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Simulating the interannual variability of Amazon precipitation

D. Medvigy, R.L. Walko, and R. Avissar
Civil and Environmental Engineering, Duke University, Durham, NC 27708, USA

ENSO strongly influences the interannual variability of Amazon precipitation. But current global climate models are unable to represent the associated variability, raising the question of their aptitude to simulate current and changing climate in that region. We explore this critical issue with the Ocean-Land-Atmosphere Model (OLAM), a new Earth System Model capable of simulating regions like mountain ranges at high resolution while efficiently simulating the rest of the world at coarser resolution. We find that simulations representing the Andes at resolutions coarser than 100 km lead to a "reverse" ENSO effect, with large precipitation rates in the Amazon during ENSO events. In contrast, the model correctly simulates the ENSO dry anomaly provided the Andes are simulated at resolutions finer than 100 km. Furthermore, we find that the grid mesh over the Andes has important implications for ENSO teleconnections, especially over the continents.