



Atmospheric rivers contribution to Andean snow accumulation

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In this work, we quantify the contribution of atmospheric rivers (ARs) to the snow accumulation in the Andes Cordillera between latitudes 26.5° and 37.5° S. We use an AR classification dataset specially developed for this region based on the Climate Forecast System Reanalysis (CFSR). AR metrics, including frequency and magnitude, were related to snow water equivalent estimates from a high resolution (0.01° resolution) snow reanalysis dataset spanning the 1984 to 2014 period. Results show that AR events are responsible for approximately 50% of the annual snow accumulation over the study area. AR snowfall events are 2.5 times more intense than no AR events and due to the rain shadow effect, windward AR snowfall is about 4 times greater than leeward AR snowfall. The impact of El Niño Southern Oscillation (ENSO) is analyzed, La Niña episodes imply a reduction in AR frequency in the whole domain and consequently, a lower contribution to snow accumulation. On the other hand, weak El Niño episodes show an increase in AR events and consequently more snowfall. For moderate to strong El Niño episodes, an increase in landfalling AR frequency from north to south was found.