



Seasonal predictions of agro-meteorological drought indicators for the Limpopo basin

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The rainfall in Southern Africa has a large interannual variability, which can cause rain-fed agriculture to fail. The staple crop maize is especially sensitive to dry spells during the early growing season. An early prediction of the probability of dry spells and below normal precipitation can potentially mitigate damages through water management. This paper investigates how well ECMWF's seasonal forecasts predict dry spells over the Limpopo basin during the rainy season December-February (DJF) with lead times from 1 to 5 months. Seasonal forecasts were evaluated against ERA-Interim reanalysis data which in turn was corrected with GPCP (EGPCP) to match monthly precipitation totals. The seasonal forecasts were also bias-corrected with the EGPCP using quantile matching as well as post-processed using a precipitation threshold to define a dry day as well as spatial filtering. The results indicate that the forecasts show skill in predicting dry spells in comparison with a "climatological ensemble" based on previous years. Quantile matching in combination with a precipitation threshold improved the skill of the forecast, whereas a spatial filter had no effect. The skill in prediction of dry spell was largest over the most drought-sensitive region. Seasonal forecasts have potential to be used in a probabilistic forecast system for drought-sensitive crops, however these should be used with caution given the large uncertainties.