Assessment of seasonal soil moisture forecasts over Southern South America with emphasis on dry and wet events

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The importance of forecasting extreme wet and dry conditions from weeks to months in advance relies on the need to prevent considerable socio-economic losses, mainly in regions of large populations and where agriculture is a key value for the economies, like Southern South America (SSA). Therefore, to improve the understanding of the performance and uncertainties of seasonal soil moisture and precipitation forecasts over SSA, this study aims to: 1) perform a general assessment of the Climate Forecast System version-2 (CFSv2) soil moisture and precipitation forecasts; and 2) evaluate the CFSv2 ability to represent an extreme drought event merging observations with forecasted Standardized Precipitation Index (SPI) and the Standardized Soil Moisture Anomalies (SSMA) based on GLDAS-2.0 simulations.
Results show that both SPI and SSMA forecast skill are regionally and seasonally dependent. In general a fast degradation of the forecasts skill is observed as the lead time increases with no significant metrics for forecast lead times longer than 2 months. Based on the assessment of the 2008-2009 extreme drought event it is evident that the CFSv2 forecasts have limitations regarding the identification of drought onset, duration, severity and demise, considering both meteorological (SPI) and agricultural (SSMA) drought conditions. These results have some implications upon the use of seasonal forecasts to assist agricultural practices in SSA, given that forecast skill is still too low to be useful for lead times longer than 2 months.