

The Soil Moisture and Ocean Salinity Mission

Ocean user meeting at EGU 2012

SMOS mission status

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MISSION STATUS AND DATA AVAILABILITY



- **SMOS successfully launched on 2 Nov 2009**
- Commissioning phase of first 6 months successfully completed and SMOS now in routine operations as of May 2011
- Expected life time 3+2 years

- The **space segment** -payload and platform- is functioning well with minor anomalies
- For example, since May 2010 0.14% of data were lost and 2.36% degraded
- System performance requirement of 98% for generating observation data
- Calibration activities amount to 1.68 % of the mission time

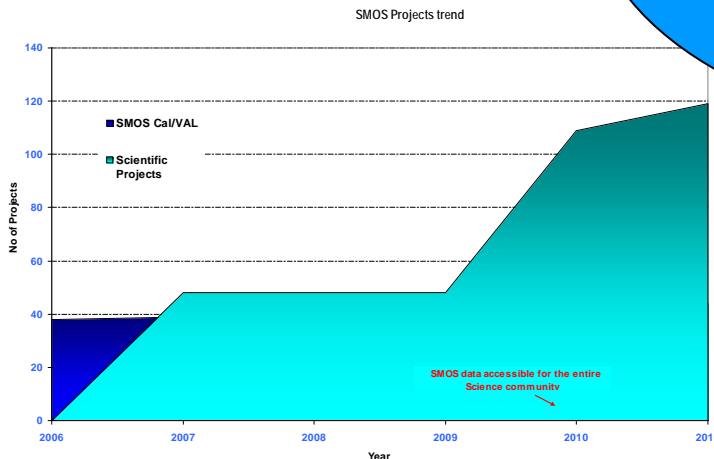
Level 1 and 2 data products available to science community since July/October 2010

First reprocessing of SMOS data up to level 2 completed, data available via ESA cal&val portal
Current acquisitions available via subscription

SMOS operations
= reliable instrument operations
= reliable data processing up to L2/NRT
= data delivery to users in timely fashion



The **ground segment** is acquiring and processing data up to level 2 and providing data in Near-Real Time to ECMWF, and a NRT light product via the UK Metoffice (and possibly EumetCast)



