





**SMOS Pilot Mission Exploitation Platform (Pi-MEP)**

**Minutes of SAG Meeting**

03/05/2017

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# Purpose of the document

This document provides the minutes of the SMOS Pilot Mission Exploitation Platform (Pi-MEP) SAG meeting #1 that was held at ESA-ESTEC, Noordwijk, the Netherlandson 3rd May 2017. The meeting is structured around 6 presentations with large dedicated time period for discussions. Additionally, part of the discussion was driven by the responses given by each SAG members to 24 seed questions that have been addressed to them 1 week before the meeting. This was particularly important to gather inputs from SAG members that have not been able to attend the meeting. All presentations have been made available one week before the meeting and can be accessed through <https://pimep-project.odl.bzh/documents>.

Meeting starts at 9:30 PM and lasts until about 18:30.

Participants:

Roberto SABIA (ESA) = RS

Suzanne MECKLENBURG (ESA)= SM

Matthias DRUSCH (ESA) = MD

Craig DONLON (ESA) = CD

Nicolas REUL (Ifremer) = NR

Jacqueline BOUTIN (LOCEAN) = JB

Sébastien CLERC (ACRI-ST) = SC

Jean-Luc VERGELY (ACRI-ST) = JLV

Manuel ARIAS (ARGANS) = MA

Stéphane TAROT (Ifremer) = ST

Justino MARTÍNEZ (ICM) = JM

Benoît TRANCHANT (CLS) = BT

Nicolas KOLODZIEJCZYK (IUEM) = NK

Julian J. SCHANZE (Earth and Space Research) = JS

Sébastien GUIMBARD (ODL) = SG

SAG members who have not been able to attend the meeting and have answered the seed questions:

Antonio TURIEL (BEC) = AT

Tony LEE (JPL) = TL

Detlef STAMMER (Univ. Hamburg) = DS

Lisan YU (WHOI) = LY

Chris Banks (NOC) = CB

Lars KALESCHKE (Univ. Hamburg) = LK

Jamie D. SHUTLER (Univ of Exeter) = JDS

Other SAG members :

Thomas MEISSNER (RSS) = TM

Gilles REVERDIN (LOCEAN) = GR

Johnny JOHANNESSEN (NERSC) = JJ

Marie-Hélène RIO (CLS) = MHR

Christophe MAES (IRD) = CM

The meeting is organized in 3 main blocks with 1 or 2 presentations in each block. The agenda is as follows:

1. Presentation of the Project & SAG involvement
   1. Pi-MEP Project introduction and SAG involvement (RS)
   2. Overview of the Pi-MEP activities (NR)
2. Definition of the Pi-MEP Required Data Sets
   1. Presentation of the Pi-MEP proposed datasets (SG)
   2. Discussion & Requirements for Datasets with SAG (all)
3. Definition of the Analyses/Processing to be implemented
   1. Presentation of proposed Analyses/processing (NR)
   2. Presentation of available tools (SG)
   3. Discussion on Analyses & processing (all)
4. Oceanographic processes monitoring capabilities
   1. Presentation of selected oceanographic Case studies (NR)
   2. Discussion & requirements on Case studies with SAG (all)

# Minutes

RS starts the meeting by welcoming everybody and asking each attendant to introduce his(her)self .

* **RS gives his presentation (1.1). He presents quickly the SMOS mission and the status of level 2 salinity products. He presents the Pi-MEP (focus and objectives) and explains the SAG meeting organization/agenda.**

Questions/comments/discussion:

* JB wants to know concerning the automatic reporting of the Pi-MEP SMOS data quality monitoring capability if somebody will look at the plots.

RS says that we could provide automatic alert via email if anomalies are detected

NR says that it is planed to have an operator working at OceanDataLab that will be able to do this kind of work.

* MD asks if a RB document exist

NR answers that the RB document will be provide as D1 at the end of June

* **NR gives his presentation (1.2). He begins by recalling the context of sea surface salinity measurements from satellite; the Cal/Val In situ vs satellite issues (metrics, sampling…). He also presents the project team and the key meetings to interact with the SAG. He concludes by presenting the Ifremer ICT infrastructure.**

Questions/comments/discussion:

* JLV asked if the Pi-MEP could be use to perform Level 1 data analysis.

NR said that it was something we have to discuss inside the SAG but certainly it will be let to the end of the project since it is not a priority of the PiMEP, which will focus essentially on salinity.

