



## **Climatic extreme indices over South America: validation and projections from the Eta RCM**

Sin-Chan Chou (1), André de Arruda Lyra (1), Diego Chagas (1), Claudine Dereczynski (2), Marcelly Sondermann (2), Pedro Regoto (2), and Priscila Tavares (1)

(1) CPTEC, INPE (National Institute for Space Research), Cachoeira Paulista, Brazil (chou@cptec.inpe.br), (2) IGEO, UFRJ (Federal University of Rio de Janeiro), Rio de Janeiro, Brazil

The assessment of the changes of the climatic extreme indices are useful to support impact, vulnerability, and adaptation studies of climate change. Output from global climate models are generally smooth due to the coarse horizontal resolution, generally of a few hundreds of kilometers. The dynamical downscaling of global climate models can reach resolutions of a few kilometers. Regional Climate Model can provide more detail of the underlying surface such as vegetation, topography, etc. In addition, smaller grid size of RCMs allows stronger horizontal gradients and consequently stronger events. Therefore, extreme climatic events are better reproduced at higher resolution. The Eta Regional Climate Model was set up in 20-km resolution over South America to downscale the climate change projections produced by three global climate models, HadGEM2-ES, MIROC5, and Can-ESM, under RCP4.5 and RCP8.5 scenarios. The objective of this work is to assess the changes in the climatic extreme indices over South America. The runs start on 1960 and end in 2100. The baseline period is taken from 1961 until 1990, whereas the projections are shown in three timeslices of thirty years, 2011-2040, 2041-2070, and 2071-2100. Initially, a validation of the indices are carried out by comparing the trends from the three downscaling simulations against the observed trends. The trends of the indices related to temperature extremes are generally well reproduced by the three simulations in the baseline period, whereas the trends related to precipitation extreme indices show that the Eta model run driven by Can-ESM reproduce better the trends. The projections show some mixed trends in the precipitation extremes in some regions. For example, in the western Amazonia and in parts of Southeast Brazil, although the total annual precipitation tends to decrease in all projections, the 99th percentile show increase in the future times slices. The projections of warming trend in the temperature extreme indices are found in all runs. The temperature extreme indices projected by the Eta model nested in HadGEM2-ES and in Can-ESM conditions result in higher climate sensitivity than using MIROC5 conditions.