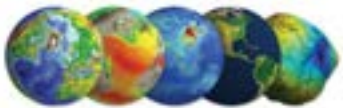
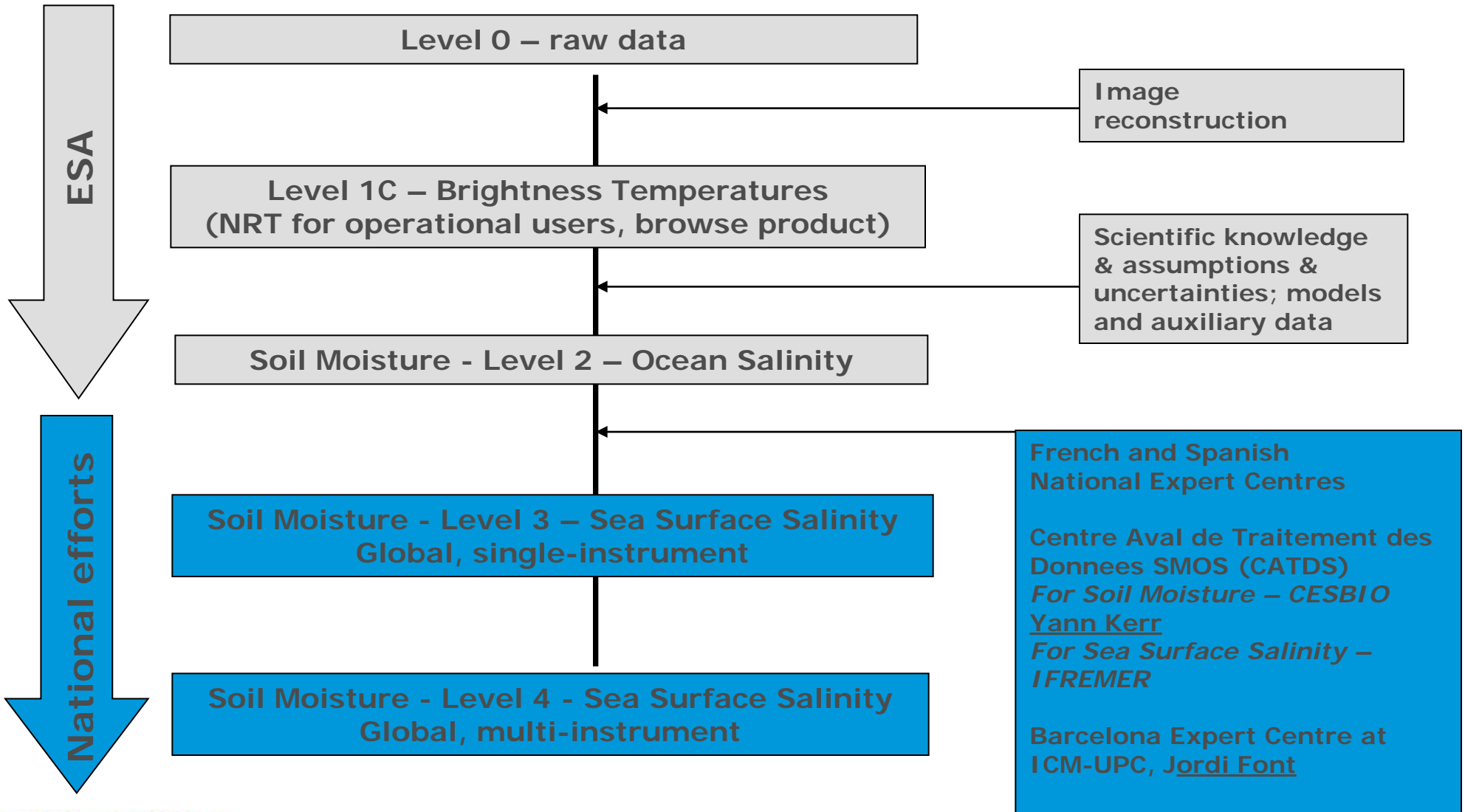
A few facts

- No data loss at acquisition
- Data successfully processed to L1, L2SM, L2OS in 99.5%
- NRT: delivered in 84.6% of the sensing time within the requirement of 165 minutes
- Data for subscription users available within 1-3 days after sensing

A total of 160 scientists and research groups have presently access to SMOS data, for both cal&val activities and science projects, tendency increasing.



AVAILABLE DATA PRODUCTS



Level 2 Ocean Salinity

- Application area: oceanography, climate

Operational agencies:

ECMWF for assimilating SMOS data into their forecasting models, as well as various weather services investigating the usefulness of SMOS data in their assimilation schemes (MeteoFrance, Environment Canada, NOAA, NASA etc)

Scientific research:

Approximately **160 Principle Investigators** from all around the world supporting our calibration and validation activities with their respective proposal and investments and/or using SMOS data for their scientific research projects.

Level 2 Surface Soil Moisture Level 3 Root Zone Soil Moisture Level 3 Vegetation Water Content

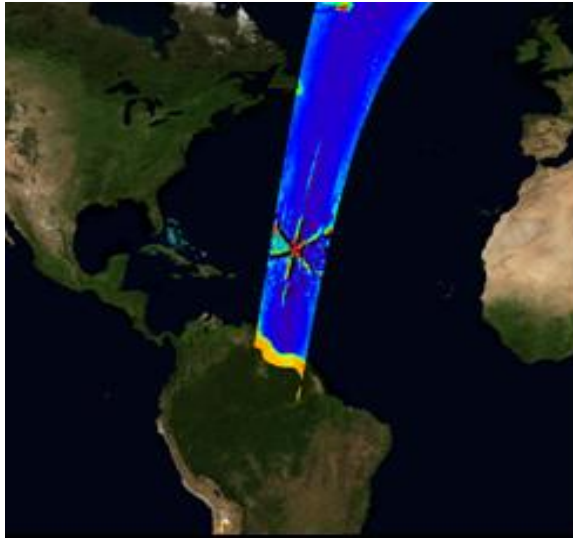
- Application area: hydrology, land use, climate, renewable resources, atmosphere, agriculture, hazard

