Daily extreme rainfall events over South America as represented by four regional models and a new observational database

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Within the framework of the EU FP6 project CLARIS (A Europe-South America Network for Climate Change Assessment and Impact Studies in South America), four regional modelling groups have coordinated simulations of South American present climate (1992-2000). The models' domains cover the entire continent and are driven by ERA40 reanalysis with an horizontal resolution of 50 km. We analyze daily precipitation of subtropical regions in South America, on both seasonal and annual timescales.

Daily rainfall data used in this study were provided by different national institutions from Argentina, Uruguay, Brazil, Bolivia and Paraguay. The distribution of gauges is relatively homogeneous, except in certain areas in western Argentina and some areas of Brazil and Uruguay. The observation data are distributed all across La Plata Basin region and in southern South America bounded by 70W-40W and 40S-15S.

A rain day is defined as a day with rainfall greater than 0.1 mm and extreme rainfall event is considered when the daily rainfall is greater than the 75th, 90th and 95th daily percentiles threshold. For each subregion selected, the different daily percentiles are calculated for each meteorological station and for each grid point for each model. Both annual and seasonal results are presented. Due to the nature of climate model, representing the rainfall of an area determined by the model resolution (in this case 50x50km), we expect the percentiles of the station data to be higher than the results of the four models. However, the idea behind this comparison is to verify if the models can capture qualitatively the differences between different regions surrounding the La Plata Basin. In future studies, the results presented here will be compared with results from updated model versions driven by ERA-INTERIM.