



## **Sub-seasonal rainfall statistics from a regional climate model for South America: Does improved resolution add value?**

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We evaluate the potential of an experimental nested prediction system to improve the simulation of sub-seasonal rainfall statistics including daily precipitation intensity, rainy season onset and withdrawal, and the frequency and duration of dry spells by examining a four-member ensemble of regional climate model simulations performed for the period 1982-2003. The study employs version three of the ICTP regional climate model (RegCM) driven with the NCEP/NCAR Reanalysis and the European Community-Hamburg GCM (ECHAM). Statistics were examined for five main regions: Northern and Southern Amazon, Northeast Brazil, Monsoon, and Southeast South America. The regional model and the GCM are able to replicate the observed modal intensity of daily rainfall in all regions. However, the regional model tends to produce more events in the low intensity categories, especially over the Amazon, while the GCM overestimates heavy rainfall events in almost every region. The analysis of the timing of the rainy season shows the observed onset occurring first over the monsoon region and then spreading northward into the southern Amazon, in contrast to some previous studies. While the GCM is able to correctly simulate the timing of the rainy season over the Amazon and Monsoon areas, the regional model consistently displays an early onset and late withdrawal. In contrast, over Northeast Brazil the regional model errors are smaller than those shown by the GCM. In addition, the strong interannual variability in the timing of the rainy season is better simulated by RegCM. Both models tends to underestimate (overestimate) the frequency of shorter (longer)

dry spells, although the differences in dry spell frequency during El Niño events and La Niña events are well simulated. The results presented here show that there is some potential for added value from the regional model.