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Atmospheric monitoring with a new GNSS network in the south-central Andes

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The Central Andes are characterized by a steep climatic and environmental gradient with large spatial and temporal variations of associated hydrological parameters. There are two main atmospheric processes that influence climate conditions in our study area in northwestern Argentina: the South American Monsoon System that transports moisture via the low-level jet and the orographic barrier of the Eastern Cordillera that forces focused rainfall at the windward facing slopes.

As part of the International Research Training Group-StRATEGy project, our research aims at monitoring integrated water vapour (IWV) in the south-central Andes, in order to track moisture propagation. In accordance with the needs of the research, we processed data from two new Global Navigation Satellite System (GNSS) ground stations that were installed in spring 2019 along with - already calculated - solutions that were derived from an existing network. We used 10 year-long time-series from 31 stations spanning an altitude range from 198 to 5141m asl and stretching from the mountain front to the interior of the mountain range. This enhanced network helped us to examine spatial correlations, as well as differences in behaviour of the IWV across the climatic gradient. Moreover, we retrieved the gradients of the IWV at single positions, in order to study seasonal correlations between wind and gradient direction.