OVERVIEW OF SMOS RETRIEVALS OVER LAND

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1. INTRODUCTION

The first dedicated Soil Moisture and Ocean Salinity mission (SMOS) has been launched by the European Space Agency on November 2, 2009. One novel aspect of this innovative spaceborne sensor is the use of the multi incidence angle observations for soil moisture retrieval [1]. The mission will deliver soil moisture products at least once every 3 day morning and evening at a 50 km spatial resolution over the globe.

The goal of this paper is to give an overview of the very first land products together with the firs Cal Val exercises.

2. CONTEXT

Within the programmatic constraints of the SMOS mission, ESA will generate and deliver data products up to Level 2 inclusive. The SMOS data will be nominally processed in the Data processing Ground segment and several types of products will be made available to the community at large, including Near real Time products for the Meterological Centres

Data products for Level-3 and -4 will be produced outside ESA by national centers in France and Spain. For instance the Centre Aval de Traitement des Données SMOS (CATDS) will be in charge of processing, calibrating, archiving and dispatching the SMOS scientific data at Level-3 and -4 including geographic maps and special products and image reconstruction. Based on and derived from the Level-1 and -2 products, the data processed by the CATDS will be archived at the CATDS or at the DPGS, and will be distributed to authorized users.

3. METHODOLOGY

The Level-2 soil moisture product contains not only the retrieved soil moisture, but also a series of ancillary data derived from the processing (nadir optical thickness, surface temperature, roughness parameter, dielectric constant and brightness temperature retrieved at top of atmosphere and at the surface level), with the corresponding uncertainties. As for Level-1C, the product is geolocated on the ISEA grid [2]. An example of Level-2 is given in Figure 1.

Over land, the approach retrieval approach is based on the use of a cost minimizing function between the actual angular measurements and the computed brightness temperatures obtained through direct modelling of the surface [3], knowing the surface cover and soil texture. Vegetation cover is estimated directly during retrieval for all points in the narrow swath, where a large number of view angles are available, and by using the previous inversion for the outer part of the swath. The retrieval algorithm is detailed in [2].

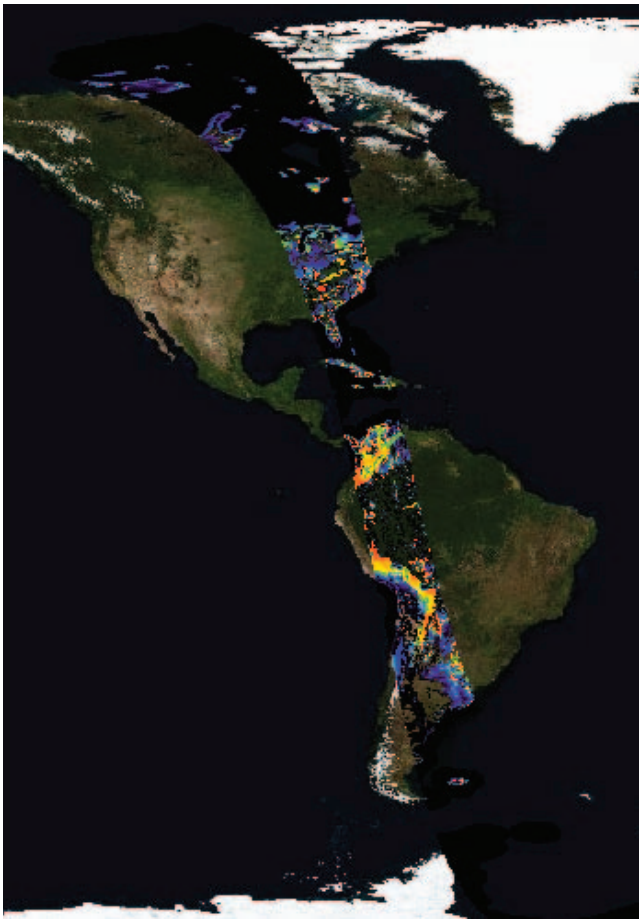

Figure 1 Soil moisture retrieval example over the Americas . Dark blue is very dry (0.1 %) red is very wet

3. RESULTS AND DISCUSSION

The algorithms (both the prototype and operational one) have now been running with the actual SMOS data. And started delivering soil moisture, vegetation opacity and surface temperature of dielectric constant fields. During the presentation we will give a first overview of the first global results gained in terms coverage accuracy and potential algorithm limitations. A particular attention to issues (water bodies, RFI or snow freeze limits) will be given.

4. REFERENCES

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