Geophysical Research Abstracts
Vol. 16, EGU2014-3407, 2014
EGU General Assembly 2014
© Author(s) 2014. CC Attribution 3.0 License.

Monitoring multi-decadal satellite earth observation of soil moisture using era-land global land water resources dataset

Clement Albergel (1), Wouter Dorigo (2), Gianpaolo Balsamo (1), Patricia de Rosnay (1), Joaquin Muñoz-Sabater (1), Lars Isaksen (1), Luca Brocca (3), Richard de Jeu (4), and Wolfgang Wagner (2)

(1) European Centre for Medium-Range Weather Forecasts (ECMWF), UK, (clement.albergel@ecmwf.int), (2) Department of Geodesy and Geo-information, Vienna University of Technology, Austria, (3) Research Institute for Geo-Hydrological Protection, National Research Council, Italy, (4) Faculty of Earth and Life Sciences, VU University Amsterdam, Netherland

It has been widely recognized that soil moisture is one of the main drivers of the water, energy and carbon cycles. It is a crucial variable for Numerical Weather Prediction (NWP) and climate projections because it plays a key role in hydro-meteorological processes. A good representation of soil moisture conditions can help improving the forecasting of precipitation, temperature, droughts and floods. For many applications global or continental scale soil moisture maps are needed. As a consequence, a signi?cant amount of studies have been conducted to obtain such information. For that purpose, land surface modeling, remote sensing techniques or a combination of both through Land Data Assimilation Systems are used. Assessing the quality of these products is required and for instance, the release of a new -long term- harmonized soil moisture product (SM-MW hereafter) from remote sensing within the framework of the European Space Agency's Water Cycle Multi-mission Observation Strategy (WACMOS) and Climate Change Initiative (CCI) projects in 2012 (more information at http://www.esa-soilmoisture-cci.org/) triggered several evaluation activities. The typical validation approach for model and satellite based data products is to compare them to in situ observations. However the evaluation of soil moisture products using ground measurements is not trivial. Even if in the recent years huge efforts were made to make such observations available in contrasting biomes and climate conditions, long term and large scale ground measurements networks are still sparse. Additionally, different networks will present different characteristics (e.g. measurement methods, installation depths and modes, calibration techniques, measurement interval, and temporal and spatial coverage). Finally using in situ measurements, the quality of retrieved soil moisture can be accurately assessed for the locations of the stations. That is why it is of interest to conceive new validation methods, complementing the existing soil moisture networks. To do so Land Surface Models (LSM) can be used to upscale the in situ surface soil moisture observations and complete the evaluation of satellite derived products, assuming that land surface models, forced with high quality atmospheric forcing data, adequately capture the soil moisture temporal dynamic.

In this study, SM-MW is first evaluated using ground measurements of soil moisture over 2007-2010. Along with SM-MW, soil moisture from two revised re-analyses; ERA-Land, an update of the land surface component of the ERA-Interim reanalysis from the European Centre for Medium-Range Weather Forecasts (ECMWF) and MERRA-Land, an enhanced land surface data product based on MERRA reanalysis by the National Aeronautics and Space Administration (NASA) were evaluated, also. In situ measurements from almost 200 stations from five networks in different countries (USA, Spain, France, China and Australia) were considered. Then soil moisture from ERA-Land, is used to monitor at a global scale the consistency of SM-MW over multi-decadal time period (1980-2010).