Level 2 Frozen Soil Indicator Level 3 Freeze / Thaw Periods Level 3 Sea Ice Thickness

- Application area: hydrology, climate, land use
- Application area: oceanography, ship routing, climate, atmosphere



Continental regions are not the only ones affected by RFI



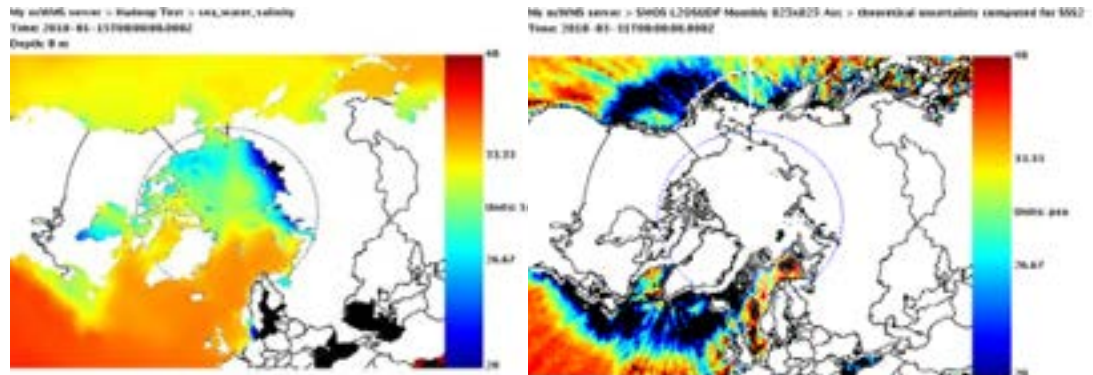
- Largest contamination → Northern Hemisphere high latitude, particularly over the North Pacific and Atlantic oceans and during ascending passes
- How the RFI impact is seen? Quasi-circumpolar belt of high brightness levels (+30 K wrt ocean brightness temp → fresher waters) polluting data acquired North of 40°N latitude
 - RFI source: compatible with radar systems in Northern America and Southern tip of Greenland.

Effect of RFI over Oceans:

- Due to terrestrial RFIs that can affect larger areas, including neighboring oceans

And also

- Due to RFI emitters on board ships observed to emit in the protected band.



