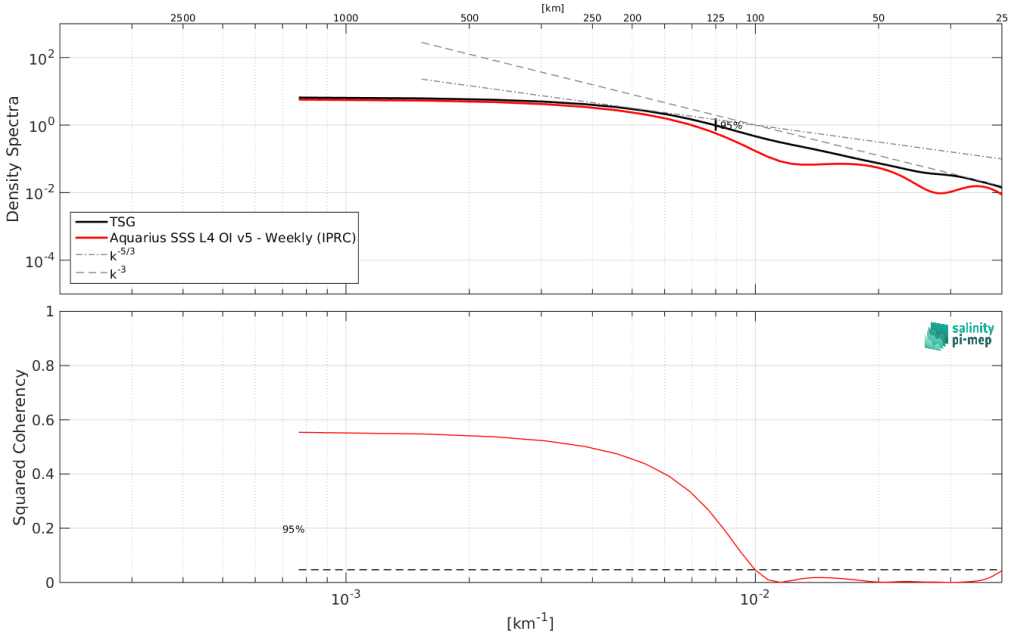

Figure 149: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l4-iprc-v5-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l4-iprc-v5-1w.nc.

4.24.6 Western Pacific region

Figure 150 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

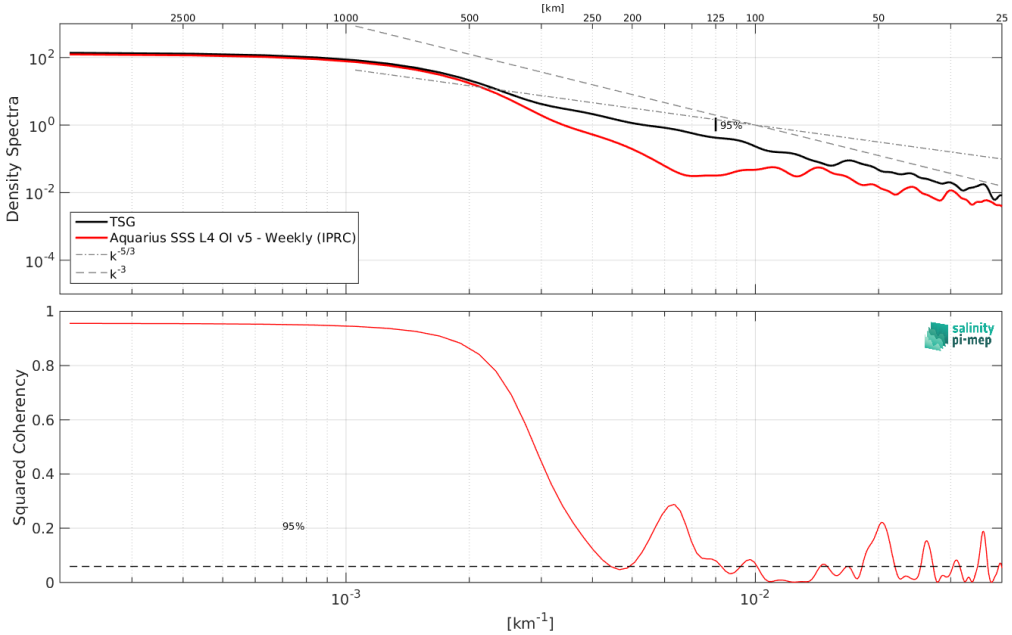

Figure 150: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Weekly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l4-iprc-v5-1w.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l4-iprc-v5-1w.nc.

4.25 Aquarius SSS L4 OI v5 - Monthly (IPRC)

4.25.1 North Atlantic region

Figure 151 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

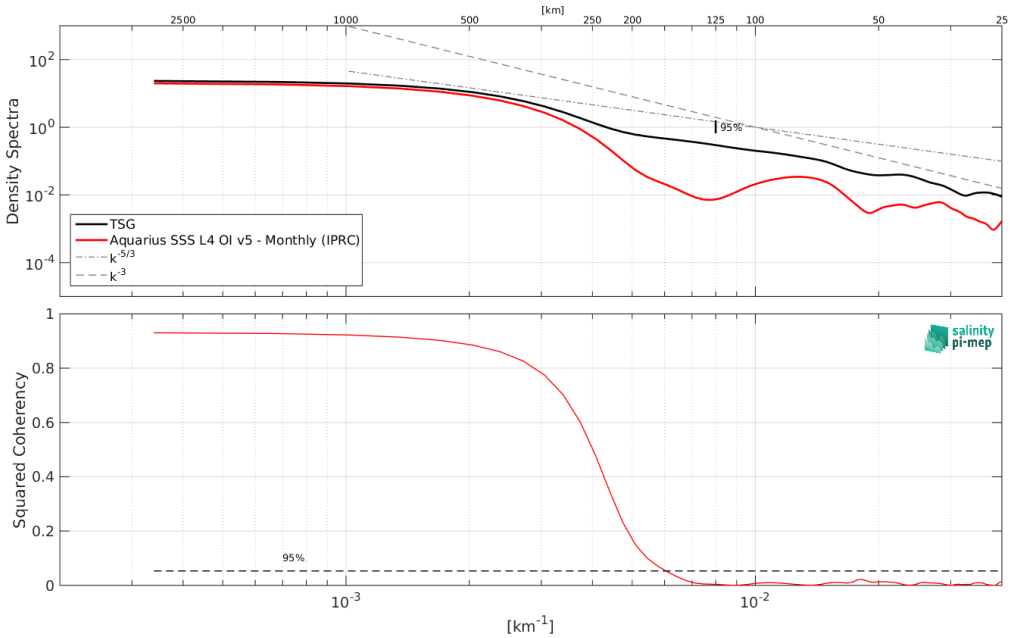

Figure 151: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_aquarius-l4-iprc-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_aquarius-l4-iprc-v5-1m.nc.

4.25.2 Topical Atlantic region

Figure 152 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

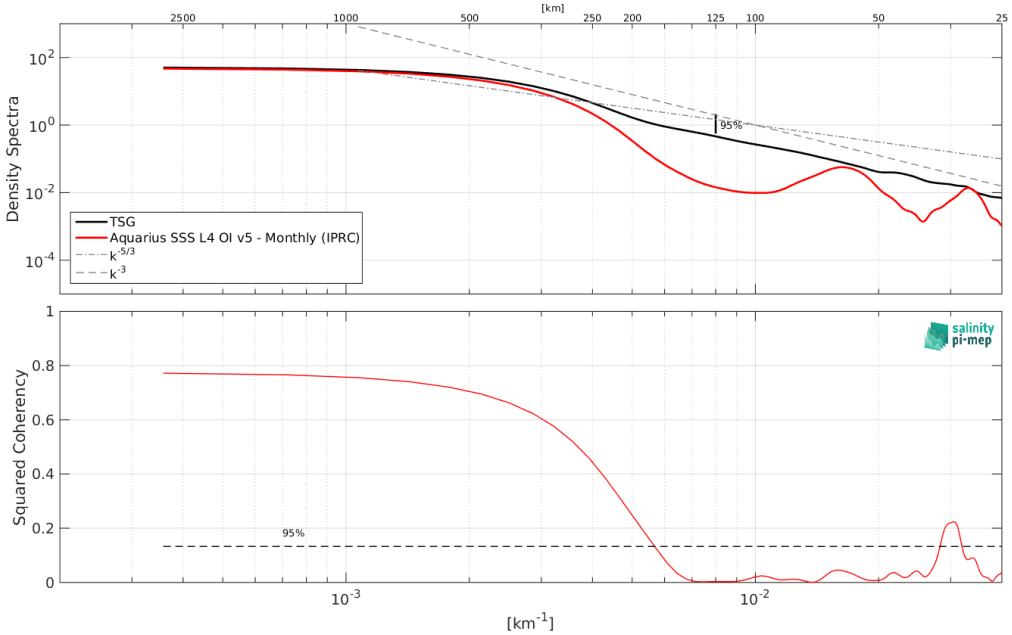

Figure 152: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_aquarius-l4-iprc-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_aquarius-l4-iprc-v5-1m.nc.

