

Oral.2: 12:15-12:30. **Evaluating Extreme Precipitation Forecasts using Convective-Permitting Modeling in Tarapacá Region, Chile**

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Abstract

During the last decade, Tarapacá Region in northern Chile has experienced extreme precipitation events causing flash flooding, landslides, and associated adverse socioeconomic impacts. Events that are likely to worsen in the future due to an increase of the intensity and frequency of convective storms driven by global warming and the consequent climatic changes. In this research, the Weather Research and Forecasting (WRF) model is used at a convective-permitting resolution to design an ensemble-based, short-range forecast for probabilistic weather forecasts in Tarapacá Region. All ensemble members from the Global Ensemble Forecast System (GEFS) are used to establish initial and lateral boundary conditions for different extreme weather precipitation events between 2012 and 2021. Preliminary simulation results show a significant improvement in total precipitation, as compared to the driving global forecast model and satellite observations. They also provide a comparative advantage over the steep terrain of the Andes Mountains satellite observations which substantially underestimate precipitation. WRF simulation results are primarily used to improve streamflow simulations using a set of hydrologic models. The final combination of climate and hydrologic simulations is used to establish hybrid evaluation metrics for the development of comprehensive data assimilation, paradigm to be operationally implemented in the Tarapacá Region.