



Numerical study of the 2005 severe drought in the Amazon Basin using Regional Climate Models over South America

Caroline Mourão, Sin Chan Chou, and José Antonio Marengo

Instituto Nacional de Pesquisas Espaciais (INPE), Centro de Ciência do Sistema Terrestre (CCST), Cachoeira Paulista, Brazil
(caroline.mourao@cptec.inpe.br)

In 2005, large areas of the southwestern Amazon Basin experienced the most severe drought episode in the last 100 years. The drought affected the population living by the lower Amazon River and its western and southwestern tributaries the Solimões (also known as Amazon River in the other Amazon countries) and the Madeira Rivers. The causes of the drought were not related to El Niño but to (a) the anomalously warm tropical North Atlantic Ocean, (b) the reduced intensity in northeast trade wind moisture transport into southern Amazon during the peak summertime season, and (c) the weakened upward motion over this area of Amazonia, resulting in reduced convective development and rainfall. The drought conditions were intensified during the dry season until September 2005. Due to the extended dry season in the region, forest fires affected part of southwestern Amazonia. Rains returned in October 2005. The drought of Amazonia in 2005 were studied in this work by means of numerical simulations using the Eta model forced by ERA Interim reanalyses to simulate the 1989-2008 climate over South America with 50-km horizontal resolution. It was used the domain suggested by the CORDEX (COordinated Regional climate Downscaling EXperiment) project of the WCRP (World Climate Research Programme). These simulations are contributions to the EU FP7 CLARIS LPB Project (A Europe-South America Network for Climate Change Assessment and Impact Studies in La Plata Basin) and CORDEX. The simulated precipitation followed the mean annual cycle observed (CRU data set) in the Amazon Basin, however, this simulation underestimated the precipitation. In December-January-February period, spatial distribution shows that precipitation was underestimated mainly in northeastern part of the Amazon, while in southwestern part of the Amazon was overestimated compared to observations. The results of the Eta model for this event are compared here with other 6 regional climate models that are part of the CLARIS LPB project. The 7 models available for comparison are: SMHI-RCA, USP-RegCM3, MPI-REMO, UCLM-PROMES, CIMA-MM5, IPSL-LMDZ and INPE-Eta.