4.25.3 Tropical Pacific region

Figure 153 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

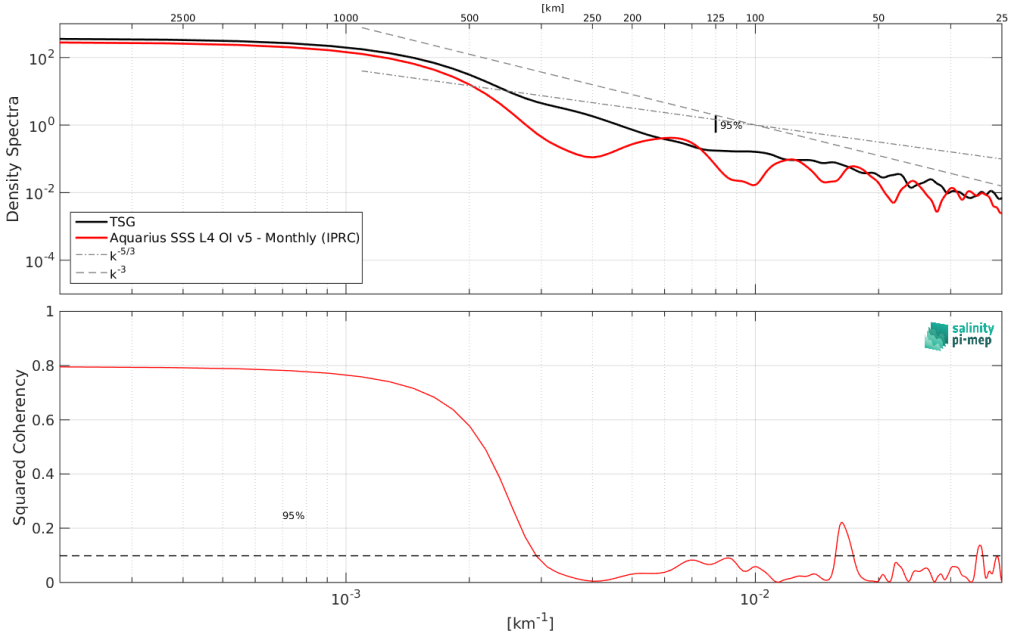

Figure 153: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_aquarius-l4-iprc-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_aquarius-l4-iprc-v5-1m.nc.

4.25.4 Arctic region

Figure 154 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

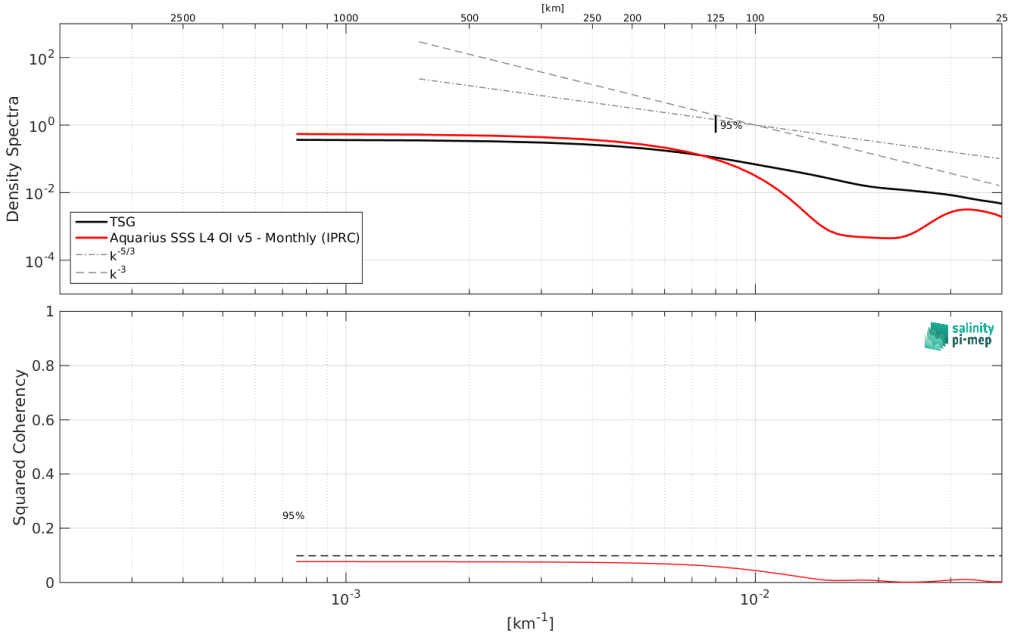

Figure 154: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_aquarius-l4-iprc-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_aquarius-l4-iprc-v5-1m.nc.

4.25.5 Southern Ocean region

Figure 155 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

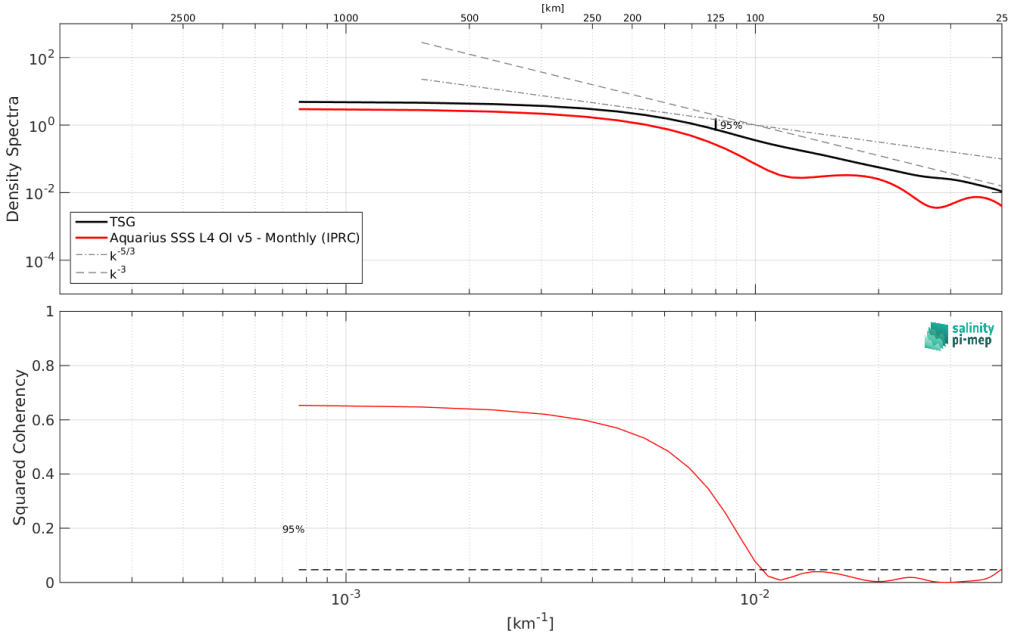

Figure 155: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_aquarius-l4-iprc-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_aquarius-l4-iprc-v5-1m.nc.

4.25.6 Western Pacific region

Figure 156 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

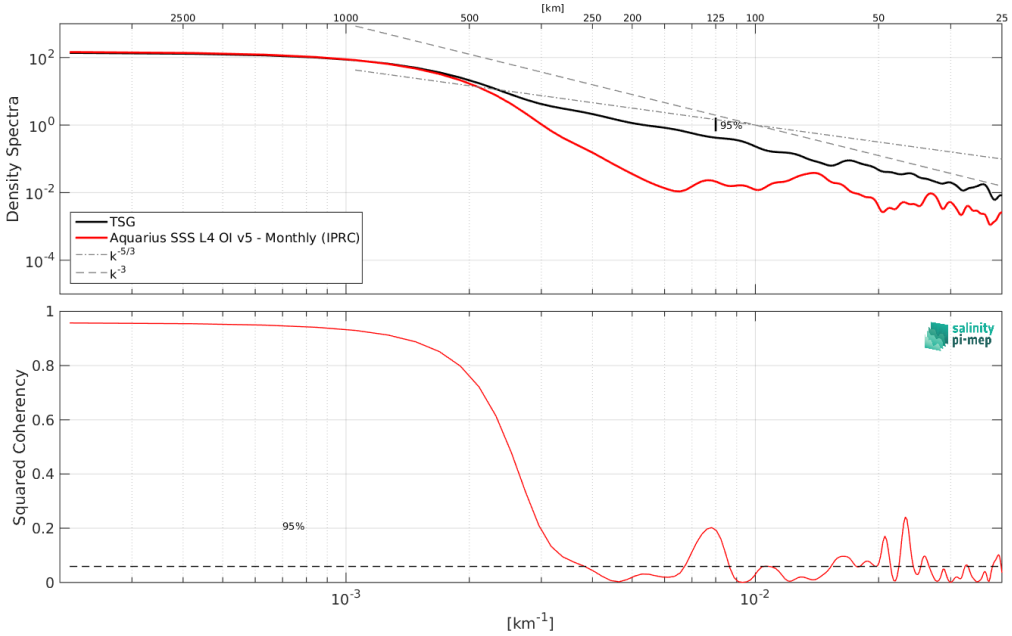

Figure 156: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated Aquarius SSS L4 OI v5 - Monthly (IPRC) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_aquarius-l4-iprc-v5-1m.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_aquarius-l4-iprc-v5-1m.nc.

