Geophysical Research Abstracts
Vol. 15, EGU2013-4822-1, 2013
EGU General Assembly 2013

Evaluation of SMOS L2 soil moisture data over the Eastern Poland using ground measurements

Jerzy Usowicz (1), Mateusz Łukowski (2), Jan Słomiński (3), Krystyna Stankiewicz (4), Bogusław Usowicz (2), Jerzy Lipiec (2), and Wojciech Marczewski (3)

(1) Torun Centre of Astronomy of the Nicolaus Copernicus University, Gagarina 11 St., 87-100 Torun, Poland, (2) Institute of Agrophysics, Polish Academy of Sciences, Doświadczalna 4 St., 20-280 Lublin, Poland (m.lukowski@ipan.lublin.pl), (3) Space Research Centre, Polish Academy of Sciences, Bartycka 18A St., 00-716 Warsaw, Poland, (4) Warsaw School of Information Technology, Newelska 6 St., 01-447 Warsaw, Poland

Validation of SMOS products is vital for their further use in the study of climate and hydrology. Several authors [1,2] have recently evaluated SMOS soil moisture data with an aid of in-situ observations of soil moisture. Collow and Robock have reported a dry bias as compared to in situ observations. Since their results are not much conclusive, they call for further studies using more data. Bircher and co-authors have also noted significant discrepancies between Danish network and SMOS soil moisture.
SWEX_POLAND soil moisture network consists of 9 stations located in Eastern Poland. These stations are located on the areas representing variety types of land use: meadows, cultivated fields, wetlands and forests. We have expanded our analysis, as presented in the EGU 2012, using data from all network stations. Similarly as before, we have used three methods in our comparison studies: the Bland-Altman method, concordance correlation coefficient and total deviation index. Using these methods we have confirmed a fair/moderate agreement of SMOS L2 SM data and network observations. Like the other authors we have also noted the significant biases in SMOS soil moisture. However, the general trends in dynamics of soil moisture revealed by SMOS, the SWEX_POLAND network and referred to GLDAS, are in a considerable relevancy. We have shown that the SMOS satellite measurements are reliable, so can be used to detect areas of dry and moist soil. In Poland the trends indicating the growth of agricultural droughts are depicted by SMOS L2 very well, even better than national drought services for the agriculture. It is worth to note that the year 2011 was more variable and drier than the 2010 for Poland. Moreover, SMOS data prove the well-known property of central Poland to be drier than the rest of the country. It is expected that further mitigation of RFI contamination in Poland will be available due to the cooperation of ESA SMOS to the national spectrum control services (UKE). Therefore, we confirm that SMOS is a very valuable source of data, which is going to be used on regional studies related to the climate in Poland.

1. Collow, T.W., A. Robock, J. B. Basara, and B. G. Illston (2012), Evaluation of SMOS retrievals of soil moisture over the central United States with currently available in situ observations, J. Geophys. Res., 117, D09113, doi:10.1029/2011JD017095.
2. Bircher, S., Skou, N., Jensen, K. H.,. Walker, J. P and Rasmussen L. (2012), A soil moisture and temperature network for SMOS validation in Western Denmark, Hydrol. Earth Syst. Sci., 16, 1445–1463, doi:10.5194/hess-16-1445-2012