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The South Atlantic Convergence Zone Represented by the BAM Model Simulations

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The South Atlantic Convergence Zone (SACZ) has been subjectively defined as a band of cloudiness from the intense convection over the Amazon basin extending toward southeast Brazil, that is one of the main components of the South American monsoon system. The SACZ represents a region of deep convection, causing heavy precipitation events in the region for at least 4 days. The precipitation that occurs during the months of October to March is essential for maintaining the climate of the Southeast, Midwest and North of Brazil. Because of this, SACZ is an important climatological feature of the austral summer in Brazil. The representation of SACZ precipitation is complex and the need for numerical models calibrated according to the atmospheric conditions of the region to be analyzed is increasing. Thinking on this, researchers from the National Institute for Space Research (INPE) have been developing the Brazilian Global Atmospheric Model (BAM), in order to improve weather and climate forecasting simulations and climate change studies. The BAM is a semi-implicit Eulerian spectral model (BAMb-SL version, approximately 1.0° x 1.0° of horizontal resolution). With the importance of SACZ in mind and the need to improve its prediction, this study aims to analyze the climatology of SACZ through simulations of the BAM model in the period between 1992 to 2015, in which 156 SACZ event were recorded. BAM simulations will be compared with observed and reanalysis data, in order to evaluate the performance of BAM simulating ZCAS. The data that will used in this study is the BAM simulations of the variables precipitation, 200-hPa wind, outgoing longwave radiation, and 850-hPa specific humidity, daily observed precipitation data from the dataset organized and interpolated to 0.25° x 0.25° grid by Alexandre C. Xavier and available on the website <https://utexas.app.box.com/v/xavier-et-al-ijoc-data>, outgoing longwave radiation from Climate Prediction Center do National Oceanic and Atmospheric Administration (CPC – NOAA, spatial resolution 0.75° x 0.75°) and 200-hPa wind and specific humidity at the level of 850-hPa from ERA5 of the ECMWF (spatial resolution 0.30° x 0.30°). The analyzes were obtained from statistical methods, with the mean and monthly standard deviation of the accumulated precipitation, and mean monthly of the outgoing longwave radiation, 200-hPa wind and specific humidity at the level of 850hPa, applied which data sets that were explained. Overall, the initial results showed a good agreement between the data sets. The average accumulated precipitation presented by the model simulations represented the spatial distribution of precipitation, in the central region of the Brazil were characterizing the SACZ, but these values were lower compared to those observed. The lowest OLR values presented by the reanalyses on the central region of the Brazil characterizes the SACZ position, as well as the BAM

simulations. The other variables are still being analyzed. With the results obtained until now, it is possible to say that, although the magnitude of each variable is underestimated, the simulations showed a good level of agreement between the data sets in the spatial representation of the variables analyzed in the 156 SACZ events.