4.26 ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)

4.26.1 North Atlantic region

Figure 157 shows the average spectra (top panel) of the 55 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

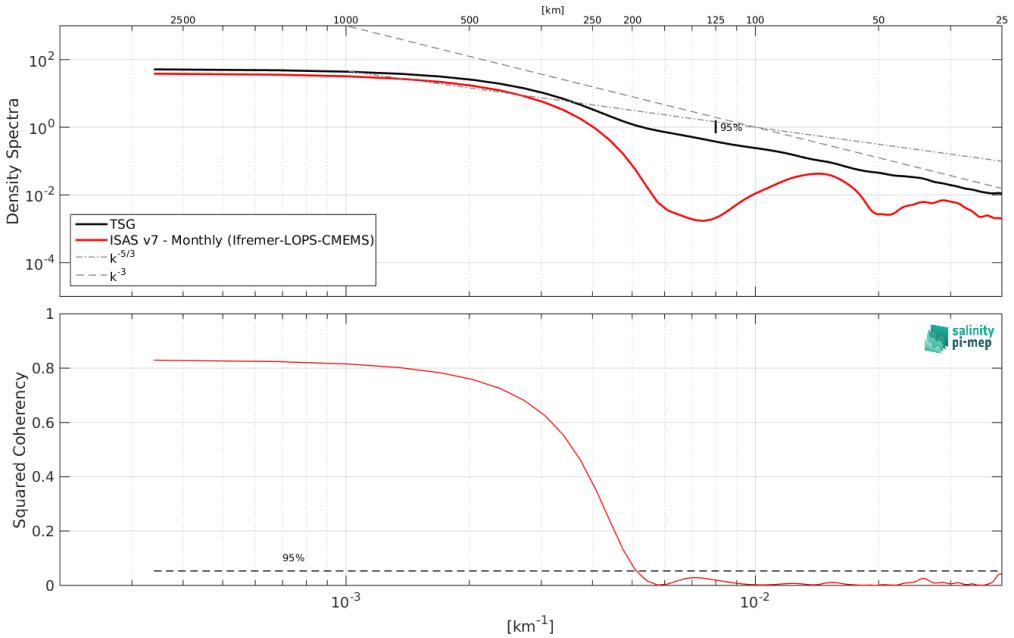

Figure 157: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_NAO_isas.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_NAO_isas.nc.

4.26.2 Topical Atlantic region

Figure 158 shows the average spectra (top panel) of the 21 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

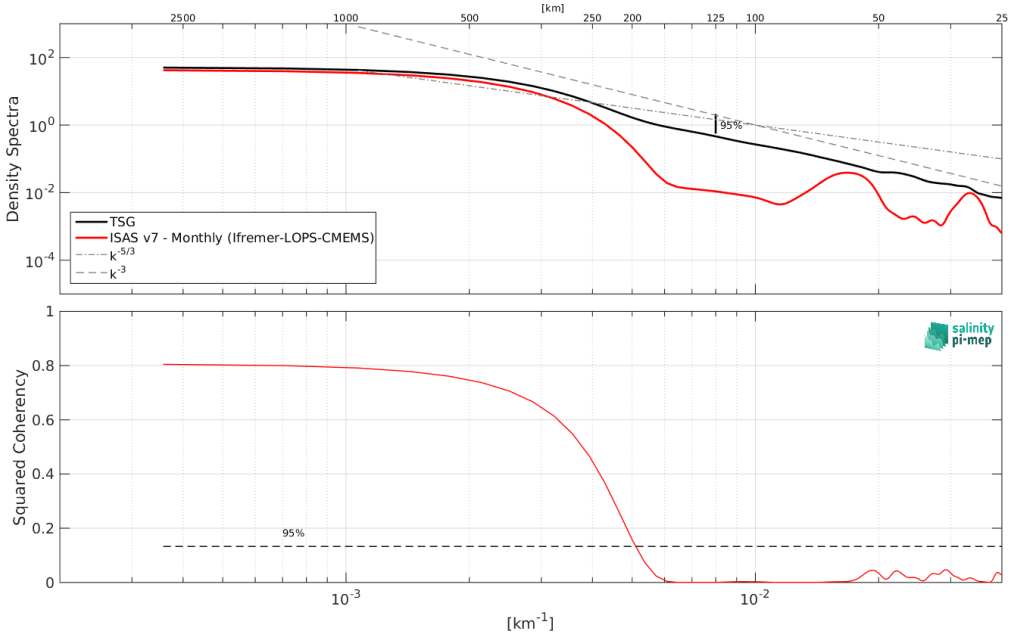

Figure 158: Density spectra (Top) calculated from averaging 21 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TAO_isas.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TAO_isas.nc.

4.26.3 Tropical Pacific region

Figure 159 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

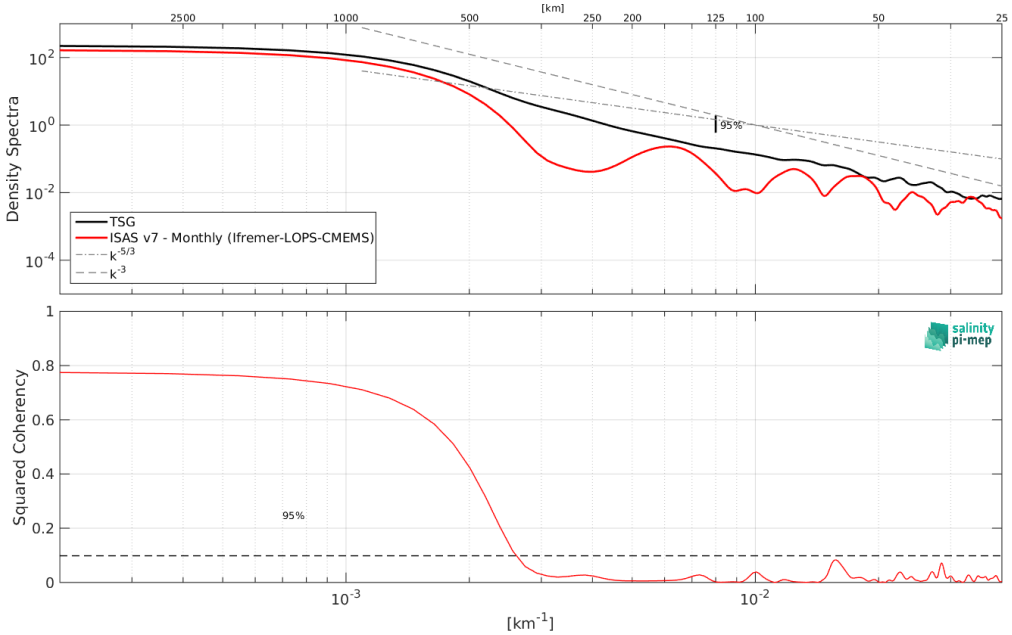

Figure 159: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_TPO_isas.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_TPO_isas.nc.

4.26.4 Arctic region

Figure 160 shows the average spectra (top panel) of the 29 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

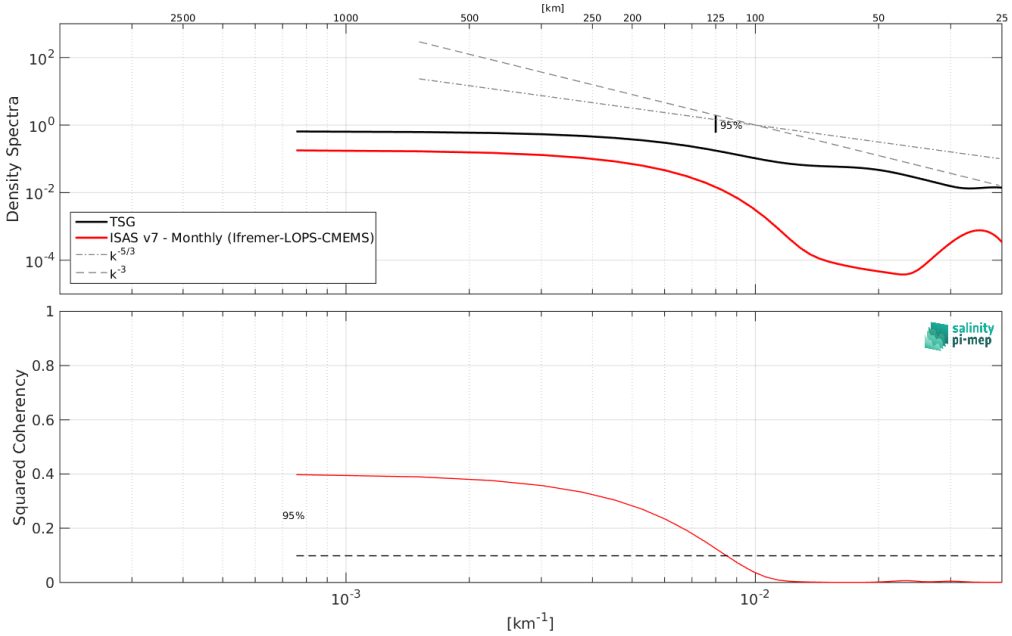

Figure 160: Density spectra (Top) calculated from averaging 29 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_ARCO_isas.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_ARCO_isas.nc.

