Geophysical Research Abstracts
Vol. 20, EGU2018-17059-1, 2018
EGU General Assembly 2018

Hydroclimate reconstruction for the analysis of drought events in the Amazon basin

Beatriz Garcia (1), Renata Libonati (1,2), and Ana Nunes (1)

(1) Federal University of Rio de Janeiro (UFRJ), Institute of Geosciences (IGEO), Department of Meteorology, Rio de Janeiro, Brazil, (2) Centro de Estudos Florestais, Instituto Superior de Agronomia, Universidade de Lisboa, Lisbon, Portugal

The Amazon basin has experienced severe drought events for centuries, and lately they have shown an increase in frequency and intensity, namely: 1998, 2005, 2010 and 2015. In the 21st century each new drought occurrence in the Amazon basin was stronger than the previous one. Drought events in Amazonia have been frequently associated with teleconnections due to El-Niño Southern Oscillation and the anomalous heating of North Atlantic sea surface temperature. Therefore, the increase in drought intensity and frequency in the region might be related to climate change impacts on those climate variability modes. Furthermore, studies pointed out the elevated warming in North Atlantic sea surface temperature as the most probably caused of the 2005 drought, and that the 2010 drought, occurred in a larger area of the Amazon basin, was driven by teleconnections from both modes.

There are challenges in the assessment of the drought conditions in tropical regions, such as uneven spatial distribution and gaps found in station data. In this context, the Satellite-enhanced Regional Downscaling for Applied Studies (SRDAS), developed at the Federal University of Rio de Janeiro in Brazil, with hourly outputs of several atmospheric and surface variables and available from January 1998 to December 2013, provided the monthly means of 2-m air temperature and relative humidity, precipitation and 4-layer vertically integrated soil moisture to be used in the analysis of the two drought episodes. SRDAS is a 25-km resolution, regional reconstruction of South American hydroclimate from the dynamical downscaling of a global reanalysis. In SRDAS, 3-hourly satellite-based precipitation rates are assimilated by the Regional Spectral Model, which employs spectral nudging as boundary forcing. The analysis of the SRDAS time series reveals the anomaly of integrated soil moisture as good indicator of the drought conditions. Results from this study using SRDAS and in-situ data corroborate previous studies on the intensity and location of the 2005 and 2010 droughts, and state the ability of this product to reproduce the extreme drought events in the region.