Geophysical Research Abstracts
Vol. 20, EGU2018-14980, 2018
EGU General Assembly 2018


# Tropospheric teleconnections and changes in low-frequency precipitation variability over the western "Pampas" region

Reinaldo Agustín Maenza (2,4,5), Eduardo Andrés Agosta (1,4), María Laura Bettolli (3,4)

(1) Universidad Nacional de La Plata, Facultad de Ciencias Astronómicas y Geofísicas, Cátedra de Introducción a la Dinámica de la Atmósfera, Argentina (eduardo.agosta@conicet.gov.ar), (2) Instituto de Investigaciones Marinas y Costeras, (UNMDP-CONICET), (3) Departamento de Ciencias de la Atmósfera y los Océanos, Universidad de Buenos Aires, Argentina, (4) Consejo Nacional de Investigaciones Científicas y Técnicas [CONICET], Buenos Aires, Argentina, (5) Instituto de Geología de Costas y del Cuaternario (UNMDP-CIC)

The precipitation is a climatic variable which constitutes a main source of freshwater in many regions, regulating thus the socio-economic development and evolution of human activities. We aim at studying the spatial and temporal variability of seasonal rainfall in southern Central Argentina (SCA), located between the Andean range and subtropical eastern Argentina, roughly between 69º-60ºW and 42º-32ºS. The area corresponds to a transition zone between the "dry Pampas" and the "wet Pampas" characterized by an intense precipitation gradient from the southwest to the northeast. Analysis is performed through various time series of monthly precipitation, accumulated into specific seasons, from diverse gauge stations. The results highlight two distinct seasons of phases for the annual precipitation: wet season (from September to April) and dry season (from May to August). The spatial analysis indicates the existence of distinct sub-regions with a similar temporal variability among the component time series. Representative seasonal precipitation indices in each sub-region highlight the presence of significant jumps in precipitation around the 1970s and the beginning of the present millennium. The SCA core region has undergone severe dry conditions between the late 1920s and the mid-1950s. Between the mid-1960s and early-1970s, a sudden increase in wet-season precipitation was responsible for a prolonged wet epoch for over four decades until the early-2000s, which explain the occurrence of significant positive precipitation changes over 30-40% of regional average on the period 1922-2012. Despite the long lasting wet period, short-term dry events have affected the socio-economic activity, such as the severe droughts occurred between 2008 and 2009, which had a strong impact on Argentina's crop production Since the early 2000s, the beginning of another dry epoch can be discerned. The examination of different climate system forcings indicates that seasonal rainfall over a sub-region can be modulated from remote regions trough quasi-stationary Rossby waves linked to anomalous warming in the equatorial Pacific, as well as by regional circulations associated with the anomalous Hadley Cell variation as well as the South Atlantic sea surface temperature, causing anomalous behavior in the availability of moisture over the SAC. These relationships vary throughout the period of analysis.