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## **Extreme events in La Plata basin: a retrospective analysis of what we have learned during CLARIS-LPB project**

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ABSTRACT: Extreme climate events over the La Plata basin (LPB) can produce significant impacts due to the importance of its agriculture and hydroelectric power production for the local economy. Progresses on describing, projecting and understanding extremes in LPB, in the framework of the CLARIS-LPB Europe-South America Network for Climate Change Assessment and Impact Studies in La Plata Basin Project are reviewed. The paper is based on recent studies and publications as well as some new diagnostics as indicators of works in progress, and can be considered as an update for the LPB region of previous reviews by Cavalcanti et al. (2015) and Rusticucci (2012). Despite of the significant advances on regional extremes, some gaps have been identified and many challenges remain. Most of the recent progresses consider temperature and precipitation extremes on timescales varying from synoptic to long-term variability and climate change, essential for impact and vulnerability assessments. Research lines on extremes requiring further efforts include the relative roles of local versus remote forcings, the impact of land use and land management changes, the specific role of soil moisture and land-atmosphere feedbacks as catalysts for heat waves, the impact of the local inhomogeneities in soil moisture, feedbacks and uncertainties in extremes' climate change projections, seasonal forecast and attribution studies. It is suggested that combining an intensive monitoring and modelling strategy should be a challenge to LPB scientific community.

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