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Comparison of Grell and Emanuel schemes in the simulations of South America climate using RegCM3

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Climate simulations were carried out with the Regional Climate Model (RegCM) over South America (SA) in the frame of FP7 EU (2008-2012) CLARIS-LPB project (A Europe-South America Network for Climate Change Assessment and Impact Studies in La Plata Basin). Two 20 years (from 1989 to 2008) simulations using Grell (SG) and Emanuel (SE) convective parameterizations were compared. Both simulations were forced by ERA-Interim reanalysis in a domain that includes SA with 50 km of horizontal resolution. Some parameters were tuning in both SG and SE experiments. The simulated precipitation and temperature were compared to CMAP (and GPCP) and CRU datasets, respectively. The spatial distribution of the simulated precipitation and temperature are similar to the analyses in both experiments, though with some differences in the intensity. In summer, SE is wetter than SG and than the analyses over the continental branch of the South Atlantic Convergence Zone (SACZ). During the summer and winter, SG and SE underestimate the precipitation over the northern of Argentina and in the south extreme of Brazil, while they overestimate the precipitation in the southern of Chile. In comparison to the SG, SE presents two main improvements: it simulates the Intertropical Convergence Zone (ITCZ) and it has more precipitation in the oceanic branch of the SACZ. Although the rainfall is better simulated by the SE than the SG, it is less skillful for the temperature. The SE simulates higher temperatures than CRU in large part of the SA in the summer. In winter, the temperature is well reproduced from center to the south of SA in both simulations. However, in the center-north (subtropics and tropics) of SA the SG (SE) underestimates (overestimates) the temperature. In summary, compared with previous results both simulations show some improvement in the annual cycle of temperature and precipitation over SA.