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Analysis of extreme climatic features over South America from CLARIS-LPB ensemble of regional climate models for future conditions

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An ensemble of seven regional climate models (RCM) included in the European CLARIS-LPB project (A Europe-South America Network for Climate Change Assessment and Impact Studies in La Plata Basin) are used to study how some features related to climatic extremes are projected to be changed by the end of XXIst century. These RCMs are forced by different IPCC-AR4 global climate models (IPSL, ECHAM5 and HadCM3), covering three different 30-year periods: present (1960-1990), near future (2010-2040) and distant future (2070-2100), with 50km of horizontal resolution. These regional climate models have previously been forced with ERA-Interim reanalysis, in a consistent procedure with CORDEX (A COordinated Regional climate Downscaling EXperiment) initiative for the South-America domain. The analysis shows a good agreement among them and the available observational databases to describe the main features of the mean climate of the continent.

Here we focus our analysis on some topics of interest related to extreme events, such as the development of diagnostics related to dry-spells length, the structure of the frequency distribution functions over several subregions defined by more or less homogeneous climatic conditions (four sub-basins over the La Plata Basin, the southern part of the Amazon basin, Northeast Brazil, and the South Atlantic Convergence Zone (SACZ)), the structure of the annual cycle and their main features and relation with the length of the seasons, or the frequency of anomalous hot or cold events. One shortcoming that must be considered is the lack of observational databases with both time and spatial frequency to validate model outputs. At the same time, one challenging issue of this study is the regional modelling description of a continent where a huge variety of climates are present, from desert to mountain conditions, and from tropical to subtropical regimes. Another basic objective of this preliminary work is also to obtain a measure of the spread among the regional climate models related to these analysis, and specifically focusing on the GCM employed to force each RCM. Differences among region and seasons will also be considered.