DRY SEASON CIRCULATION TYPE CLASSIFICATION APPLIED TO PRECIPITATION AND TEMPERATURE IN THE PERUVIAN ANDES

Marti Bonshoms Calvelo[1]*, Francisco José Álvarez García[1], William Cabos Narváez[1], José Úbeda Palenque[1]

[1]Universidad Complutense de Madrid (UCM), España
*Email: martibon@ucm.es

We present the first application of a systematic circulation regimes classification that characterize the Tropical Andes during the dry season (May-August). The k-means clustering method is used on reanalysis data of daily mean geopotential height at the 500-hPa and 200-hPa levels for the period 1981-2015. Combining the variability in intensity and location of the geopotential upper-level anomalies, 15 Circulation Types (CT) are established. The relationship between the CTs and surface conditions in the Peruvian Andes (PA) is analysed using a high resolution daily temperature and rainfall gridded dataset. More intense precipitation is linked to four cyclonic CTs characterized by an Upper Tropospheric Trough (UTT) centred at subtropical latitudes (~30°S) and between -78.75°W to -71.25°W of longitude. Drier conditions across the entire PA appear particularly for three strongly anticyclonic CTs. Strong variations in daily minimum and maximum temperatures can be related to the effect of day/night cloudiness in the radiative balance, but also to subtropical cold air advections favoured by the UTT. CTs featuring warmer conditions have become more frequent in the last decades of the record, the opposite holding for cold CTs. There is no systematic link between positive or negative trends in occurrence and the wetter and drier character of the CTs. The annual frequency of nine CTs are significantly correlated with sea surface temperature anomalies in the equatorial Pacific Ocean, with warmer and drier (cooler and wetter) CTs generally preceded by an El Niño (La Niña) pattern in the previous wet season (December-March).

Palabras clave: *Andes, circulation types, Kmeans, precipitation, temperature, Tropics*