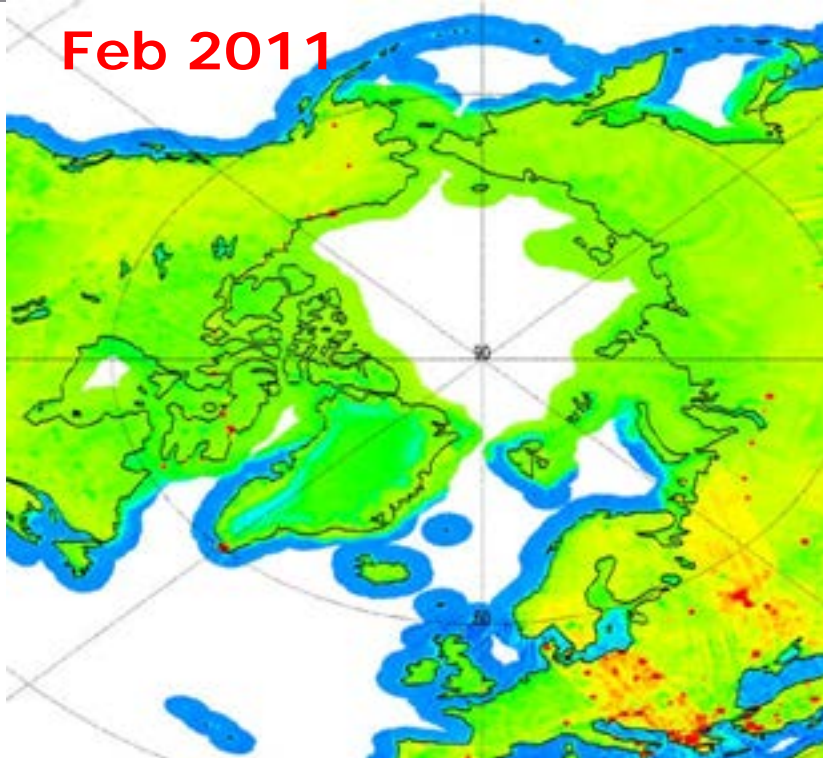
In-situ

April 2010 ascending

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Feb 2011

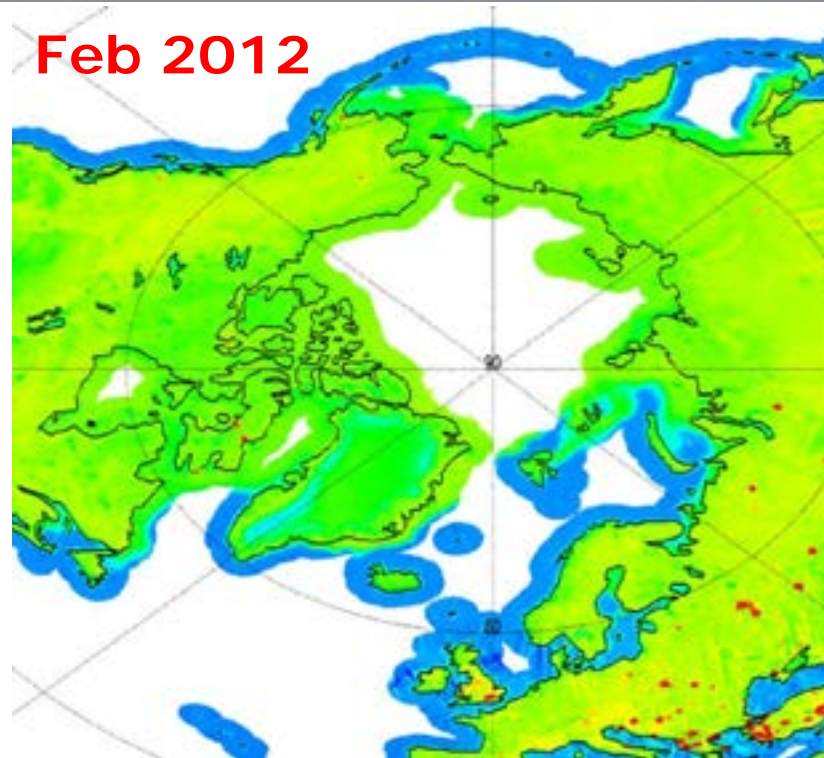


SMOS brightness temperatures
Feb 2011

Several radars are observed over the Northern Canadian border and at the tip of Greenland.

The authorities from Canada and Greenland were informed, and requested to take actions.

Feb 2012



SMOS brightness temperatures
Feb 2012

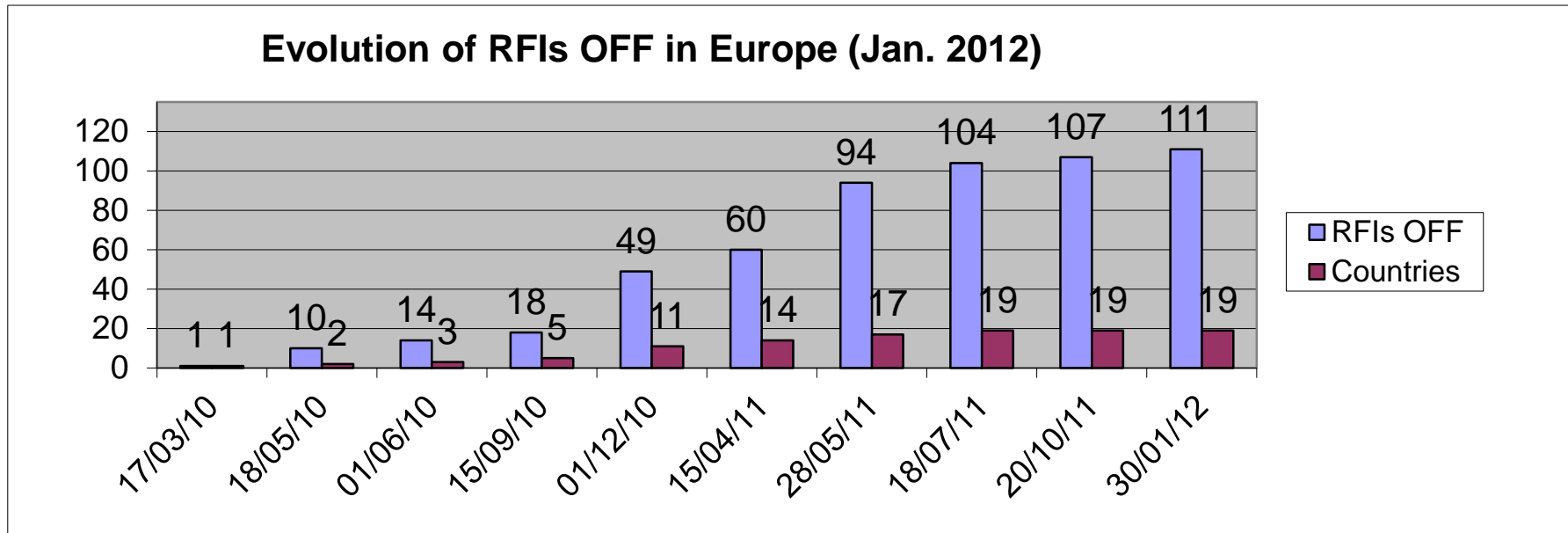
Canada started to refurbish their equipment in autumn 2011. Greenland switched their transmitters off in March 2011.

