

SMOS Newsletter # 3 (October 2012)

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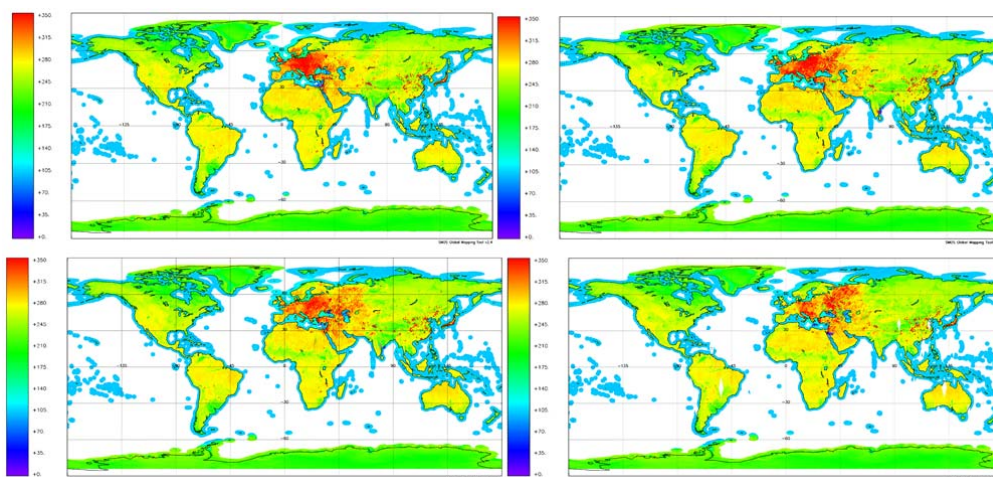
The ESA SMOS web portal provides a comprehensive access point for all SMOS related information. Users are encouraged to visit the SMOS portal for announcements, updates on ground segment operation and scientific mission achievements. Recent SMOS newsletters are also available on the ESA web portal:

<https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/smos/newsletter>

Highlights

RFI over Central Europe

Several very strong RFI sources have been detected in the last months over Central Europe which are disturbing the instrument measurements over significantly large areas. The national authorities have been informed and investigations are on-going. The figure below shows the weekly average value of the Brightness Temperature (1st Stokes parameter) in September 2012 as sensed by SMOS; the areas polluted by RFI are coloured in red. For full details please also see the latest news on http://www.cesbio.ups-tlse.fr/SMOS_blog/



Weekly average of the L-band Brightness Temperature (1st Stokes parameter) as sensed by SMOS: Week of 3 Sept (top left), Week of 10 Sept (top right), Week of 17 Sept (bottom left), Week of 24 Sept (bottom right)

Using G-POD for processing SMOS data: call for proposals

The Grid Processing-on-Demand (G-POD) environment [<http://gpod.eo.esa.int>] is a tool for EO data users offered by ESA for conducting Earth Science research activities.

G-POD is open to SMOS data users which are now again encouraged to submit proposals for:

- The prototyping, development, validation, and operational deployments of new algorithms and “scientific added value products”, requiring high volumes of data and processing resources,
- The development of new Earth science applications exploiting the synergetic use of EO data, including synergy with other space-borne and ground data, models and multidisciplinary applications.

G-POD SMOS proposals need to be submitted directly onto the following website: <http://eopi.esa.int/G-POD>. This is an open call, i.e. proposals can be submitted at any time.

SMOS data disseminated through EUMETCAST

The SMOS NRT light product (Multi-angular Brightness Temperature on N256 Gaussian grid) will be disseminated through EUMETCAST, the data dissemination system operated by EUMETSAT. The technical tests for the link are under way and the service will be activated in the second half of October 2012. Further information on the EUMETCAST service is available under: <http://www.eumetsat.int/Home/Main/DataAccess/EUMETCast/index.htm?l=en>

Validating SMOS sea-surface salinity

Recent work on validating the SMOS sea-surface salinity versus in-situ measurements from Argo drifting floats have been summarised in the following article: https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/smos/news/-/asset_publisher/W76o/content/smos-has-a-better-look-at-salinity?p_r_p_564233524_assetIdentifier=smos-has-a-better-look-at-salinity&redirect=%2Fc%2Fportal%2Flayout%3Fp_1_id%3D65625

Recent improvements in the RFI situation as well as enhanced data processing have improved the SMOS data quality significantly. The mission is now approaching its objective of 0.1 psu (practical salinity unit) accuracy for a 10–30 day average, over an open ocean area of 200 km by 200 km.

