



## **Evaluation of short-range ensemble predictions using Eta Model over South America**

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Short-Range Ensemble Prediction (SREP) system based on the Eta Model is recently implemented at CPTEC/INPE. The model is configured at 40-km horizontal over South America domain and is integrated for 6 days. Four cases of South America Convergence Zone (SACZ) events were chosen for the tests and evaluation. The SACZ is a common summer season feature of Southern Hemisphere that causes persistent rain for a few days over the Southeast Brazil. These persistent rains accumulate large amounts and may cause generalized landslides and death. The objective of this work is to introduce another source of perturbation and evaluate the forecasts resulting from the SREP produced. The evaluation is carried out specifically over the coastal region of Sao Paulo, Brazil. The SACZ cases accumulated over 100 mm precipitation over at least 5 days. The Eta Model SREP uses the CPTEC global model as lateral boundary conditions. The global model members are generated by perturbing 850-hPa temperature and winds in the tropical region. It is expected that the inclusion of 850-hPa moisture may produce different ensemble members and clusters. The global model produces 15 ensemble members which are grouped into 4 clusters. The evaluated SREP is based on 5 members, one from each group, plus control member. Comparison between the SREP constructed with and without moisture perturbation is carried out

for mean sea level pressure, 2-meter temperature, 10-meter winds, 500-hPa geopotential height, and 250-hPa winds. In general the mean error and the root mean squared errors (RMSE) of the two methodologies of perturbation are similar, which indicates that the inclusion of moisture does not lead to increase of error. The SREP showed a small reduction in the precipitation spread. In general, the magnitude of RMSE is comparable to the spread of the variable. The talagrand diagram showed that despite the inclusion of moisture variable in the perturbation, both methodologies still show insufficient spread. More members are being included to the SREP. This work is a contribution to the Serra do Mar Project to provide probability forecast of heavy rainfall to manage landslide risks.