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A first look at an ensemble of XXIst Century RCM simulations over South America

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The CLARIS-LPB project (A Europe-South America Network for Climate Change Assessment and Impact Studies in La Plata Basin performed within FP7 EU 2008-2012) has developed a set of regional climate model simulations at 50 km horizontal grid spacing covering all South America. The RCMs are forced with three IPCC-AR4 global climate models (IPSL, ECHAM5 and HadCM3). Climate simulations were made over three time periods: present (1960-1990), near future (2010-2040) and distant future (2070-2100). Present climate results were validated against observational datasets before examination of the future climate simulations. In a first analysis, the changes in the seasonal patterns of temperature and precipitation are examined for both future periods. Then, a sub-regional analysis is carried out focusing on several regions of the continent: four sub-basins over the La Plata Basin, the southern part of the Amazon basin, Northeast Brazil, and the South Atlantic Convergence Zone (SACZ). Several metrics, such as the annual cycle of precipitation and temperature and the frequency distribution functions, are examined. These analysis allow us to evaluate changes in the magnitude and timing of precipitation, and also the distribution of austral summer daily maximum temperatures, austral winter daily minimum temperatures, and heavy precipitation events. The objective of this first analysis is to obtain a more detailed description of the projected changes over these sub-regions, as well as a measure of the spread among the regional climate models used. The evaluation distinguishes between results of each GCM employed to force the RCMs. In the next stage of the study the atmospheric processes that may force the climate change or could be responsible for the amplification or damping of climate change reponses and for changes in the variability for each region will be assessed. Likewise, an examination of extreme events (as simulated in the models) will be performed.