MA said that L1 data are really important to take into account in order to be able to provide uncertainty on salinity. He asked if one of the roles of the PiMEP should be to produce uncertainty. If so, including uncertainty of all auxiliary parameters will be necessary.

CD confirms that L1 data is important to derive uncertainty and propose to include brightness temperatures (TB) as an important parameter to look at.

MA and SG insist on the fact that including TB in the PiMEP is tricky and will certainly be too demanding in term of storage and processings. JS said that he was not seeing the point of including TB since there is no ground truth TB to be compare with.

CD says that it certainly can be hold by the soon coming CCI on salinity.

* **SG gives his presentation (2.1). He presents the different datasets required for the Pi-MEP. The discussion (2.2) takes place at the time. The list of the retained and proposed datasets by the SAG members can be found here:** [**https://pimep-project.odl.bzh/data**](https://pimep-project.odl.bzh/data)**.**

Questions/comments/discussion:

* ***Seed Question #1(SQ): Would you favour the inclusion of SMOS L1 (TB) data in the Platform and, if so, in which frame (antenna/earth), at which level (TOA/BOA) and with which correction included (eg. atm/Gal/Ionosphere)?***

AT - If the distribution is intended to be used in assimilation then the distribution at BOA level including corrections and geolocation is necessary.

NR: challenging! the tool to have TB at BOA is not available

JLV - TB at 42.5°, antenna level with OTT correction. Monthly average according to FOV position (for instance 5 positions across track). TX, TY, T3, T4, St1 and T3/(TX-TY).

JLV – maybe use browse product

JB- intersection with Aquarius and SMAP would require same forward model. This is intended for CCI.

Consensus: Merging and intercomparison with other satellites Tbs are beyond the scope of the Pi-MEP and left to CCI, also in terms of homogenizing forward model, auxiliary data and so on. However, we could consider: i)L3TB from CATDS, ii)L1TB browse product (tbc), iii) list of L1c products (orbits list) used per each specific pixel of the match-up database.

* ***SQ#2: SMOS L2 SSS will only refer to SSS1 (roughness model #1). Do you consider adequate to retain only the last two reprocessed dataset (currently v622 and v662)?***

CB - The number of options has always been confusing for the user, as such provision of a single “best” product seems sensible for the purposes here.

Every body agreed

AT - In our opinion only the last one is necessary

JM: not really, both.

MA: readme note useful to guide users.

JLV - V662 only + next versions. SSS uncorrected and SSS corrected from LSC..

RS: Ok to have both – full product anyway.

JDS - Yes

LY - This will depend on the frequency that dataset is reproduced. I personally prefer to retain any older version for 1-1.5 years so that a manuscript, if based on the older version, has sufficiently time to respond during the review process if the results are affected by the version update.

JS : Experiences from the Aquarius mission showed that it can be useful to have previous repro campaigns.

RS: Agree on SSS1 and to maintain the current ops (v662) and the last repro (v622). In 662 both uncorr and corr

* ***SQ#3: Are you aware of additional constraints that would prevent the regular update of the identified datasets?***

AT - Beware: Continuity of advanced BEC products is not guaranteed

ST: Do you plan to establish a servicedesk.

NR: form or single email (contact point).

RS : Not really putting in place an ICD. Establish a communication mechanism btw PiMEP and the data provider (ad hoc).

Refer to newsletter of the data provider and reflect this into the monthly reports.

* ***SQ#4: Could you spot any missing crucial dataset?***

AT - TOPAZ (Atlantic and Arctic dataset), EN4 (salinity observations/OA) and a global precipitation dataset.

Ok for the rest, TOPAZ tbc – contact point L. Bertino (NERSC)

JLV - CATDS OP L3Q (unbiased), L4 AO, Rainfall products. Release RE05.

Agreed to update

TL - In high-latitude oceans, the quality of ancillary SST becomes more important for SSS retrieval because the L-band sensitivity to SSS is poor. Canadian Meteorology Centre (CMC) SST has been found to out-perform other SST datasets the Arctic/sub-Arctic Oceans. The Aquarius project has shifted from NOAA OISST to CMC SST. Including the CMC SST will be helpful for evaluating Arctic/sub-Arctic Ocean SSS retrievals.

