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Climate Change Projections over Northeast Brazil According to CMIP5 Models

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Northeast Brazil (NEB) climate is well diversified, influenced by various large-scale and mesoscale systems as the ITZC (Intertropical Convergence Zone), FSs (Frontal Systems), El Niño and La Niña, among others, causing great climate variability in this region. That translates into vulnerability to climate change - which will possibly occur due to changes in land use, aerosols and greenhouse gases (GHGs) in the atmosphere, and other issues, which are largely due to the anthropic action. Thinking of the possible conditions that the climate system might be forced into by human action, the IPCC (Intergovernmental Panel on Climate Change) established RCP (Representative Concentration Pathways) scenarios, among which RCP4.5 RCP8.5 projected an increase in radiative forcing - mainly from GHGs of $\sim$4.5 and $\sim$8.5 W/m^2 at the end of the 21st century, respectively. In order to study how NEB climate might behave under these scenarios of GHGs emissions, we analyzed projected temperature and precipitation from 30 Global Climate Models (GCMs) that participate in CMIP5 (Coupled Model Intercomparison Project - Phase 5) regarding climatological changes, including quantitative increase and/or decrease of these variables, and spatial changes. In the present analysis we verified GCMs ability in representing the climate, and the mean value in the GCMs ensemble (for the variables studied) agreeing with the region's climate. The projections under scenarios RCP4.5 and RCP8.5 show significant increases in the temperature during the 21st century, depending on the time slice (2015-2035, 2045-2065 and 2079-2099) in both scenarios, and a slight decrease in the precipitation - though there are greater uncertainties associated with this variable. The models tend to present distribution profiles (precipitation versus temperature changes) that are more dispersed as one approaches the end of 21st century, resulting from larger variations of the percentual changes in precipitation with respect to the historical value. The analysis of the results from those GCMs is done within the context of CORDEX, indicating models that are suitable to provide lateral boundary conditions for dynamical downscaling studies over NEB.