## Progress in American monsoon research: Extreme monthly precipitation over La Plata Basin in South America-observations, simulations and climate change projections Iracema Cavalcanti<sup>†</sup>:

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La Plata Basin in South America is affected by monthly and seasonal precipitation anomalies which can cause intense damages in agriculture, cattle raising, can disturb the water resources to hydroelectricity power and also have impacts on urban areas. Persistent conditions of above or bellow rainfall are reflected on monthly anomalies, therefore, the study of extremes in this time scale is important in seasonal monitoring and prediction. It is also important to know the models behaviour in simulating these extremes as well to investigate the projections in climate change scenarios. Observed precipitation is analyzed from GPCP data set. Results from CPTEC/COLA AGCM obtained from six members ensemble long-term climate simulations and results from HADCM3/CMIP3 are analyzed in three periods: 1979 to 2001 (GPCP and CPTEC/COLA AGCM), 1979 to 1999 (HADCM3-20th century) and 2000-2020; 2079-2099 (HADCM3-SERES A2) to obtain extreme cases of precipitation in two sectors of La Plata Basin (LPB). The extreme precipitation months are selected based on Standardized Precipitation Index (SPI) to obtain extreme, severe and moderate precipitation cases. The main objective of the AGCM analysis is to compare the simulated frequency with observed frequency and the associated large scale features, while the main objective of the coupled HADCM3 model is to analyze the projected frequency changes. Results show that there are more observed extreme wet cases than dry cases in the northern and southern sectors of LPB, and both CPTEC/COLA AGCM and HADCM3 capture this variability. The frequencies in the 20th century are better simulated in the northern sector, and in the southern sector both models overestimate the numbers. Some members of CPTEC/COLA simulate higher than observed extreme intensity and there is large dispersion, but the ensemble variability in some periods is similar to observations. HADCM3 also displays similar variability to observations, in some periods. The projected frequencies do not vary much in the first 21 years but increase in the last 21 years of 21st century, when the intensity of extremes is also higher. Large scale features during the extremes in the last period of climate projections are discussed to investigate the relations with the frequency and intensity precipitation extremes increase.