In principle agreed to include it (tbc access) – contact J. Schanze/T. meissner

LY - The subsurface temperature at the base of the mixed layer (see the salinity budget equation on slide #8 from 1\_1\_Pi-MEP\_SMOS\_SAG\_v1.pptx. This could be done by the MLD data provider.

Agreed to include it.

The Ekman upwelling velocity, which is one component of we (the entrainment velocity). The component can be computed from satellite wind stress dataset. The spatial structure of Wek is closely correlated with that of precipitation. See attached Wek pattern for Aug 12-18, 2012 versus precipitation for the same period on slide 17, in q2\_Pi-MEP\_SMOS\_SAG\_V3.ppt.

CD: refer to globcurrent? – not really, here v component. NR: check with Lisan and globcurrent

Evaporation and wind:

We are in the process of disseminating a high-resolution (0.25-degree) package (called OAFlux-HR) of surface fluxes including evaporation (fused from 8 scanners and sounders, daily), and ocean winds (fused from 15 scatterometers + passive microwave radiometers, available on 6 hourly and daily). The fluxes are fully validated and consistent with each other. They improve over the current 1-degree products, particularly in the boundary current regions. If needed, I can provide the two forcing datasets (and Ekman upwelling velocity) for the SMOS era ahead of our planned data dissemination that is scheduled in summer/fall.

Ok – update the current OAFLUX

GPCP has a new version 3. Daily data are now available from November 1997 onward. CMORPH does not have data 60N/S poleward, and it has stronger ITCZ rainfall than that of GPCP. The stronger CMORPH may not be bad. We feel that GPCP might be a bit weaker in the tropical region from our recent reanalysis intercomparison study.

Check with SMOS+ rainfall and SSMI WS

* ***SQ#5: Delayed Mode versus Near Real Time - how to cope with this? Preliminary idea is splitting the database for the matchup according to QC control. Any further insight?***

CB - For true cal / val need to use QC-ed in situ delayed mode data

AT - D/R Mode can be treated as an additional QC flag... To be discussed...

JDS - Yes, this approach makes sense.

LY - Use different suffix for near real time file names?

NR: to have two different files (DM and DM+NRT) was the original idea.

Argo: DM but with a flag if NRT

TSG + drifters: DM only

Moorings: ?

* ***SQ#7 : Any suggested mechanism for transferring/including campaigns data (eg. SPURS-2) directly into the Platform?***

CB - AMT - Atlantic Meridional Transect – ESA (Craig) already involved for other variables. Ok doable

AT - It would be necessary to define some standards based on XML or SOS in order to transferring sensor data (<http://www.opengeospatial.org/standards/sos>)

TL - SPURS-2 data will be hosted by PO.DAAC. Can find a mechanism to link/transfer the data.

Bingham is the data manager. Ok to send QC datasets (tbc)

Clerc – disclaimer and indicate data providers.

JB – moorings are the best, but QC is an issue.

NK – Oceansites – repository of moorings – contact N. Kolo

SC and CD – Felyx could be a mechanism.

Issue on any IPR

* Try to simplify as possible the naming convention of SMOS data.
* JS asks about the possible capability given by the Pi-MEP to upload personal in situ data to make some colocations with different Pi-MEP datasets.

SM says that the uploaded data should stay private in order to avoid problems regarding evident quality-control issues.

* **NR gives his presentation (3.1). The SMOS Level 2 SSS Validation protocol is described. The production of Satellite/In situ Match-Up Database is explained. Product inter-comparison metrics are presented. Enhanced Validation Protocols & Metrics are proposed.**

Questions/comments/discussion:

* Regarding the matchup database, NK asks to include high-resolution drifter data, the QC variables, the adjusted and original data and to put a flag between delayed and NRT data. He also proposed to use the TAO/PIRATA/RAMA mooring data from oceansites since they have different quality control criteria and to give the salinity at different depth when available.
* ***SQ#8: Match-up criteria: suggested additional spatial or temporal scales?***

CB- User defined for specific purposes or is that out of scope?

Pre-defined scales and according to the L3 products. Traceability of the criteria chosen.

JLV - Data should be put at the same resolution before comparison. If not, representativeness error could be added.

Not really, more for process studies (re-gridding).

Normalized measurements by the errors (incl. representativeness) – to be assessed how

* ***SQ#9: Match-up criteria: suggested collocation radii?***

NOC - User defined for specific purposes or is that out of scope?

