

Wet and dry spells in the Rio Santa Basin, Tropical Andes of Peru: processes and teleconnections

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The climate in the Rio Santa basin (Peruvian Andes) is characterized by a strong seasonality, with a wet season reaching its maximum intensity from December to March. Understanding the characteristics and variability of rainfall during the wet season is fundamental for small-scale farmers based on rain-fed agriculture. In this contribution, we analyze the occurrence of wet and dry spells (consecutive days of unusually high or low precipitation) and their connection with the large scale circulation. To do so, we rely on several datasets: daily observations from rain gauges, large scale reanalysis data (ERA-Interim, 1979-present), and high-resolution (but short term) numerical simulations realized with the Weather Research and Forecasting (WRF) model. Based on this unique combination of data we revisit the commonly used framework which relates the dry and wet spells to the upper-tropospheric zonal wind and the location of the Bolivian High pressure system. Our results draw a sharpened (and revisited) framework for the occurrence of convection in this region of complex topography. This is of relevance for weather forecasting purposes as well as for a better understanding of the climate of the Tropical Andes, where the upper-zonal flow has already been used as a proxy for future projections of changes in precipitation amounts.