## Atmospheric Circulation Influence on the Seasonal Trends of Daily Extreme Temperature and Precipitation Events over southern South America

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## Abstract

Southern South America (SSA) is an extended region where temperature and precipitation daily extreme events have several impacts on the different socio-economic activities. In this work, their occurrence over SSA and association with atmospheric circulation were studied during 1979–2015. Extreme events showed trends in the different sub-regions. On one hand, heavy precipitation exhibited a significant increase over central-eastern Argentina and Uruguay, northeastern Argentina and southern Brazil during the warm season, and a significant decrease in central and southern Chile during the cold season. On the other hand, warm (cold) extremes generally presented significant upward (downward) trends. Circulation patterns (CPs) were generated with a classification of 500 hPa geopotential height based on an obliquely rotated T-mode principal components analysis. The influence of changes in CPs frequencies in the seasonal trends of extremes was assessed using the method of hypothetical linear trends, which consists in generating a time series of circulationinfluenced trends and comparing its linear trend with the results of the surface variable. Overall, the attribution of trends suggested that the changing frequency of CPs could explain some of the temporal changes in extremes, indicating that changes in atmospheric circulation would be responsible in particular for a large portion of the observed warm season warming.

Keywords: extreme events, precipitation, temperature, circulation types

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