As above

AT - As a first approximation it could be taken as the Rossby deformation radius

Only relevant to products with res higher than Rossby def. radius

JLV - Collocation radii could depend on the location and season (from instance, if SSS comes from homogeneous region, collocation radius could be taken larger in comparison with region affected by strong gradients).

Related to the characterization of the rep. errors – to be assessed how

LY - Rossby radius of deformation?

Only relevant to products with res higher than Rossby def. radius

JB – how about temporal radius? Flexible for the user:

Lowe bound: tbc (NR/JB)

Upper bound: tbc (NR/JB)

* ***SQ#10: Any missing data in the in situ datasets (see PIMEP\_DATASETS.xls table) as it is defined currently?***

NOC - There seems to be no information under altimeter waves – should here be?

Agreed. GlobWave

What about including SAR wave information too? Would that be useful? tbc

GPCP? Tbc (N. Kolo)

Check with SMOS+ rainfall and SSMI WS

Check with Lisan Yu at WHOI

Also, ECMWF U10 (as per SMOS SSS aux WS)

TL - The current list is adequate

LY - All look good to me.

* ***SQ#11: Any clear limitation with the current official SMOS validation protocol?***

AT - The ocean dynamics is smoothened by using the current spatial/temporal grid (100km, 1 month)

Agreed. To be studied at different s/t scales and also beneficial to have spectral analysis.

TL - It’d be nice to have a procedure to systematically evaluate the consistency of SMOS data with Aquarius/SMAP SSS and with in-situ OI data (e.g., JAMSTEC, ISAS) at different spatial and temporal scales (e.g., Lee 2016 (GRL) evaluates Aquarius V4 SSS against Argo-based OI products at 1x1, 3x3, and 10x10 degree spatial scales, and for seasonal and non-seasonal time scales). This is because some users are interested in knowing how good the satellite SSS are for the spatial and temporal scales of their interest.

Agreed and totally in scope for this platform.

JB – also interesting to cfr SMOS and SMAP at high-res (0.25 deg)

LY - No sure how sufficient the SMOS data are in representing mesoscale variability given the 1-degree resolution.

Agreed. To be studied at different s/t scales and also beneficial to have spectral analysis.

* ***SQ#12: Any suggestion to agree on a common set of flags for the various products?***

LY - Flag for retrievals near the coastline. How far from the coast is the retrieval regarded “good”?

Flag for Retrievals at high latitudes.

To use the flags as coming from the data provider (and refer to it).

L2 SSS as per the current val protocol.

Reading all the flags anyway (SMOS L2) to let user tick/untick them.

BT – maybe the goal to have a common flag? Not easy…

* ***SQ#13: Any other statistics/metrics/plot to be included/visualized?***

AT - Number of measures per cell (point) excluded and included. Intra cell variability

Useful, but not in all products.

JM – mean/median/mode in the same plot

JLV – Robust indicator for std. RMSE – but very sensitive to extreme values – eg norm[L1]

Quantiles? Agreed

Wavelet analysis? Maybe adequate for process studies cases. Not systematically.

PCA analysis? As above

Statistics of extreme events (not outliers, eg. freshening…). These events are rare. This is why, when comparing SMOS with other data, the restitution of extreme events have a low weight in the statistics if we don’t consider them apart.

Tbc if can be treated with datalaps?

LY - The number of grids that have high salinity (>35.5 for instance) and low salinity (<30.5 for instance), for the same regional/global ocean area.

* ***SQ#14: The Platform intends to “stratify” data according to selected geophysical regimes to favour an enhanced validation (Eg. wrt SST, or WS/SWH, or WS/MLD). Any suggestion for additional regimes to be considered?***

AT - Collocation with precipitation; Take into account the temporal variability (based on TAO...).

Already implemented.

JB- instantaneous is crucial

SC - What does this “stratification” mean from the user point of view ?

JDS - Longhurst or biogeochemical provinces. Tbc if doable

TL - High-variability regions vs low-variability regions. For example, high-variability regions include western-boundary current regions, coastal oceans (esp. near river plumes), ITCZ. These are regions where Argo data are not adequate to evaluate satellite SSS because Argo data are subject to aliasing.

Also, high-latitude oceans vs. tropical/subtropical oceans.

No problem. It makes sense

LY - Strong currents versus weak currents regimes. As above (precip)

NR – one way of characterizing is through the std(in-situ) as a first order.