Data and Processors

Data availability

The SMOS instrument – MIRAS – is operating nominally with the exception of some well-known on-board anomalies [see description of anomalies http://earth.eo.esa.int/missions/smos/MIRAS_ANOMALIES.pdf]. The cumulative data loss due to instrument unavailability since the beginning of the routine operations phase in May 2010 amounts to 0.134% and the degraded data amounts to 1.847%. A detailed list of instrument anomalies is compiled on a weekly basis and is available on https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/smos/content?p_r_p_564233524_assetIdentifier=mission-status-7060].

No data loss has occurred during the acquisition of MIRAS raw data at the ground stations since the beginning of the routine operations phase in May 2010. This result has been achieved by implementing an on-board data recording overlap strategy.

Instrument Calibration

Several calibration activities are performed on board and an overview on the calibration strategy implemented for the MIRAS instrument can be found on [https://earth.esa.int/c/document_library/get_file?folderId=118493&name=DLFE-1732.pdf]. During calibration activities, science data is not available hence data users should consult the calibration plan available on [<https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/smos/available-data-processing>] for data availability.

Since the issue of newsletter #2, calibration activities were performed in accordance with the routine calibration plan and calibration results are within the nominal range. The last Flat Target Response (FTR) acquired in June 2012 does not show any significant deviation from the previously used one in the Level 1 ground processor (acquired in summer 2011) and therefore no update of the FTR has been implemented in the ground processor.

The evolution of the calibration parameters since the beginning of the mission is available on: [https://earth.esa.int/c/document_library/get_file?&folderId=143382&name=DLFE-3501.pdf].

Data quality

A monthly report summarising the main events which occurred in the SMOS flight and ground segment and the SMOS data products quality status can be found on [https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/smos/content?p_r_p_564233524_assetIdentifier=data-quality-7059]

Since the issue of newsletter #2 an anomaly in the Sun tail flag has been detected in the Level 1C data product. Not all pixels in the snapshot being contaminated by the Sun tail have the appropriate flag set. Please see the product quality disclaimer in the monthly report issued in August 2012 [https://earth.esa.int/c/document_library/get_file?folderId=143382&name=DLFE-3105.pdf] for a further description of the anomaly and its impact on the data.

Updates on operational processors

The current versions of the operational processors installed in the SMOS ground segment are:

Processor	Current version	In operations since
Level 1A	V5.04	14 November 2011
Level 1B	V5.04	14 November 2011
Level 1C	V5.05	21 March 2012
Near Real Time processor (NRTP)	V5.05	7 March 2012
Level 2 soil moisture	V5.51	24 April 2012
Level 2 ocean salinity	V5.50	15 December 2011

Below are further details on the current versions of the operational processors:

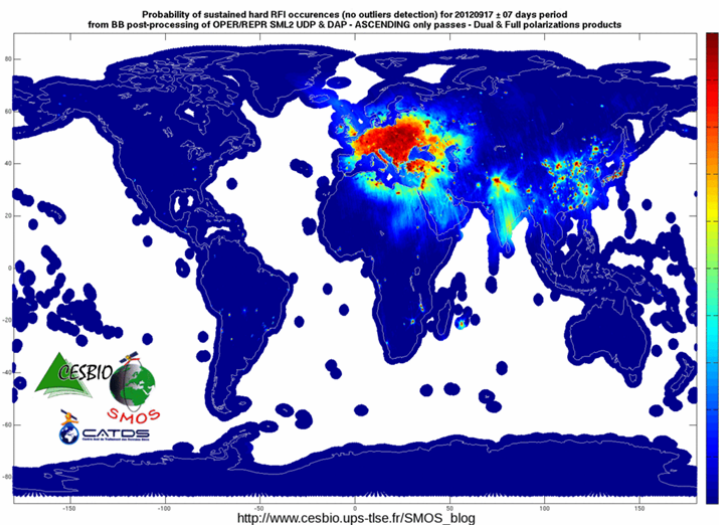
Level 1/ NRTP: No change has been implemented in the Level 1 processor during the period July – September 2012. Therefore, the algorithm baseline and data quality are as reported for the SMOS newsletter #1 issued in May 2012.

