



Winter daily precipitation in La Plata Basin and circulation patterns in Southern South America

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La Plata Basin is one of the most important agriculture and hydropower producing regions worldwide, where temporal and spatial variability of precipitation have a significant socio-economic impact.

The aim of this work is to analyze the dependence of the daily precipitation in the south of La Plata Basin region on the large-scale circulation in Southern South America and its future projection. Daily mean sea level pressure (SLP) fields from NCEP reanalysis 2 were used to represent observed circulation for the period 1979-1999. The analyzed season was austral winter (June-July-August) for the spatial domain from 15°S to 60°S and from 42.5°W to 90°W. The circulation types were obtained by combining the Principal Component Analysis with the k-means Cluster Analysis. Daily precipitation data was used from the gridded datasets of the Claris LPB Project ("A Europe-South America Network for Climate Change Assessment and Impact Studies in La Plata Basin").

Precipitation fields conditioned by the observed surface circulation were analysed and compared. The results indicate that specific daily circulation patterns can be identified as responsible for a significant contribution to precipitation anomalies. The synoptic structures identified in this work can be associated with daily rainfall over the region of study. The classification scheme is effective not only in discriminating dry and rainy days and subregions of La Plata Basin, but also in differentiating between different thresholds of rainfall intensities. In this sense, the findings of this research help to improve our understanding of the relationship between rainfall variability and atmospheric circulation as defined by an objective classification of circulation types.