

Mesoscale climate simulations over South America: Preliminary results for the LGM

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In an attempt to understand the present and glacial climates of South America, and perhaps shed some light on the interpretation of the growing number of paleodata sets, I have started a series of simulations with our regional climate model. The domain of the model is centered at 6.5°S 60°W and extends from about 26°N to 37°S latitude and 15°W to 114°W longitude at a grid spacing of 60 km. Due to the large number of model grid points (> 18,000), the high resolution, and the frequency of convective precipitation, a rather small time step (180 sec) is necessary to maintain computational stability of the model. As a result, the final production simulations of the LGM and present are proceeding at 1+ month per calendar day. My goal is to run five or more complete seasonal cycles. The simulations are being driven by a control GENESIS run with fixed SSTs and a GENESIS LGM run with fixed SSTs combining CLIMAP and Alan Mix's revisions in the Eastern Pacific and Atlantic Oceans.

Preliminary comparisons with observed data of simulated mean monthly temperature and precipitation (September through January) for the first year of the control run are encouraging. The model appears to capture very well both the within- and between-month spatial patterns in the observations. Modeled precipitation amounts are generally good, however the model produces too much rain over parts of the Caribbean and in the monsoon region of Mexico. Modeled air temperatures are generally good throughout the domain. For the first few months of simulation, LGM temperatures are generally 3°C colder than the control over the model domain, with areas in the Caribbean, the south interior and the Andes being as much as 6°C colder. LGM precipitation is generally reduced over the Mexico and Central America, northeastern South America, the Caribbean, and parts of the Amazon basin and increased along the coastal and western Brazil and over the Andes. I will be running the model continuously until the workshop and I will present whatever results are available at that time.