



## **Downscaling of South America present climate driven by 4-member HadCM3 runs**

Sin Chan Chou (1), Jose Antonio Marengo (1), André Lyra (1), Gustavo Sueiro (1), Jose Fernando Pesquero (1), Lincoln Alves (1), Richard Betts (2), Gillian Kay (2), Diego Chagas (1), Jorge Gomes (1), and the Sin Chan Chou Team

(1) INPE, Cachoeira Paulista, Brazil (chou.sinchan@cptec.inpe.br), (2) Hadley Centre, Exeter, UK

The regional Eta Model has been modified for long-term decadal integrations and has shown to reproduce present climate, for the period 1961-1990, reasonably well when forced by the Hadley Centre Global Coupled-Ocean model, the HadCM3. The global model conditions were provided at 3.75° and 2.75° grid sizes in zonal and meridional directions, respectively, and at 6-hourly frequency. However, a single realization of the climate does not indicate model internal variability. The objective of this work is to evaluate the climate simulations using the Eta Model driven by 4 members of the HadCM3. These four members were comprised of a standard unperturbed member, a high, low and average sensitivity perturbation member. The Regional Eta Model nested in these conditions was configured with 40-km grid sizes and 38 layers in the vertical. The model was altered to take in the 360-day year calendar of the global climate model runs. Vegetation greenness was modified to vary along the year, as it used to be fixed to the initial value in the weather forecast mode. Sea surface temperature was taken from the global model monthly mean values and daily updated in the Eta Model. It is expected that after one year of integration, the regional conditions has reached a climate state of equilibrium with the lateral boundaries, therefore the runs started in 1960 and the first year of adjustment was discarded from the analysis. El Niño and La Niña years were identified in the HadCM3 member runs based on the NOAA Climate Prediction Center criterion of the 3-month average sea surface temperature over 0.50°C for 5 consecutive seasons over Niño 3,4 area. The frequency of the El Niño events in the study period were comparable to observations, however, La Niña frequency was over-estimated. The circulation anomalies typical of these events were reproduced. In general, the regional model has shown small spread among the members and also small interannual variability.