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ABSTRACT BOOK



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**WELCOME TO
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Parallel Session A: Advances in regional downscaling

A3: Downscaling tools and methods

A comparison of statistical downscaling techniques for daily precipitation: Results from the CORDEX Flagship Pilot Study in South America

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Southeast South America (SESA) is one of the regions of the planet where extreme precipitation events occur and have high impact on human activities. These extreme events result from the complex interactions of a broad range of scales, therefore their study, modelling and projections in a changing climate continue to be a challenging task. The CORDEX Flagship Pilot Study in South America (FPS-SESA) addresses this topic in order to advance in the understanding and modelling of extreme precipitation events based on coordinated experiments using different downscaling approaches. In this work we present the results from the collaborative action to intercompare different statistical downscaling techniques in simulating daily precipitation in SESA with special focus on extremes. To this end, seven statistical downscaling models based on the regression and analog families were evaluated over SESA. The sensitivity to the different predictor and predictand datasets were tested using two reanalyses (ECMWF ERA-Interim and Japanese 55-year Reanalysis JRA-55) and two daily precipitation (station data and MSWEP) datasets. The models were calibrated and cross-validated during the 1979-2009 period and also evaluated in the independent warm season of 2009-2010. This season, with record of extreme precipitation events, is the target season chosen in the FPS-SESA to perform the dynamical downscaling simulations as well, and therefore it allows for comparisons between both approaches. The results show that the methods are more skillful when combined predictors including circulation variables at middle levels and local humidity at low levels of the atmosphere are considered. The performance of the models is also sensitive to reanalysis choice. The methods show overall good performance in simulating daily precipitation characteristics over the region, but no single model performs best over all validation metrics and aspects evaluated.

Keywords: Flagship Pilot Study, Precipitation extremes, Statistical Downscaling