



Regional Climate Modeling of Possible Changes in Precipitation, Soil Moisture and Surface Fluxes over the Amazon

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Dynamical downscaling simulations were performed over the Coordinated Regional Climate Downscaling Experiment (CORDEX) “Central America” domain (which also comprises southern North America, the Caribbean and northern South America), using the Regional Atmospheric Modeling System (RAMS), forced by data from the Hadley Centre Global Environmental Model, Earth System (HadGEM2-ES) for both the current climate and the Representative Concentration Pathway 8.5 (RCP 8.5). Projected changes include a generalized warming, more intense over land areas, as well as changes in precipitation patterns. Projected warming increases along the 21st century, being especially pronounced over the Amazon. Over South America, by the end of the century, the regional model projects changes in the annual cycle, with enhanced precipitation in most months over Southern Amazon (except for the SON season) and April-August over Northern Amazon (with rainfall reduction in the rest of the year). The relationships between temperature and precipitation changes and moisture flux, radiative and turbulence fluxes were also investigated. Over Eastern Amazon, especially in the 2079-2099 period, under the heavy-emission scenario, a coherent springtime (SON) reduction of soil moisture, evaporation and precipitation was found, along with increased sensible heat flux, and an increase in temperature that is greater than in the rest of the year. Such pattern is also accompanied by changes in the distribution of daily precipitation, with a reduction of the number of rainfall events below 20 mm and an increase in precipitation events with 24h total greater than 30 mm, as well as longer periods with consecutive dry days.