Geophysical Research Abstracts
Vol. 12, EGU2010-8754, 2010
EGU General Assembly 2010

First Results of the SMOS mission

Yann Kerr (1), Jordi Font (2), Manuel Martin Neira (3), Steven Delwart (3), Achim Hahne (3), Susanne Mecklenburg (4), and François Bermudo (5)

(1) CESBIO, TOULOUSE CEDEX 4, France (Yann.Kerr@cesbio.cnes.fr), (2) ICM-CSIS/BEC, Barcelona Spain, (3) ESA ESTEC, Noordwijk Netherland, (4) ESA ESRIN Frascati Italy, (5) CNES Toulouse France

It is now well understood that soil moisture and sea surface salinity are required to improve meteorological and climatic predictions. These two quantities were not available globally and with an adequate temporal sampling. So as to cover this data gap, it has been recognized that, provided it is possible to accommodate a suitable antenna on board a satellite, L Band radiometry was most probably the most promising way to fulfill this gap. It is within this framework that the European Space Agency (ESA)'s selected the second Earth Explorer Opportunity Mission, namely the Soil Moisture and Ocean Salinity (SMOS) mission. SMOS, launched successfully in November 2009. The SMOS mission is ESA's second Earth Explorer Opportunity mission it is a joint program lead by the European Space Agency (ESA) with the Centre National d'Etudes Spatiales (CNES) in France and the Centro para el Desarrollo Teccnologico Industrial (CDTI) in Spain. SMOS carries a single payload, an L band 2D interferometric radiometer in the 1400-1427 MHz h protected band. This wavelength penetrates well through the vegetation and the atmosphere is almost transparent. Consequently, the instrument probes the Earth surface emissivity. Surface emissivity can then be related to the moisture content in the first few centimeters of soil over land, and, after some surface roughness and temperature corrections, spatio temporal aggregation, to the sea surface salinity over oceans. SMOS achieves an unprecedented spatial resolution of 50 km at L-band maximum (43 km on average) seeking to meet soil moisture science objectives. Such innovative concept has required a significant effort in the development of calibration techniques. It provides multiangular-dual polarized (or fully polarized) brightness temperatures over the globe and with a revisit time smaller than 3 days to retrieve soil moisture and ocean salinity, but with a somewhat reduced sensitivity when compared to conventional radiometers. SMOS as been now acquiring data and undergoing the commissioning phase. The data quality exceeds what was expected, showing very good sensitivity and stability. The data is however very much impaired by man made emission in the protected band, ruining the measurements in several areas including parts of Europe and of China. However, many different international teams are now addressing cal val activities in various parts of the world, with notably large field campaigns either on the long time scale or over specific targets to address the specific issues. This paper thus gives an overview of the science goals of the SMOS mission, a description of its main elements, and a taste of the first results including performances at brightness temperature as well as at geophysical parameters levels.