* ***SQ#15: The platform aims at a full characterization/error budget of the actual SMOS performances; any suggested metric to characterize and discount errors due to h/v variability and representativeness?***

AT - Use triple collocation to estimate RMSE;

H variability could be assessed from TSG measures whereas ARGO profiles could provide V-structure (WS/MLD).

CD- G2U measurements (ref. standard).

MA: prefer QA4EO.

Inherit all the inputs from SISS and BAMS paper and inputs from Nadya Vinog.

CD - Be consistent with nomenclature (bias, error…)

JS – useful to have a tool for sub-footprint variability (NR – included in the matchup for TSG).

Agreed to decompose the satellite uncertainty from the geophysical signals and h/v variability.

JLV - Robust indicator for std. Weight the performance with representativeness error if possible (see questions 8 and 9).

* **SG gives his presentation (3.2). He presents the different tools that will be used on the platform : FELYX/NAIAD, Datavore/Datalaps/Merginator, Syntool web, and Jupyter notebooks.**

Questions/comments/discussion:

* ***SQ#16: Any clear limitation of the described Tools? Any missing feature?***

CB - Information on assumptions/inputs for the various data products (e.g. OI length scales).

Refer to the data provider and documentation

LY - Vertical mixing. Or more specifically, the interaction between SSS and subsurface salinity.

* ***SQ#17: Any additional tool recommended to implement?***

SC - The link between available tools and the objectives of the platform is not clear to me. For instance, what is the workflow to perform a validation wrt in-situ data, or to monitor evolutions of the SSS in the Mississippi river plume ?

Some features described in the “processes” seem to require SSS gradients, Hoevmuller plots, extraction of maximum, computation of correlation between datasets: are these features supported by selected tools?

User manual for each tool or sort of tutorial. “walk-me-through” guidelines. Short video or demo – tbc a valuable outreach strategy

JDS - Ability to run analyses on user defined regions. Eg. Upload NetCDF masks of user defined regions.

I was confused as to why the ocean definitions that you are using are not the International Hydrographic Office definitions of the oceanic waters. E.g. some overlap (north and central pacific overlap), one of the Atlantic ocean definitions includes a piece of the pacific..

Agreed. This can be updated.

Datavor – extraction on user-defined area.

JM – issues if no-regular areas. Tbc

* ***SQ#18: The platform intends to allow some capability of ingesting user codes (yet limited in complexity) – Any suggested constraint to the user?***

JLV - Matlab code ?

NR – it depends on the interface. Matlab code can be compiled and run, but on-demand (case-bycase)

SC - If the platform aims at supporting improvements of L2 to L4 processing, this seems indeed a key feature. I suppose a first step could be to use the IPython notebook for prototyping. Therefore it could be useful to have some ready-made scripts to access (APIs) and read SMOS products and visualize data to support prototyping.

The next step could be to run some “pre-operational” code in batch mode. How would this be done: code to be provided to platform operators for ingestion?

What about sharing strategy with other users?

* ***SQ#19: The platform intends to allow some capability of ingesting user datasets (yet limited in size and format) – Any suggested constraint to the user?***

AT - NetCDF format seems to be the most convenient because it can contain also meta-data that can be requested by PI-MEP to ingest data automatically. ASCII (csv) could be also allowed for its easy generation.

NetCDF should be the standard.

Dynamic development – things can be updated later on.

SC - What about sharing strategy with other users?

Agreed on the validation – only reliable datasets as those described.

SAG to decide on case by case in terms of specific needs of datasets upload (and conditions/IPRs/disclaimer attached)

JDS - In situ data at fixed locations or drifting buoys, multiple depths at each location.

* **NR gives his presentation (4.1). An extensive list of oceanic case studies is presented with corresponding required datasets.**

Questions/comments/discussion:

* ***SQ#20. Any missing info to attain the listed process studies?***

AT -

- Mesoscale analysis in the Mediterranean

- Stationality of the SSS fronts

- Correlation between SSS fronts and ACC fronts (Antarctic Circumpolar Current)

SC - Who is going to lead these studies? It would be useful to identify a PI

To be decided if the ENSO project and OA project could be a way to assign lead scientists or to descope these studies.

JDS - Who is/are going to lead these studies and how? Are there any staff resources available to support these studies?

Keen to ensure that this work supports ongoing research efforts. Need to be careful that data provision doesn’t imply that everything is solved in each of the identified Process case studies.

