Geophysical Research Abstracts
Vol. 15, EGU2013-9609, 2013
EGU General Assembly 2013

Seasonal forecasts of drought indices in African basins

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Vast parts of Africa rely on the rainy season for livestock and agriculture. Droughts can have a severe impact in these areas which often have a very low resilience and limited capabilities to mitigate drought impacts. In this work we assess the predictive capabilities of an integrated drought monitoring and seasonal forecasting system (up to 5 months lead time) based on the Standardized Precipitation Index (SPI). The system is constructed by extending near real-time monthly precipitation fields (ERA-Interim reanalysis and the Climate Anomaly Monitoring System-Outgoing Longwave Radiation Precipitation Index, CAMS-OPI) with monthly forecasted fields as provided by the European Centre for Medium-Range Weather Forecasts (ECMWF) seasonal forecasting system.

This new seamless approach to merge monitoring and forecasting fields of precipitation to generate SPI at different time-scales is evaluated within the framework of the EU project DEWFORA. In particular, the evaluation was preformed over four basins in Africa: the Blue Nile, Limpopo, Upper Niger, and Upper Zambezi. There are significant differences in the quality of the precipitation between the datasets depending on the catchments, and a general statement regarding the best product is difficult to make. All the datasets show similar spatial and temporal patterns in the South and North West Africa, while there is a low correlation in the equatorial area which makes it difficult to define ground truth and choose an adequate product for monitoring.

The Seasonal forecasts have a higher reliability and skill in the Blue Nile, Limpopo and Upper Niger in comparison with the Zambezi. This skill and reliability depends strongly on the SPI time-scale, and more skill is observed at longer time-scales. The ECMWF seasonal forecasts have predictive skill which is higher than using climatology for most regions. In regions where no reliable near real-time data is available, the seasonal forecast can be used for monitoring (first month of forecast). Furthermore, poor quality precipitation monitoring products can reduce the potential skill of SPI seasonal forecasts in two to four months lead time.