4.26.5 Southern Ocean region

Figure 161 shows the average spectra (top panel) of the 62 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

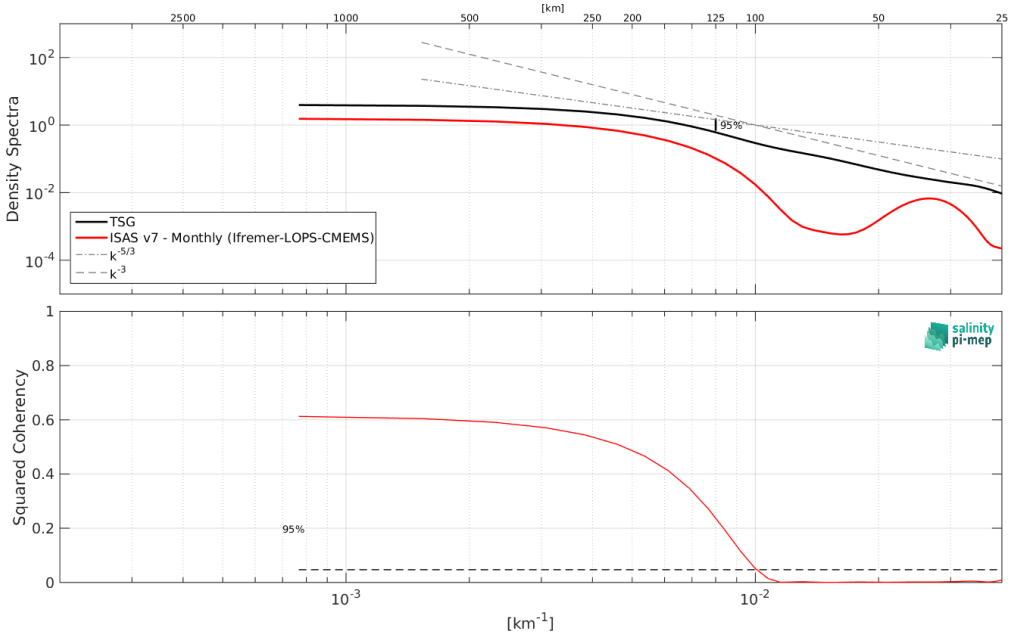

Figure 161: Density spectra (Top) calculated from averaging 62 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_SO_isas.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_SO_isas.nc.

4.26.6 Western Pacific region

Figure 162 shows the average spectra (top panel) of the 49 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

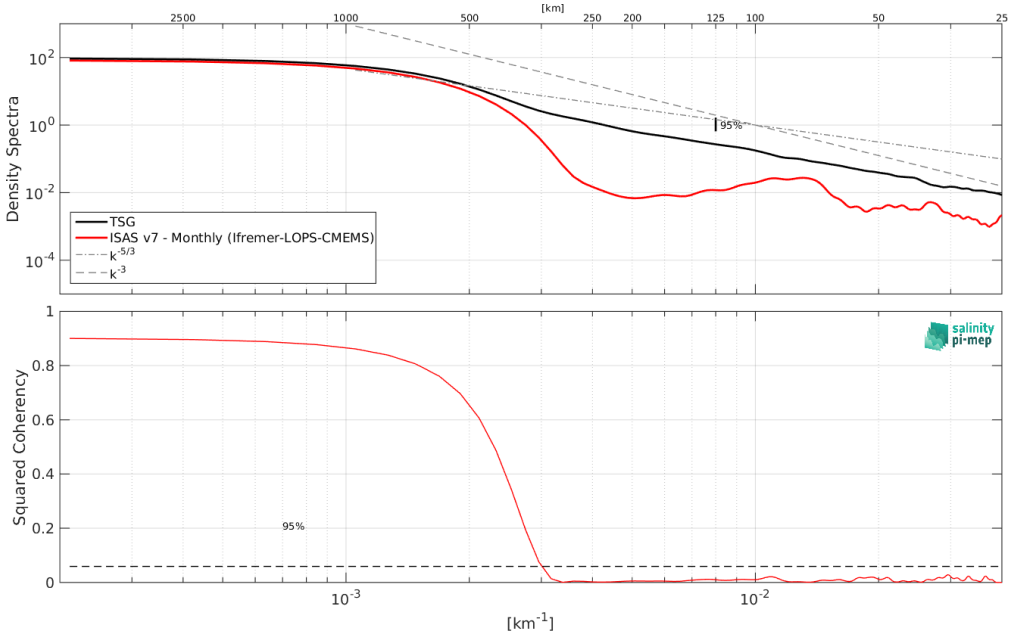

Figure 162: Density spectra (Top) calculated from averaging 49 TSG transects (black line) and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product (red line). Coherency spectrum (bottom) between TSG SSS transects and collocated ISAS v7 - Monthly (Ifremer-LOPS-CMEMS) Satellite product.

Figures showing the mean and standard deviation (STD) maps of Satellite SSS across each TSG transect period, along with Satellite and TSG SSS plotted against cumulative distance and their corresponding individual spectra, are provided for each TSG transect in the following document: pimep-spectrum-report_WPO_isas.pdf.

Satellite and TSG SSS, individual Satellite and TSG spectra for each TSG transects, average spectra and the corresponding coherency spectrum are provided in the following NetCDF file: pimep-tsg-spectra_WPO_isas.nc.

5 Density and Coherency spectra

5.1 North Atlantic region

Figure 163 show the average spectra (top panel) of the 55 TSG transects (black line) and collocated Satellite products (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated satellite products.

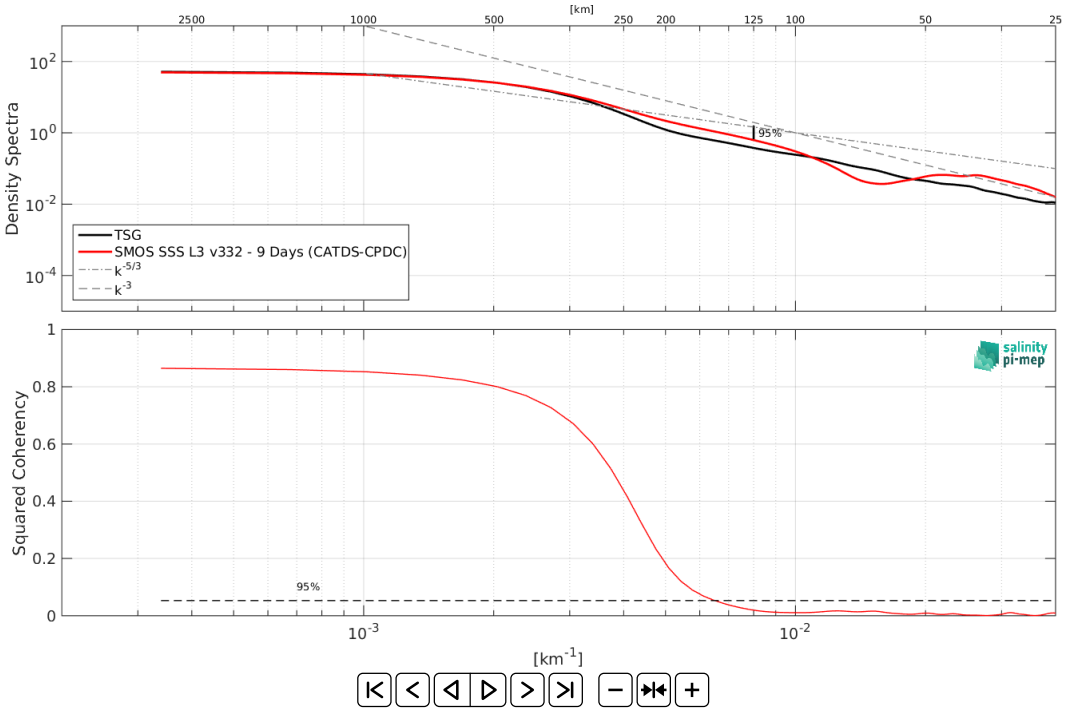

Figure 163: Density spectra (Top) calculated from averaging 55 TSG transect (black line) and collocated Satellite product (red line) spectra. Coherency spectrum (bottom) between TSG SSS data and collocated SSS satellite product for the **North Atlantic region**.

Figure 163 is also available as an animated gif : Spectra_NAO.gif.

5.2 Topical Atlantic region

Figure 164 show the average spectra (top panel) of the 21 TSG transects (black line) and collocated Satellite products (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated satellite products.

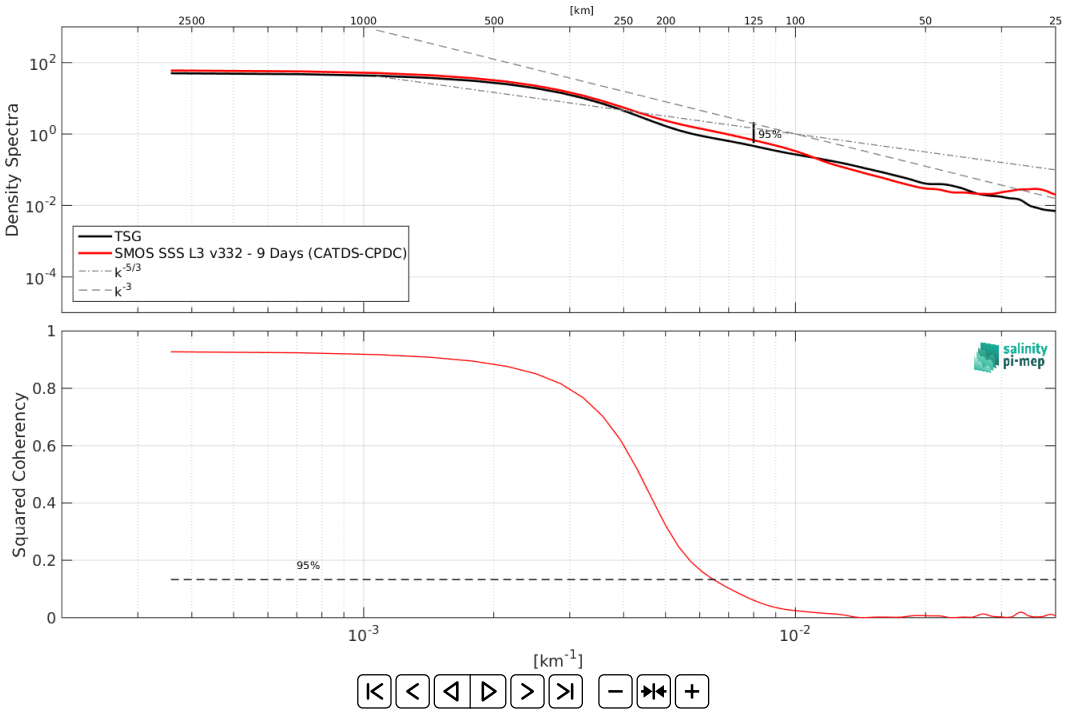

Figure 164: Density spectra (Top) calculated from averaging 21 TSG transect (black line) and collocated Satellite product (red line) spectra. Coherency spectrum (bottom) between TSG SSS data and collocated SSS satellite product for the **Topical Atlantic region**.

