Geophysical Research Abstracts
Vol. 21, EGU2019-13112, 2019
EGU General Assembly 2019

Assessing the forecast skill of agricultural drought from satellite-derived products in the Lower Shire River Basin

Marijke Panis (1), Pieter van Gelder (2), Marc van den Homberg (1), Narcisa Nechita (3), Aklilu Teklesadik (1), Gerrit Schoups (2), Mendy van der Vliet (3), and Hessel Winsemius (2)

(1) Delft University of Technology, Civil Engineering, Watermanagement, Netherlands (mpanis@rodekruis.nl), (2) Netherlands Red Cross, 510 an initiative of the Netherlands Red Cross, The Hague, The Netherlands , (3) Vandersat B.V., Wilhelminastraat 43a, 2011 VK, Haarlem, The Netherlands

In 2008 the Red Cross Red Crescent (RCRC) started with Forecast-based Financing pilots to improve existing Early-Warning Early Action systems. Forecast-based financing is a new methodology to prepare, deliver and respond in a more effective and efficient manner, based on hazard forecasts. Actions are triggered when a forecast exceeds a danger level in a vulnerable intervention area. Forecast-based financing consists of several implementation steps, of which the first three aim at impact-based forecasting.

Therefore, In this study we investigate how forecast skill of agricultural drought forecasts can be achieved. More specifically, the aim is to identify the contribution of high spatial and temporal resolution soil moisture monitoring data in improving the forecast skill of agricultural drought forecasts. We explore this through a machine learning model for a case-study area of the Lower Shire River Basin in Malawi. Several experiments with different sets of predictors and predictands are conducted to test which data adds to skill and at what spatial detail. As predictors, the following agro-climatic indices are used: cumulative precipitation, soil moisture anomalies, land surface temperature anomalies, El Niño Southern Oscillation in July and four different dry spell categories within the growing season (0-2 days dry spell, 3-4 day dry spell, 5-10 day dry spell and larger than 10 day dry spell). As drought predictand, the normalized difference vegetation index (NDVI) and the vegetation optical depth (VOD) in March are used, the latter obtained from satellite data company VanderSat. The final set of predictors and predictands is narrowed down based on which data is available and with which quality (timeliness, reliability, accuracy). Initial results, show higher accuracy and weighted accuracy values for the models including soil moisture data compared to the ones without soil moisture, expect for the last month in the growing season, where it give opposite results.

The outcome of the model can support humanitarian organisations to increase the lead time necessary to act upon a drought trigger and reduce the impact of such event.