Statistical forecast of soil water storage in the rolling Pampas, Argentina

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Summary
Establishing a seasonal forecast for soil water storage (SWS) on a smaller spatial scale is of great interest for the agricultural sector since this could reduce uncertainty and facilitate decision making. On the other hand, we should consider that variations in soil moisture are due partly to small scale influences and to soil-specific features such as the capacity of the field. The purpose of this work is to propose a statistical forecasting methodology for different soil water availability scenarios in the Pampean region. For this purpose, monthly soil water storage values were calculated SWS for the INTA meteorological station, Pergamino (Buenos Aires, Argentina). Data was gathered using the Operating Hydrological Balance for Agro (OHBA) for October, November and December during 1979-2016. Relations between SWS and climate forcing on a monthly, bimonthly and quarterly scales were analyzed. Statistical forecasting models were developed for each month using the loop regression, a modern regression technique that uses cross-validation k fold. The efficiency analysis of different models takes into account the adjusted values of square correlation coefficient (R^2 adj) and cross-validation coefficient (CV). These models appropriately represent the SWS values, particularly the most extreme ones.

Key words: Hydrological balance, Statistical forecasting, Climate forcing