Figure 164 is also available as an animated gif : Spectra_TAO.gif.

5.3 Tropical Pacific region

Figure 165 show the average spectra (top panel) of the 29 TSG transects (black line) and collocated Satellite products (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated satellite products.

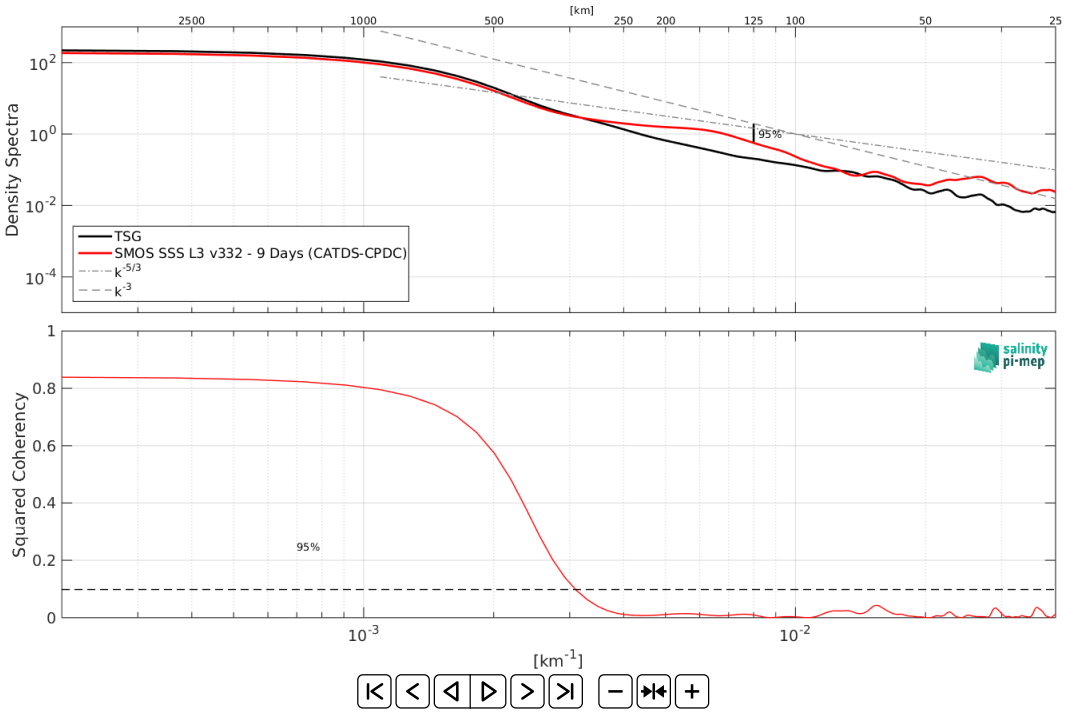

Figure 165: Density spectra (Top) calculated from averaging 29 TSG transect (black line) and collocated Satellite product (red line) spectra. Coherency spectrum (bottom) between TSG SSS data and collocated SSS satellite product for the **Tropical Pacific region**.

Figure 165 is also available as an animated gif : Spectra_TPO.gif.

5.4 Arctic region

Figure 166 show the average spectra (top panel) of the 29 TSG transects (black line) and collocated Satellite products (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated satellite products.

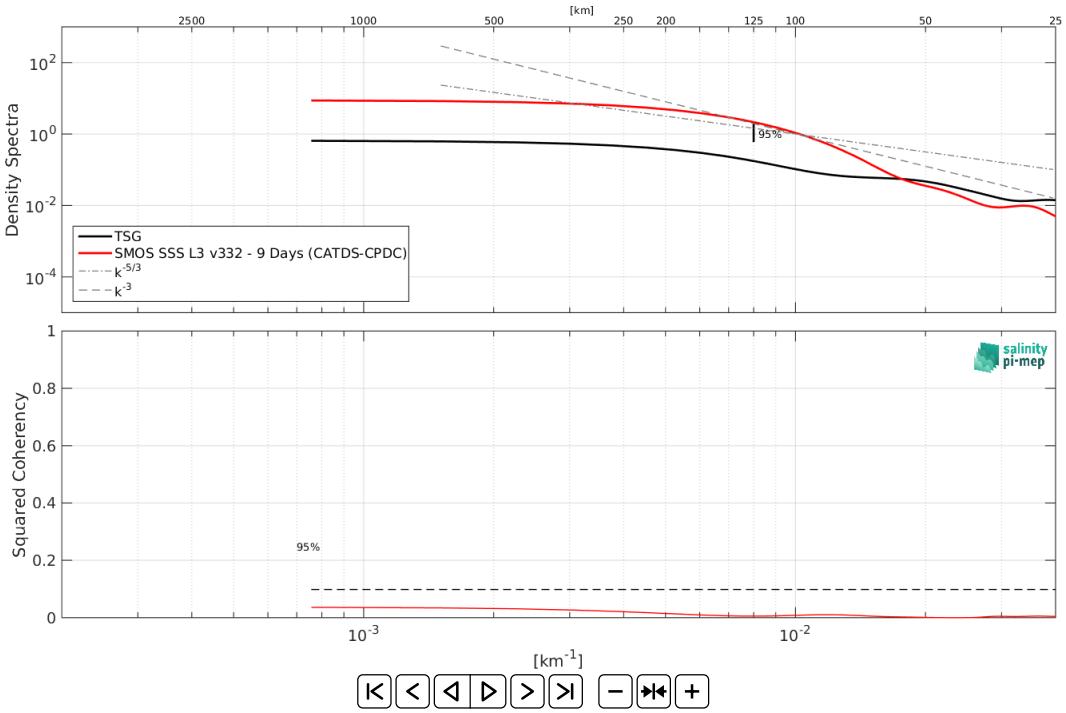

Figure 166: Density spectra (Top) calculated from averaging 29 TSG transect (black line) and collocated Satellite product (red line) spectra. Coherency spectrum (bottom) between TSG SSS data and collocated SSS satellite product for the **Arctic region**.

Figure 166 is also available as an animated gif : Spectra_ARCO.gif.

5.5 Southern Ocean region

Figure 167 show the average spectra (top panel) of the 62 TSG transects (black line) and collocated Satellite products (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated satellite products.

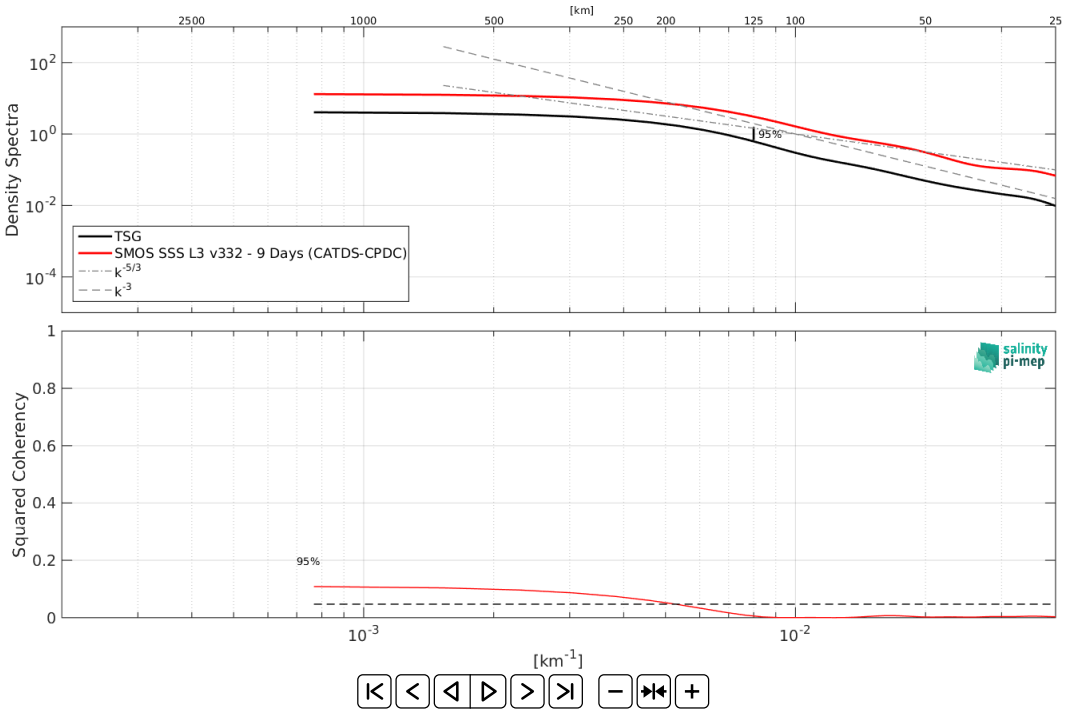

Figure 167: Density spectra (Top) calculated from averaging 62 TSG transect (black line) and collocated Satellite product (red line) spectra. Coherency spectrum (bottom) between TSG SSS data and collocated SSS satellite product for the **Southern Ocean region**.

