SEASONAL FORECAST OF ACCUMULATED RAINFALL IN SOUTHERN URUGUAY DURING SPRING AND SUMMER

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We present the results of a dynamical-statistical methodology for seasonal rainfall prediction in southern Uruguay based on the combination of an Atmospheric General Circulation Model (AGCM) and a statistical downscaling. Southern Uruguay presents a challenge for seasonal prediction because it is a region of high climate variability with an El Niño signal that is not as strong as in northern Uruguay and south of Brazil.

We use the ICTP AGCM, a low resolution model with simplified physics which is able to skilfully simulate the large scale flow and circulation anomalies associated with the teleconnections from the tropical oceans. The statistical downscaling is performed searching for relationships between the large scale circulation anomalies at 200 and 850 mb and the accumulated precipitation over the region of interest. We focus on prediction of the mean accumulated precipitation in southern hemisphere spring (September, October and November) and summer (December, January and February). A correlation analysis between observed rainfall and reanalysis data is performed in order to determine the best regions of the wind to construct the indices to be used in the statistical dowscaling model. We choose the ones where the dynamic model has skill and the correlations with rainfall in southern Uruguay are statistically and physically significant.

Deterministic and probabilistic forecast models are constructed performing hindcast experiments with the ICTP AGCM forced with sea surface temperature predictions from the NOAA CFS model in the period 1991-2011. The hindcast experiments are started in August and November and run for 4 months. In addition to predict rainfall averaged in southern Uruguay, the particular situation of Carrasco is studied.

Different validation criteria are used to evaluate the models' skill. It is found that the meridional wind in 200 hPa averaged in a region containing SESA is the best predictor. This variable impacts rainfall through the surface pressure centers that are affected by the vorticty advection in the 200 hPa level. The results also show that spring is more predictable than summer in southern Uruguay but not in Carrasco, where the forecasts' skill are higher than considering a bigger area.