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Evaluation of the present climate simulated by the regional Eta model driven by the Brazilian Global coupled ocean-atmosphere Model

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The Eta Model is used operationally by INPE at the Centre for Weather Forecasts and Climate Studies (CPTEC) to produce weather forecasts over South America since 1997 and seasonal climate forecasts since 2002. The model has gone through upgrades along these years and is able to produce decadal integrations to downscale climate projections. Likewise, the INPE global atmospheric model has been coupled to MOM4 ocean model and decadal integrations in the period 1960-2105 was produced and contributed to the CMIP5 dataset. The development of the Brazilian Earth System Model (BESM) has been ongoing parallel to the development of the Brazilian regional earth system model (BESM-R). The objective of this work is to evaluate the regional Eta model nested in the BESM in the present climate simulations, from 1961-1990. The Eta model was configured with 20-km horizontal resolution and 38 layers, in a domain covering all South America. In the lower boundary, sea surface temperature was provided by the BESM and was updated daily during the regional integration, whereas the lateral boundaries were updated every 6 hours with the BESM atmospheric conditions. Continuous 30-year integrations were carried out by the regional model. Large scale circulation pattern at upper and low levels are shown in comparison with the respective BESM flow and evaluated against reanalyses. The regional model shows improvement in the precipitation and temperature pattern over the continent. Seasonal cycle of precipitation and temperature are also shown.