Figure 167 is also available as an animated gif : Spectra_SO.gif.

5.6 Western Pacific region

Figure 168 show the average spectra (top panel) of the 49 TSG transects (black line) and collocated Satellite products (red line). The bottom panel presents the coherency spectrum between TSG SSS transects and collocated satellite products.

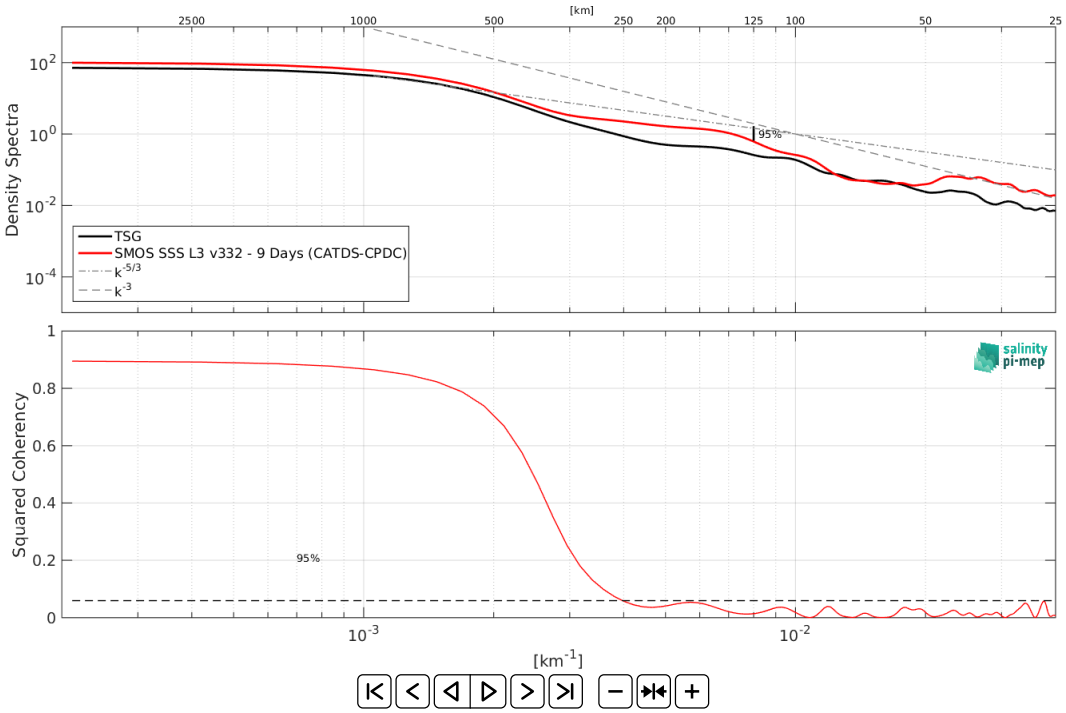

Figure 168: Density spectra (Top) calculated from averaging 49 TSG transect (black line) and collocated Satellite product (red line) spectra. Coherency spectrum (bottom) between TSG SSS data and collocated SSS satellite product for the **Western Pacific region**.

Figure 168 is also available as an animated gif : Spectra_WPO.gif.

6 Spectral slopes and effective resolution

Generally, for wavelengths over 100 km, spectral slope range from -5/3 to -3. For example, combining in situ data and numerical results, Droghei et al. (2016) determined that in the SPURS-1 experiment in the subtropical North Atlantic, the spectral slope is -5/3 for scales larger than 200 km, sharpening to -3 near 125 km.

Similarly, Nardelli et al. (2016) observed, using SMOS satellite data and in situ measurements, that spectral slopes in the mesoscale range (less than 325 km) across a wide zonal band in the Southern Hemisphere (10°S–65°S) vary between -2 and -3.

More recently, Yi and Wang (2024) calculate spectral slopes of SSS variance at mesoscales in the near-global ocean and link the spectral slopes with the geostrophic turbulence energy spectrum. They also compare Aquarius satellite results with high-resolution TSG in situ measurements in terms of SSS spectral slopes.

Here, we proposed to compute the spectral slopes in two ranges of scales, naming the large scale range for wavelength between 1000 and 200 km, and the mesoscale range for wavelength between 125 and 25 km, using the average spectra of TSG and satellite products for each 6 regions.

6.1 North Atlantic region

Table 1 presents the spectral slopes derived from the averaged TSG spectrum for the Tropical Pacific region across two ranges of scales. Similarly, Table 2 provides the spectral slope estimates for each satellite product in the same region. The effective resolution of each product is indicated as the wavelength where the coherency spectrum equals 0.5.

Table 1: TSG Spectral Slope Estimates

Slopes ([1000 - 200] km)	**Slopes ([125 - 25] km)**
-2.239(± 1.003)	-2.276(± 0.037)

Table 2: Satellite Spectral Slopes and effective resolution estimates

Satellite products	**Slopes ([1000 - 200] km)**	**Slopes ([125 - 25] km)**	**Effective resolution [km]**
SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)	-1.904(± 0.751)	-1.430(± 0.271)	264
SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)	-1.616(± 0.558)	-2.025(± 0.090)	303
SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)	-2.120(± 0.867)	-1.920(± 0.052)	259
SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)	-1.811(± 0.694)	-1.400(± 0.270)	267
SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)	-2.184(± 0.947)	-1.222(± 0.269)	233
SMOS SSS L3 v2 - 9-Days (BEC)	-1.559(± 0.477)	-2.039(± 0.053)	346
SMAP SSS L3 v6 - 8-Day running (RSS)	-2.229(± 0.993)	-1.675(± 0.158)	231
SMAP SSS L3 v6 - Monthly (RSS)	-2.488(± 1.194)	-1.454(± 0.202)	226
SMAP SSS L3 v5.0 - 8-Day running (JPL)	-2.047(± 0.851)	-1.719(± 0.238)	252
SMAP SSS L3 v5.0 - Monthly (JPL)	-2.325(± 1.050)	-1.714(± 0.253)	240
Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)	-2.106(± 0.826)	-2.122(± 0.122)	304
Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)	-2.250(± 0.886)	-1.975(± 0.129)	310
Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)	-2.202(± 0.894)	-1.936(± 0.070)	290
Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)	-2.322(± 0.943)	-1.984(± 0.145)	316
Aquarius SSS L3 CAP v5 - 7-Day running (JPL)	-2.342(± 1.041)	-1.976(± 0.084)	293
Aquarius SSS L3 CAP v5 - Monthly (JPL)	-2.589(± 1.144)	-2.048(± 0.090)	277
SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)	-2.011(± 0.787)	-1.688(± 0.135)	257
SMOS SSS L4 v1 - Daily (CMEMS-CNR)	-2.316(± 0.941)	-2.835(± 0.204)	389
SMOS SSS L4 v1 - Monthly (CMEMS-CNR)	-3.028(± 1.650)	-2.632(± 0.217)	292
CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)	-2.411(± 1.127)	-1.858(± 0.092)	214
CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)	-2.453(± 1.155)	-1.891(± 0.127)	227
SMAP SSS L4 OI v3 - Daily (ESR)	-2.409(± 1.126)	-0.263(± 0.643)	225
SMAP SSS L4 OI v3 - Monthly (ESR)	-2.778(± 1.440)	-0.264(± 0.641)	227
Aquarius SSS L4 OI v5 - Weekly (IPRC)	-2.893(± 1.489)	-1.972(± 0.274)	259
Aquarius SSS L4 OI v5 - Monthly (IPRC)	-3.175(± 1.760)	-1.989(± 0.325)	249
ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)	-3.214(± 1.891)	-1.349(± 0.454)	278

6.2 Topical Atlantic region

Table 3 presents the spectral slopes derived from the averaged TSG spectrum for the Tropical Pacific region across two ranges of scales. Similarly, Table 4 provides the spectral slope estimates for each satellite product in the same region. The effective resolution of each product is indicated as the wavelength where the coherency spectrum equals 0.5.

