

## **Parallel Session A: Advances in regional downscaling**

### **A3: Downscaling tools and methods**

**A3-P-13**

#### **How well do RCMs and ESDs reproduce the occurrence of extreme precipitation events over Southeastern South America? A case study approach**

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Individual extreme precipitation events over Southeastern South America (SESA) during the spring and summer time are responsible of more than 40% of the total accumulated seasonal precipitation. These extreme events are associated with the occurrence of organized convection in the region. Given the mesoscale features involved in their development, modelling their main features and lifecycles is challenging. In this work we gather different modelling strategies, including several Empirical Statistical Downscaling (ESD) models, several CORDEX Regional Climate Models (RCMs) for the South American domain at various horizontal resolutions and several convective permitting simulations performed with the WRF model for selected case studies to assess the capability of different methodologies in capturing the spatial distribution of rainfall during the occurrence of an extreme event. The evaluation of different methodologies also allows identifying their capability in capturing (or not) the associated physical forcings triggering extreme events. Ten individual events were selected based on data from the TRMM dataset and the CPC-Unified gridded dataset for the period 1979-2015 satisfying the following criteria: daily precipitation exceeding the 95th percentile and with a coverage of more than 10% of grid points within SESA. Due to the large observational uncertainty, we also included several observational datasets to characterize the main features of the individual cases evaluated, which include station data, gridded products (CPC-Unified data) and several precipitation estimates based on satellite data (CHIRPS; MSWEP; TRMM; PERSIANN; CMOPRH). For each individual event, evaluation RCM simulations from the CORDEX database at 50 km and 25 km resolutions; 72-hours simulations performed with the WRF model driven by ERA-Interim reanalysis at roughly 20km, 12 km and 4 km, and several ESD models based on different techniques and different predictor variables were compared.

**Keywords:** downscaling techniques, extreme precipitation events, Southeastern South America