Geophysical Research Abstracts, Vol. 7, 04412, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04412

The influence of Southern Hemisphere centers of action on SACZ and the CPTEC/COLA AGCM behaviour

I.F.A. Cavalcanti and C.C.Cunningham

Center for Weather and Climate Studies/ National Institute of Space Research, São Paulo, Brazil, iracema@cptec.inpe.br/FAX 55 1231012835

1. Introduction

One of the main austral summer features over South America is the occurrence of episodes of a Northwest-Southeast convective activity band named South Atlantic Convergence Zone (SACZ) (Kodama, 1993). The influence of intraseasonal variability on this system has been shown in observational data and has been linked to low frequency wavetrains over Pacific and South America (PSA-kind pattern) (Castro and Cavalcanti, 2003). CPTEC/COLA AGCM has been able to simulate several features of the SACZ and some of them related to atmospheric variability (Cavalcanti and Castro, 2003). Anomaly correlations of precipitation between observation and model results show that the predictability, using ensemble mean, of southeastern region of Brazil, where the SACZ occurs, is very low, opposite to the northeastern or southern regions. As the southeastern region is a very populated area and is a large industrial and economic region, it is important to implement different analysis techniques to analyse model results, in order to improve the seasonal prediction in the region.

1. Data and method

The model dataset is obtained from the CPTEC/COLA AGCM climate simulation results (1982-1991) and the observational dataset are OLR (NOAA) and reanalysis (NCEP/NCAR) for the period of 1979 to 1999. The SACZ is a typical summer system, therefore only the SH summer season is analysed. The Lanczos filter was applied to daily anomalies of geopotential at 200 hPa and OLR to retain the intraseasonal variability between 30 and 90 days. These filtered data were normalized by the standard

deviation to be used in the index calculations. The daily anomalies without filtering are used to analyse specific periods of extreme events. Centers of action were obtained from the main teleconnection patterns, obtained in model and observational studies (Castro and Cavalcanti, 2003; Cavalcanti and Castro, 2003). Geopotential and OLR anomalies were analysed to generate indices of teleconnections associated with convective activity in the SACZ area. The purpose is to establish indices from the observational data and to compare with those extracted from model data in order to use them in seasonal prediction.

1. **Results**

Examples considering maximum indices are analysed and related to extreme events over SACZ. One of them shows high negative geopotential anomalies to the east of the center of action over southeastern South Pacific, related to an anomalous trough consistent with the development of a SACZ episode. Negative OLR anomalies in a NW-SE band indicate the SACZ activity during the period. The north-south dipole over South America is also identified in the model simulations. A zonal wavenumber four in the geopotential field, consistent with periods of maximum positive geopotential anomaly over the Southeast Pacific center of action, are also related to periods of convective activity of SACZ.

1. **Conclusion**

Preliminary results show that the indices identified are appropriated to analyse SACZ cases, and corrections should be made in the model results to improve the seasonal prediction.

References

Cavalcanti, IFA; C.C.Castro. 2003. " Southern Hemisphere atmospheric low frequency variability in a GCM climate simulation". VII international Conference on Southern Hemisphere Meteorology and Oceanography, 24-28 march 2003, Wellington, New Zealand.

Castro, CC; IFA Cavalcanti, 2003. "Intraseasonal modes of variability affecting the SACZ". VII international Conference on Southern Hemisphere Meteorology and Oceanography, 24-28 march 2003, Wellington, New Zealand.

Kodama, Y-M., 1993: Large-scale common features of subtropical precipitation zones (the Baiu Frontal Zone, the SPCZ and the SACZ). Part II: Conditions of the circulations for generating the STCZs, J. Meteor. Soc. Japan, **71**, 581-610.