Table 3: TSG Spectral Slope Estimates

Slopes ([1000 - 200] km)	**Slopes ([125 - 25] km)**
-2.008(± 0.953)	-2.611(± 0.055)

Table 4: Satellite Spectral Slopes and effective resolution estimates

Satellite products	**Slopes ([1000 - 200] km)**	**Slopes ([125 - 25] km)**	**Effective resolution [km]**
SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)	-1.964(± 0.870)	-1.838(± 0.271)	229
SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)	-1.745(± 0.705)	-2.040(± 0.157)	254
SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)	-2.100(± 0.989)	-2.070(± 0.135)	252
SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)	-1.935(± 0.844)	-1.842(± 0.265)	239
SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)	-2.195(± 1.046)	-1.777(± 0.241)	226
SMOS SSS L3 v2 - 9-Days (BEC)	-1.359(± 0.406)	-2.225(± 0.104)	363
SMAP SSS L3 v6 - 8-Day running (RSS)	-1.809(± 0.863)	-1.552(± 0.072)	230
SMAP SSS L3 v6 - Monthly (RSS)	-2.231(± 1.157)	-1.298(± 0.197)	232
SMAP SSS L3 v5.0 - 8-Day running (JPL)	-1.953(± 0.948)	-1.153(± 0.285)	223
SMAP SSS L3 v5.0 - Monthly (JPL)	-2.241(± 1.170)	-1.037(± 0.335)	240
Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)	-2.184(± 1.084)	-2.049(± 0.144)	261
Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)	-2.092(± 1.012)	-2.008(± 0.086)	295
Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)	-2.131(± 1.010)	-2.053(± 0.098)	282
Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)	-2.155(± 1.077)	-2.013(± 0.104)	295
Aquarius SSS L3 CAP v5 - 7-Day running (JPL)	-2.316(± 1.150)	-2.121(± 0.123)	298
Aquarius SSS L3 CAP v5 - Monthly (JPL)	-2.416(± 1.259)	-2.126(± 0.188)	273
SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)	-2.000(± 0.929)	-1.959(± 0.199)	221
SMOS SSS L4 v1 - Daily (CMEMS-CNR)	-2.329(± 1.153)	-2.469(± 0.144)	303
SMOS SSS L4 v1 - Monthly (CMEMS-CNR)	-2.635(± 1.483)	-2.061(± 0.165)	273
CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)	-2.077(± 1.006)	-2.082(± 0.070)	214
CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)	-2.287(± 1.181)	-2.032(± 0.168)	226
SMAP SSS L4 OI v3 - Daily (ESR)	-2.279(± 1.162)	-0.445(± 0.367)	227
SMAP SSS L4 OI v3 - Monthly (ESR)	-2.507(± 1.361)	-0.255(± 0.425)	233
Aquarius SSS L4 OI v5 - Weekly (IPRC)	-2.388(± 1.243)	-1.597(± 0.402)	250
Aquarius SSS L4 OI v5 - Monthly (IPRC)	-2.670(± 1.501)	-1.402(± 0.576)	271
ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)	-2.742(± 1.607)	-1.366(± 0.623)	264

6.3 Tropical Pacific region

Table 5 presents the spectral slopes derived from the averaged TSG spectrum for the Tropical Pacific region across two ranges of scales. Similarly, Table 6 provides the spectral slope estimates for each satellite product in the same region. The effective resolution of each product is indicated as the wavelength where the coherency spectrum equals 0.5.

Table 5: TSG Spectral Slope Estimates

Slopes ([1000 - 200] km)	**Slopes ([125 - 25] km)**
-3.624(± 0.227)	-2.302(± 0.070)

Table 6: Satellite Spectral Slopes and effective resolution estimates

Satellite products	**Slopes ([1000 - 200] km)**	**Slopes ([125 - 25] km)**	**Effective resolution [km]**
SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)	-2.955(± 0.441)	-1.469(± 0.138)	464
SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)	-2.542(± 0.492)	-2.476(± 0.135)	474
SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)	-3.247(± 0.551)	-2.339(± 0.091)	516
SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)	-2.849(± 0.379)	-1.502(± 0.152)	483
SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)	-3.430(± 0.447)	-1.455(± 0.134)	464
SMOS SSS L3 v2 - 9-Days (BEC)	-2.315(± 0.540)	-2.378(± 0.088)	503
SMAP SSS L3 v6 - 8-Day running (RSS)	-3.198(± 0.397)	-1.646(± 0.074)	431
SMAP SSS L3 v6 - Monthly (RSS)	-4.388(± 0.491)	-1.717(± 0.124)	480
SMAP SSS L3 v5.0 - 8-Day running (JPL)	-3.384(± 0.285)	-1.448(± 0.227)	437
SMAP SSS L3 v5.0 - Monthly (JPL)	-4.421(± 0.458)	-1.394(± 0.240)	498
Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)	-2.830(± 0.418)	-2.161(± 0.048)	464
Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)	-3.582(± 0.328)	-2.087(± 0.084)	518
Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)	-2.647(± 0.573)	-2.087(± 0.109)	476
Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)	-3.588(± 0.342)	-2.121(± 0.064)	513
Aquarius SSS L3 CAP v5 - 7-Day running (JPL)	-3.255(± 0.457)	-2.071(± 0.088)	475
Aquarius SSS L3 CAP v5 - Monthly (JPL)	-3.710(± 0.395)	-2.058(± 0.079)	519
SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)	-3.034(± 0.467)	-2.182(± 0.101)	463
SMOS SSS L4 v1 - Daily (CMEMS-CNR)	-3.592(± 0.579)	-2.680(± 0.108)	521
SMOS SSS L4 v1 - Monthly (CMEMS-CNR)	-5.177(± 0.717)	-2.360(± 0.239)	575
CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)	-3.574(± 0.517)	-2.264(± 0.084)	417
CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)	-3.968(± 0.557)	-2.166(± 0.089)	472
SMAP SSS L4 OI v3 - Daily (ESR)	-3.633(± 0.291)	-0.762(± 0.296)	448
SMAP SSS L4 OI v3 - Monthly (ESR)	-4.492(± 0.471)	-0.987(± 0.301)	484
Aquarius SSS L4 OI v5 - Weekly (IPRC)	-4.811(± 0.865)	-1.664(± 0.220)	425
Aquarius SSS L4 OI v5 - Monthly (IPRC)	-5.458(± 1.272)	-1.624(± 0.267)	460
ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)	-5.857(± 1.533)	-1.493(± 0.251)	540

6.4 Arctic region

Table 7 presents the spectral slopes derived from the averaged TSG spectrum for the Tropical Pacific region across two ranges of scales. Similarly, Table 8 provides the spectral slope estimates for each satellite product in the same region. The effective resolution of each product is indicated as the wavelength where the coherency spectrum equals 0.5.

Table 7: TSG Spectral Slope Estimates

Slopes ([1000 - 200] km)	**Slopes ([125 - 25] km)**
-0.354(± 0.361)	-1.655(± 0.143)

Table 8: Satellite Spectral Slopes and effective resolution estimates

Satellite products	**Slopes ([1000 - 200] km)**	**Slopes ([125 - 25] km)**	**Effective resolution [km]**
SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)	-0.374(± 0.379)	-3.815(± 0.336)	NaN
SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)	-0.287(± 0.287)	-4.218(± 0.480)	NaN
SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)	-0.259(± 0.262)	-4.589(± 0.528)	NaN
SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)	-0.370(± 0.372)	-4.425(± 0.287)	NaN
SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)	-0.376(± 0.378)	-4.324(± 0.292)	NaN
SMOS SSS L3 v2 - 9-Days (BEC)	-0.162(± 0.162)	-3.596(± 0.332)	NaN
SMAP SSS L3 v6 - 8-Day running (RSS)	-0.333(± 0.332)	-2.431(± 0.150)	NaN
SMAP SSS L3 v6 - Monthly (RSS)	-0.437(± 0.435)	-2.702(± 0.053)	NaN
SMAP SSS L3 v5.0 - 8-Day running (JPL)	-0.408(± 0.422)	-3.598(± 0.387)	NaN
SMAP SSS L3 v5.0 - Monthly (JPL)	-0.410(± 0.424)	-3.944(± 0.502)	NaN
Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)	-0.392(± 0.406)	-2.378(± 0.101)	NaN
Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)	-0.440(± 0.454)	-2.378(± 0.097)	NaN
Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)	-0.388(± 0.403)	-2.377(± 0.100)	NaN
Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)	-0.437(± 0.450)	-2.381(± 0.099)	NaN
Aquarius SSS L3 CAP v5 - 7-Day running (JPL)	-0.499(± 0.523)	-2.210(± 0.255)	NaN
Aquarius SSS L3 CAP v5 - Monthly (JPL)	-0.456(± 0.481)	-2.241(± 0.232)	NaN
SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)	-0.146(± 0.163)	-5.644(± 0.447)	NaN
SMOS SSS L4 v1 - Daily (CMEMS-CNR)	-0.289(± 0.303)	-3.545(± 0.104)	NaN
SMOS SSS L4 v1 - Monthly (CMEMS-CNR)	-0.482(± 0.489)	-4.242(± 0.114)	NaN
CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)	-0.378(± 0.367)	-2.624(± 0.125)	NaN
CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)	-0.362(± 0.350)	-2.464(± 0.084)	NaN
SMAP SSS L4 OI v3 - Daily (ESR)	-0.295(± 0.316)	-4.961(± 0.732)	NaN
SMAP SSS L4 OI v3 - Monthly (ESR)	-0.399(± 0.410)	-4.264(± 0.517)	NaN
Aquarius SSS L4 OI v5 - Weekly (IPRC)	-0.436(± 0.458)	-1.442(± 1.014)	NaN
Aquarius SSS L4 OI v5 - Monthly (IPRC)	-0.411(± 0.436)	-1.132(± 1.185)	NaN
ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)	-0.603(± 0.634)	-0.559(± 1.401)	NaN

6.5 Southern Ocean region

Table 9 presents the spectral slopes derived from the averaged TSG spectrum for the Tropical Pacific region across two ranges of scales. Similarly, Table 10 provides the spectral slope estimates for each satellite product in the same region. The effective resolution of each product is indicated as the wavelength where the coherency spectrum equals 0.5.

