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# RegCM4 Dynamical Downscaling of Seasonal Climate Predictions over the Southeast of Brazil

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In this study the Regional Climate Model version 4 (RegCM4) was nested in the General Circulation Model from the Brazilian Center for Weather Forecasts and Climate Studies (CPTEC) to produce three month (seasonal) predictions to the southeast of Brazil (SB). The predictions for MAM (March-April-May), AMJ (April-May-June) and SON (September-October-November) of 2012 used six different parameterizations of convection: 1) Grell with Arakawa-Schubert (GAS) closure, 2) Grell with Fritsch-Chappell (GFC) closure, 3) Kuo, 4) Emanuel (EM), 5) Mixed-1 with GFC and Emanuel schemes over the land and ocean, respectively and 6) Mixed-2 with Emanuel and GFC over the land and ocean, respectively. The simulations started 48 days before the seasons of interest to permit a spin-up period. The predicted precipitation was compared with observation from Climate Prediction Center (CPC). For MAM/2012, the experiment with Kuo scheme presented the seasonal precipitation similar to CPC, while GAS, GFC and Mixed-1 experiments underestimated the precipitation ($\sim$1-2 mm/day) over the center of SB and EM and Mixed-2 schemes overestimated it ($\sim$4 mm/day) over most part of SB. For AMJ/2012 all experiments underestimated the precipitation ($\sim$2-3 mm/day) in the central-south part of SB, but they simulated the precipitation intensity close to the observation over the center-north SB (except the EM which shows overestimation in this area). For this season, Mixed-1 presented the smaller bias compared to the other convective schemes. For AMJ/2012, the experiments underestimated the precipitation ($\sim$2-4 mm/day) over the center-north of SB and overestimated it ($\sim$2-4 mm/day) in the eastern sector. In this period, the EM and Mixed-1 predictions presented the smaller bias compared to CPC. Considering the three seasons, this study suggests that the best convective scheme to seasonal predictions for SB is Mixed-1, while GFC, GAS and Kuo also produce satisfactory seasonal precipitation.