Climate simulation evaluation of the RegCM3 model over Southeast Brazil

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The RegCM3 (Regional Climate Model version 3) performance over Southeast Brazil was evaluated along of 10 years (89 to 90) for seasonal simulations (Dec-Jan-Feb) using the NCEP-NCAR reanalysis data as initial and boundary conditions. To evaluate the seasonal climatology three specific areas were considered: the main grid (10 to 30°S and 75° to 30°W) and two sub-regions, the north (SE1) and south (SE2) sectors of the southeast of Brazil. The seasonal average of the precipitation and surface temperature used to validate the results were obtained from the CRU analysis at 0.5 x 0.5 degrees of horizontal resolution. The main climate systems associated to the precipitation (such as the South Atlantic Convergence Zone- ZCAS) and temperature (warm air in central part of the continent) over the South America were well reproduced by the model. It was observed that the RegCM3 under-estimate the precipitation in the main grid when compared to the CRU data. However, the difference is generally below 15%, except for the 1997 summer. For the temperature, it was found that the model result is colder than the CRU data ranging from –2.0^o C to –0.7^o C. On the other hand, the interannual variability and the positive temperature tendency between 89-98 summers were well reproduced by the model.

To the north sector of the Southeast Brazil, the RegCM3 showed good skill to simulate the interannual anomalies of the seasonal precipitation, though it underestimated the total volume of the rain. On the other hand, an opposite situation is observed in the south sector. The model was able to reproduce quite well the total volume of the seasonal precipitation in this region. This may be related to the ability of the model to solve the steep topography in the area as well as the oceanic atmosphere circulation present in the south sector.