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RegCM4-HadGEM2-ES simulated cyclone climatology (1979-2005) over the Southwestern South Atlantic Ocean

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Cyclones over the Southwestern South Atlantic Ocean (SAO) are a subject of great interest once they modify the weather and control the climate near east coast of South America (SA). In this study we compare the cyclones climatology in the period 1979-2005 simulated by Regional Climate Model version 4 (RegCM4) with that from ERA-Interim reanalysis (ECMWF). RegCM4 was nested in HadGEM2-ES output and the simulation used the SA domain of CORDEX project, with a horizontal grid of 50 km and 18 sigma-pressure levels in the vertical. The RegCM4 simulation used the land surface Biosphere-Atmosphere Transfer Scheme (BATS) and the mixed convection Emanuel-Grell scheme configurations. This simulation is part of the CREMA (CORDEX REgCM4 hyper-MAtrix) experiment. The cyclones were identified using an automated tracking scheme based on minima (cyclonic in Southern Hemisphere) of relative vorticity from the wind at 925 hPa. The threshold of -1.5 x $10^{-5}s^{-1}$ was used in the algorithm. All cyclones in RegCM4 and ERA-Interim with relative vorticity lower than this threshold and with lifetime higher or equal 24 hours were included in the climatology. ERA-Interim shows three main cyclogenetic regions near east coast of SA. In general, RegCM4 simulated these same regions but with an underestimation of the number of cyclones. In each of these regions, there is a different season of higher cyclones frequency. Over extreme south of southern Brazil and Uruguay the higher frequency of cyclones occurs in winter, while southeastern Brazil and southeastern Argentina cyclones are most frequent during summer. RegCM4 is able to simulate this observed seasonality.