Convective-permitting ensemble forecast system using BRAMS: uncertainty related with dynamical downscaling simulation over Southeastern Brazil

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In the context of the development of the convection-permitting regional ensemble weather forecast system using the Brazilian developments on the Regional Atmospheric Modeling System (BRAMS) of the Center for Weather Forecasting and Climate Studies of the National Institute for Space Research (CPTEC/INPE) in Brazil to account for the well representation of severe weather events in South America (mainly heavy precipitation events) the dynamical downscaling method has been used to dynamically downscale the CPTEC/INPE Global Ensemble Forecast System (SPCON). In this work, we explore four different horizontal resolution downscaling successively from 100km until achieve 2km for the period of 14-24 November 2014 when it was observed intense precipitation over Southeastern Brazil, the most populous region in the country. The SPCON drives the initial and lateral conditions of the regional ensemble. It has also been applied a cluster analysis to reduce the 15 SPCON ensemble members to 9 regional ensemble members. Results indicate that the cluster analysis of regional ensemble members performs better if compared with random procedure. The dynamical downscaling procedure using different grids leads to uncertainties and limitations in the final results. We identified more uncertainty in the surface weather variables simulations in the convective-permitting resolution simulations using the successive grid downscale process, probably associated with mass conservation. Using only one intermediate domain (20km) as initial and boundary conditions to the convective-permitting scale, the simulations uncertainties variability is better captured.