→ At least 13 RFIs have been switched off in the Northern Latitudes.

However the few remaining RFIs can contaminate areas 3000 Km away from the original source, especially in passes descending towards North-America.



IN EUROPE



WORLDWIDE

- Canada has switched Off 11 radars
- US has switched off 13 RFIs
- 32 RFIs in China have disappeared, after some actions taken by the Chinese authorities.



THURSDAY 26 APRIL 8:30-12:30 room SM1

Topic	Speaker	Time
Briefing to ocean salinity data users		
Introduction and scope of this meeting	Susanne Mecklenburg (ESA)	5 min
SMOS MIRAS instrument performance and status of level 1 data processing	Manuel Martin-Neira (ESA)	20 min
Status of the level 2 ocean salinity retrieval	Jordi Font (CICM)/ Jacqueline Boutin (LOCEAN)/ Nicolas Reul (IFREMER)	15 min
Level 3 and 4 data products based on SMOS data	Nicolas Reul (IFREMER) for CATDS Antonio Turiel (CSIC) for CP34	20 min
Use of SMOS ocean salinity data for other user communities: introduction to the user feedback	Nicolas Reul (IFREMER)	10 min
User feedback on		
Global Level 3 SMOS ocean salinity assessment <ul style="list-style-type: none"> Global Level 3 Ocean Salinity from SMOS: The NOC Experience Validation of a new SMOS salinity L3 product 	Ch. Gommenginger (NOC, UK) M.S.Martins, J.Köhler, D.Stammer (University of Hamburg)	10-15 min per presentation
Data assimilation <ul style="list-style-type: none"> Proposed use of satellite salinity data in the FOAM ocean forecasting system: validation and data assimilation Surface salinity data to validate ocean simulations and data assimilation experiments in the North-eastern Atlantic Ocean Use of SMOS-derived surface salinity products to improve the quality of ocean estimates obtained by Mercator Océan using assimilative ocean models 	N. McConnell (UK Metoffice) J. Ballabrera (UTM-CSIC) Eric Dombrowsky (Mercator Océan)	
Bio-geochemical use <ul style="list-style-type: none"> Spatial and temporal coherence between Amazon River discharge, salinity, ocean color variables in western tropical Atlantic surface waters 	J. Salisbury and D. Vandemark (UNH), N. Reul and B. Chapron (IFREMER)	
Salinity retrieval in warm waters <ul style="list-style-type: none"> Seasonal cycle of the low-salinity pool off Panama, Eastern Pacific, from in situ and SMOS data Rain impact on SMOS SSS intertropical convergence zone of the Pacific: SOLAS 	Gael Alory (LEGOS) J.Boutin (LOCEAN)	
Salinity retrieval in coastal areas	Joel Wesson (Naval Research Laboratory, USA)	
Summary discussion		15 min