Table 9: TSG Spectral Slope Estimates

Slopes ([1000 - 200] km)	**Slopes ([125 - 25] km)**
-0.515(± 0.527)	-2.412(± 0.071)

Table 10: Satellite Spectral Slopes and effective resolution estimates

Satellite products	**Slopes ([1000 - 200] km)**	**Slopes ([125 - 25] km)**	**Effective resolution [km]**
SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)	-0.402(± 0.408)	-2.321(± 0.113)	NaN
SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)	-0.330(± 0.330)	-2.360(± 0.148)	NaN
SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)	-0.384(± 0.382)	-2.401(± 0.141)	NaN
SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)	-0.395(± 0.396)	-2.343(± 0.109)	NaN
SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)	-0.511(± 0.517)	-2.249(± 0.105)	NaN
SMOS SSS L3 v2 - 9-Days (BEC)	-0.316(± 0.302)	-2.324(± 0.121)	NaN
SMAP SSS L3 v6 - 8-Day running (RSS)	-0.400(± 0.401)	-2.379(± 0.146)	NaN
SMAP SSS L3 v6 - Monthly (RSS)	-0.450(± 0.458)	-2.110(± 0.211)	NaN
SMAP SSS L3 v5.0 - 8-Day running (JPL)	-0.480(± 0.498)	-1.647(± 0.714)	NaN
SMAP SSS L3 v5.0 - Monthly (JPL)	-0.427(± 0.445)	-1.442(± 0.896)	NaN
Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)	-0.442(± 0.452)	-2.336(± 0.120)	NaN
Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)	-0.501(± 0.516)	-2.143(± 0.148)	NaN
Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)	-0.442(± 0.453)	-2.338(± 0.110)	NaN
Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)	-0.498(± 0.513)	-2.140(± 0.149)	NaN
Aquarius SSS L3 CAP v5 - 7-Day running (JPL)	-0.553(± 0.569)	-2.524(± 0.075)	NaN
Aquarius SSS L3 CAP v5 - Monthly (JPL)	-0.601(± 0.622)	-2.406(± 0.119)	208
SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)	-0.246(± 0.260)	-2.355(± 0.146)	NaN
SMOS SSS L4 v1 - Daily (CMEMS-CNR)	-0.551(± 0.569)	-2.960(± 0.203)	152
SMOS SSS L4 v1 - Monthly (CMEMS-CNR)	-0.624(± 0.656)	-3.841(± 0.388)	142
CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)	-0.470(± 0.470)	-2.425(± 0.049)	NaN
CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)	-0.459(± 0.457)	-2.432(± 0.053)	NaN
SMAP SSS L4 OI v3 - Daily (ESR)	-0.531(± 0.548)	-1.440(± 0.966)	NaN
SMAP SSS L4 OI v3 - Monthly (ESR)	-0.593(± 0.618)	-1.104(± 1.072)	369
Aquarius SSS L4 OI v5 - Weekly (IPRC)	-0.586(± 0.611)	-2.174(± 0.330)	258
Aquarius SSS L4 OI v5 - Monthly (IPRC)	-0.610(± 0.639)	-2.126(± 0.412)	170
ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)	-0.655(± 0.693)	-1.364(± 1.162)	210

6.6 Western Pacific region

Table 11 presents the spectral slopes derived from the averaged TSG spectrum for the Tropical Pacific region across two ranges of scales. Similarly, Table 12 provides the spectral slope estimates for each satellite product in the same region. The effective resolution of each product is indicated as the wavelength where the coherency spectrum equals 0.5.

Table 11: TSG Spectral Slope Estimates

Slopes ([1000 - 200] km)	**Slopes ([125 - 25] km)**
-3.168(± 0.325)	-2.164(± 0.032)

Table 12: Satellite Spectral Slopes and effective resolution estimates

Satellite products	**Slopes ([1000 - 200] km)**	**Slopes ([125 - 25] km)**	**Effective resolution [km]**
SMOS SSS L3 v332 - 9 Days (CATDS-CPDC)	-2.592(± 0.389)	-1.400(± 0.197)	405
SMOS SSS L3 v335 - 10 Days - 25 km (CATDS-CPDC)	-2.204(± 0.290)	-2.147(± 0.047)	440
SMOS SSS L3 v335 - Monthly - 25 km (CATDS-CPDC)	-3.000(± 0.506)	-2.142(± 0.063)	428
SMOS SSS L3 v9 - 9 Days (CATDS-CEC-LOCEAN)	-2.449(± 0.222)	-1.429(± 0.197)	410
SMOS SSS L3 v9 - 18 Days (CATDS-CEC-LOCEAN)	-3.156(± 0.393)	-1.441(± 0.190)	394
SMOS SSS L3 v2 - 9-Days (BEC)	-2.458(± 0.404)	-2.122(± 0.051)	459
SMAP SSS L3 v6 - 8-Day running (RSS)	-2.882(± 0.277)	-1.796(± 0.101)	415
SMAP SSS L3 v6 - Monthly (RSS)	-3.822(± 0.581)	-1.756(± 0.149)	418
SMAP SSS L3 v5.0 - 8-Day running (JPL)	-2.825(± 0.277)	-1.531(± 0.157)	432
SMAP SSS L3 v5.0 - Monthly (JPL)	-3.650(± 0.471)	-1.442(± 0.159)	426
Aquarius SSS L3 OR v5 - 7-Day running (NASA-GSFC)	-2.760(± 0.406)	-1.956(± 0.111)	387
Aquarius SSS L3 OR v5 - Monthly (NASA-GSFC)	-3.062(± 0.515)	-1.837(± 0.131)	444
Aquarius SSS L3 OR v5 - 7-Day running - Rain mask (NASA-GSFC)	NaN(± NaN)	NaN(± NaN)	NaN
Aquarius SSS L3 OR v5 - Monthly - Rain mask (NASA-GSFC)	-3.178(± 0.527)	-1.850(± 0.117)	443
Aquarius SSS L3 CAP v5 - 7-Day running (JPL)	-3.409(± 0.422)	-1.962(± 0.084)	410
Aquarius SSS L3 CAP v5 - Monthly (JPL)	-3.955(± 0.545)	-1.880(± 0.127)	415
SMOS SSS L4 OI v346 - Weekly (CMEMS-CATDS-LOPS)	-2.756(± 0.329)	-1.991(± 0.068)	392
SMOS SSS L4 v1 - Daily (CMEMS-CNR)	-3.428(± 0.519)	-2.403(± 0.166)	443
SMOS SSS L4 v1 - Monthly (CMEMS-CNR)	-5.294(± 1.020)	-2.122(± 0.183)	425
CCI SSS L4 Merged-OI v4.41 - 7-day running (ESA)	-3.204(± 0.504)	-2.055(± 0.078)	380
CCI SSS L4 Merged-OI v4.41 - 30-day running (ESA)	-3.403(± 0.567)	-2.085(± 0.077)	410
SMAP SSS L4 OI v3 - Daily (ESR)	-3.409(± 0.363)	-0.279(± 0.289)	390
SMAP SSS L4 OI v3 - Monthly (ESR)	-4.321(± 0.614)	-0.504(± 0.287)	402
Aquarius SSS L4 OI v5 - Weekly (IPRC)	-4.231(± 0.604)	-1.770(± 0.137)	345
Aquarius SSS L4 OI v5 - Monthly (IPRC)	-5.548(± 0.999)	-1.795(± 0.230)	400
ISAS v7 - Monthly (Ifremer-LOPS-CMEMS)	-6.933(± 1.659)	-2.012(± 0.199)	434

7 Conclusion

As shown in the previous section, the effective resolution of a specific satellite SSS product can vary from one geographical region to another due to several key factors:

- Variability in Surface Conditions: Surface roughness can differ greatly across regions, affecting the uncertainty on SSS retrievals by L-band sensors. For instance, open ocean surfaces typically exhibit less variability compared to coastal areas, where features such as islands, landmasses, and varying water properties complicate the measurement. This can reduce the effective resolution, particularly in regions with high surface variability like coastal zones, river plumes or areas with ice cover.

- Sampling Density and Data Averaging: The effective resolution is also influenced by the satellite product sampling strategy. In regions with sparse data points, data may be averaged over larger areas, resulting in a coarser resolution compared to areas with denser data collection.

- Instrument Sensitivity to Regional Conditions: The sensitivity of satellite instruments to local environmental factors, such as sea surface temperature, can affect resolution. SSS retrievals from L-band microwave radiometers are more effective in warm, open waters than in regions with cooler temperatures or higher levels of environmental noise, such as areas with sea ice or freshwater plumes.

- Temporal Resolution and Data Gaps: The frequency of satellite revisits to different regions can also affect the quality and resolution of the product. Polar regions may have more frequent satellite passes due to the convergence of orbits, but this can lead to overlapping swaths and challenges in data merging. On the other hand, equatorial regions may receive less frequent coverage, impacting temporal resolution.

The Arctic region presents the greatest challenge, as all satellite coherency spectra show correlations below 0.5 across all wavelengths, resulting in undefined effective resolution estimates according to our methodology. The TSG SSS data generally exhibit very little variability in this region, and retrieving SSS from satellites is particularly challenging due to the low sensitivity of L-band brightness temperature in cold waters.

For the same reason, almost no effective resolution estimates are available for the southern ocean region. Only L4 products that incorporate in situ data can adequately resolve scales on the order of 100 km.

For the 4 other regions, coherency spectra decline at wavelengths between 200 and 300 km depending on the satellite product. This indicates that these products cannot consistently resolve scales smaller than half of their respective effective resolution estimates.

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