Level 2 Soil Moisture: No change has been implemented in the Level 2 Soil Moisture processor during the period July – September 2012. Therefore, the algorithm baseline and data quality are as reported for the SMOS newsletter #2 issued in July 2012.

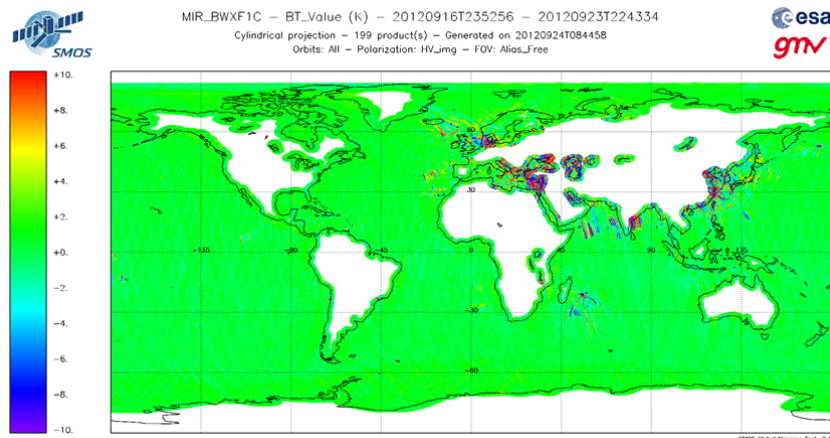
Level 2 Ocean Salinity: No change has been implemented in the Level 2 Ocean Salinity processor during the period July – September 2012. Therefore, the algorithm baseline and data quality are as reported for the SMOS newsletter #1 issued in May 2012.

Radio Frequency Interference (RFI)

Illegal RFI sources operating in L-band adversely affect the SMOS measurements, making SMOS data products largely unusable for scientific applications when they are present. Users can check whether data are corrupted by RFI by using the quality flags, available in the SMOS data products, as indicators. A detailed description of these flags was included in the SMOS newsletter #1 issued in May 2012. Additional information with regard to RFI contamination can be found on the RFI probability maps, generated fortnightly by CESBIO and available on the SMOS blog [http://www.cesbio.ups-tlse.fr/SMOS_blog/?p=2963]. The figure below shows an example of the map generated for the period centred on 17 September 2012. Thus the user can visually inspect the map to identify areas with strong RFI presence over land.



The 3rd and 4th Stokes parameter can also be used to detect RFI. Nominal values for the 3rd and 4th Stokes parameters are expected to be very small for natural targets at L-band. Hence larger deviation in the 3rd and 4th Stokes parameter, i.e. beyond a few Kelvin, would indicate the presence of RFI. The figure below shows an example of the weekly map of the 4th Stokes parameter for the week of 17 September 2012. The user can visually inspect the map to identify areas with possible RFI presence over Sea (i.e. third and fourth Stokes parameters above 10 K in absolute value). Weekly maps of 3rd and 4th Stokes parameter are available in the SMOS Monthly QC Report [https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/smos/content?p_r_p_564233524_assetIdentifier=data-quality-7059].



The evolution of the SMOS RFI sources worldwide is regularly monitored by ESA and results are reported to the Space Frequency Coordination Group meeting and to the national administrations responsible for the radio frequency requesting the illegal transmissions to be switched off. As of September 2012, a total of 522 RFIs have been detected worldwide and 42 % of them have been successfully geo-located and switched-off. The improvement to the RFI situation in North America continues, however, there is no progress concerning those RFIs that are due to excessive out-of-band emissions from radars in Alaska.

Upcoming Meetings

SMOS training course at CESBIO 5-9 November, Toulouse, France

The training course is organised by the SMOS team at CESBIO and it is sponsored by CNES and ESA. It The training course will provide both theoretical and practical sessions and is an opportunity for SMOS data users and researchers to learn about the theoretical background of the SMOS mission, the data processing algorithms and how to deal with the brightness temperature, soil moisture and ocean salinity products. The technical program and organisational details are available on the CESBIO blog (http://www.cesbio.upstlse.fr/SMOS_blog/?p=3313). Applications are now closed.

