Geophysical Research Abstracts
Vol. 20, EGU2018-15841-4, 2018
EGU General Assembly 2018

The importance of satellite soil moisture for humanitarian aid and development applications

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With the continuous expanding constellation of satellites, we are entering a new era where satellite derived products become mature enough for applications in the NGO domain. Projects like the ESA Climate Change Initiative (ESA CCI, http://cci.esa.int) and the Copernicus Climate Change Service (C3S, https://climate.copernicus.eu/) provide easier access to these type of datasets and support a shift from the scientific community towards more application-driven users like policy makers, public authorities and NGOs. One climate variable for which this especially holds is soil moisture.

This study provides an overview of how mature satellite data products can be used in the humanitarian aid and development sector, in order to improve the social and environmental impact of their activities. Three case studies on the implementation of satellite derived soil moisture are presented:

(1) An insurance product based on satellite derived soil moisture data is being developed for smallholder farmers in Kenya. The project aims to reduce the global insurance gap and to improve the farmers ability to cope with climate change related crop losses. Here, the potential impact on food security and the livelihoods of these farmers are evaluated.

(2) An assessment is performed on how satellite soil moisture data can be of added value for impact-based forecasting as part of a Forecast-Based Financing (FbF, https://www.drk.de/en/forecast-based-financing/). The Red Cross Red Crescent movement has FbF pilots in several countries for a variety of hazards. Initial focus is on a flood pilot in Malawi of the EU ECHO Enhancing Resilience program, but also a pilot on droughts is foreseen. FbF enables access to funding for preparedness and early action for response, based on forecasting the impact of the upcoming hazard and corresponding trigger levels.

(3) Currently many organizations are actively trying to regreen degraded areas. By supporting landscape restoration organizations in the development of a satellite data based monitoring framework, the success of these large-scale landscape restoration projects can be better quantified. The impact of such an approach is evaluated.

With these case studies, the importance of consistent satellite data records are highlighted, which is one of the key aspects of European satellite programs like ESA CCI and C3S.