As above.

LY - using SSS to provide information (or constraint) on the ocean freshwater budget change.

Pros and issues of involving external people as PIs of the specific case studies.

* ***SQ#21. Could you rank your most valuable 3 case studies among those selected?***

CB - Large rivers (not all examples Tropical), freshwater cycle, variability with climate indices

AT -

- Climatic study

- pCO2 fluxes

- Interaction between river discharge and the circulation pattern of the zone

SC - 4, 3, 6.

6 seems interesting but scientifically challenging

JDS - 7 could attract a lot of positive international attention and is region where SMOS data are under exploited.

For climate research 4.

1 and 6 are to some extent interlinked.

TL -

1. River plume regions.

2. Mesoscale structure.

3. High latitudes and marginal seas

These are regions where satellite SSS have better coverage/sampling then in-situ system such as Argo and moorings.

LY -

(1) Process #3: mesoscale and frontal scale SSS features – these features reflect the interaction between different water masses, with the fresher water mass either from the rainfall (such as the ITCZ) or from the eddy shedding from the freshwater zone. This process study links to Processes #1 (river plumes) and partially to #2 (freshwater cycle area; for instance, we can gain a better understand of the distribution and dissipation of the ITCZ produced fresh surface water through tracking the movements of the tropical SSS fronts.

(2) Process 4: SSS variability with climate indices – this should also tie to process #2 as surface wind and freshwater forcing also co-vary with climate indices. Could NAO index be included too?

(3) Process #6: broadening the scope of the interactive nature between salinity and bio-geochemical variables would benefit the science, the societal impact driven studies, and the longevity of the mission.

Compile table counting votes and ranking the process studies and decide if assigning or not to PIS (and whom)

* ***SQ#22. Any additional process study users might like to address?***

CB - Perhaps Rossby waves and MJO? (although probably fit under existing main headings)

AT - Deep convection episodes in the western Mediterranean during winter

JLV - I guess, Nicolas, you chose the good ones with different characteristic time and space scales. And different amplitude dynamic. Maybe low dynamic missing?

TL -

For Process 7, can include the Arctic Ocean. Arctic Ocean has large SSS dynamic range. Even though L-band SSS quality is not good in the Arctic Ocean, the signal-to-noise ratio may not be that bad in certain regions.

Specific questions for the Arctic Ocean SSS:

1. How consistent are satellite SSS in depicting Arctic Ocean SSS changes?
2. How consistent are satellite SSS in the Arctic Ocean with the limited in-situ measurements? (need to find as much in situ measurements in the Arctic Ocean as possible and put them in a central repository).
3. Are there areas in the Arctic Ocean where S/N ratio is good such that it warrants scientific analysis?

Are SSS changes near Arctic river mouths consistent with changes in river discharges? (need to find the time series of Arctic river discharges).

LY –

Using salinity to validate and constrain the ocean water cycle budget

Recognizing the important role of ocean processes when referring to the ocean rain gauge concept. The concept needs to be carefully defined, as salinity cannot be an indicator on the regional scale although it should work on the global mean basis.

* ***SQ#23. Suggested metrics for the performance assessment of the platform in the pre-operational phase?***

SC – Number of users, products accessed/downloaded, processing done online, availability of platform, Software Problem Reports statistics

JDS - Numbers of users and diversity of users (i.e. not just EO scientists), uptake by Earth system modeling communities.

LY -

Standardize the characterization of SSS meso- and frontal features in selected regions?

Define SSS composite patterns for associated climate modes (e.g. El Nino, La Nina, Indian Ocean dipole, etc)?

* ***SQ#24. Any insight to avoid overlapping with future CCI SSS activities, considering that merging SSS datasets is already beyond scope of this Platform?***

SC - “Processes”/use cases presented are clearly not SMOS-specific, and could be addressed in a future CCI SSS platform. It would be good to refocus the activities as contributing to validation/improvement of SMOS data

JDS – In case its useful: both skin and depth normalized SSS datasets would benefit the biogeochemistry work and Processes 6. (e.g. depth normalized data similar to that which ESA SST CCI provide).

LY - What is CCI? Sorry I did not know the acronym.

CCi domain:

* L1 comparison/homogenization
* Re-calibration of retrieval algorithms
* Standardization of aux SST, WS and dielectric constant algo parameters
* FRM for SSS