SMOS sessions at AGU 3-7 December, San Francisco, US

SMOS mission status and the achieved science results will be presented at the largest scientific geophysical conference in the world (see <http://fallmeeting.agu.org/2012/> for details) The SMOS related sessions are:

- H045. SMOS - ESA's Water Mission
- OS034. Science Results from the Aquarius and SMOS Ocean Salinity Missions
- H033. Using Field Measurements and Experiments to Advance Science
- OS028: Ocean Surface Emissivity for Passive Remote Sensing Observations
- OS024: Observations and Modelling of Regional and Global Freshwater and Saltwater Budgets and Transports

SMOS workshop for applications over land 25-27 February 2013, ESRIN, Frascati, Italy

A workshop addressing the SMOS land surface component is jointly organized by ESA, CESBIO, and CNES. The workshop themes will be grouped around the level 2 soil moisture and vegetation opacity products. Key topics will be the soil moisture retrieval using SMOS brightness temperature observations, the SMOS L2 processor and soil moisture product verification including performance indicators. In addition, novel products (e.g. wetland monitoring or detection of frozen soils) and applications over land will be addressed. The workshop will provide a forum for discussion and the exchange of the latest scientific results. The detailed announcement will be available shortly via the SMOS (<https://earth.esa.int/smos>) webpage and the CESBIO blog (http://www.cesbio.ups-tlse.fr/SMOS_blog/). A dedicated workshop webpage for abstract submission and registration will be available soon.

EGU General Assembly 07-12 April 2013, Wien, Austria

The SMOS mission will complete its nominal 3-years life time in November 2012 and to mark this important milestone a specific session on EGU has been organized by ESA and the SMOS Principal Investigators. The session, ***SMOS: successfully completing 3-years nominal life time*** will address major scientific achievements based on data provided by the SMOS mission so far. We would like to encourage you to submit abstracts relevant for one or more of the main session's topics:

- i. Major scientific achievements based on SMOS data products, including level 1 (brightness temperatures) and level 2 (soil moisture and ocean salinity) data,
- ii. Innovative applications, going beyond initial mission objectives, based on SMOS data products,
- iii. Calibration aspects and algorithm development in support to improving SMOS data quality,
- iv. Validation of the SMOS soil moisture, ocean salinity and vegetation data products using in-situ, airborne campaigns and satellite measurements,
- v. Using SMOS data in data assimilation and predictive models in general.

The deadline for the submission of abstracts is 9 January 2013. Further information on EGU 2013 are available on the conference web site: <http://www.egu2013.eu>

SMOS - Aquarius workshop 15-17 April 2013, IFREMER, Brest, Italy

ESA, NASA, IFREMER, SMOS MODE and CNES are jointly organising a SMOS-Aquarius workshop. The objective of this workshop is to explore common L-band sensor and algorithm issues for sea surface salinity and soil moisture retrievals derived by SMOS and Aquarius data and explore synergistic use of and validation approaches for these two missions and other sensors' data over land and ocean. In addition, the workshop will provide a forum for discussion on specific topics related to improving sea surface salinity and soil moisture retrievals through dedicated working groups. The detailed announcement will be made shortly via the SMOS (<https://earth.esa.int/smos>) and Aquarius (<http://aquarius.nasa.gov/>) webpages. There will be a dedicated website, which will be up and running shortly with a detailed description of the programme and the organisation.

ESA Living Planet Symposium 9-13 September 2013, Edinburgh, UK

The ESA Living Planet Symposium 2013 will be held in Edinburgh, United Kingdom from 9 to 13 September 2013 and it is organised with the support of the UK Space Agency. SMOS data users are invited to present and discuss their results on the on-going science activities. A detailed description of the programme and the organization is available here: <http://congrexprojects.com/living-planet-2013/home>.

Data Access

If you wish to access science data please see the following link for the procedure to follow: [https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/smos/content?p_r_p_564233524_assetIdentifier=how-to-obtain-data-7329].

If you wish to access near-real time data (full or NRT light product), please send an email to Susanne.Mecklenburg@esa.int.