Assessment of future regional precipitation pattern for an Andes region in Southern Peru

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The Cusco and Apurímac region (Southern Peru) in the outer tropical Andes is characterized by a distinct wet and dry season. The climatology of the Andes region in southern Peru is complex and mainly influenced by tropical and extra tropical upper level-large scale circulation as well as by local convection. For the past decades, observations from station data show a slight negative precipitation trend for the area. Scenarios for the future are associated with large uncertainties. Data from the few available Regional Climate Model simulations, and results from statistical downscaling show neither clear nor consistent future precipitation trends for this region

The large biodiversity in the high altitude of the Andes and the critical socio-economic situation of the majority of the local population imply a high vulnerability to climate variability and change. Even small shifts in particular in the precipitation regime (sum, frequency or intensity) can therefore have significant impacts on the livelihood of the rural population. Droughts and flooding events that occurred in the past years have demonstrated the heavy repercussion of extreme events.

In our study, we analysed and correlated past regional station observations with large-scale circulation patterns from Renanalyses in order to aim at improving our understanding of the major drivers for precipitation in the Cusco-Apurímac region. First results show an only moderate correlation with ENSO and a relative stronger correlation with moisture transported from the Amazon Basin.

Our results are then related to large-scale pattern scenarios provided by GCMs and discussed in view of possible impacts of climate change for the Cusco – Apurímac region. In conclusion, we aim at showing at the example of this specific area of the Andes how process knowledge can be used to support the development of adaptation measures in regions with limited availability of data.