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**Climandes**
Servicios Climáticos para el Desarrollo



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Spatio-temporal temperature and precipitation patterns in the southern Peruvian Andes

Insights from the Climandes project

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Study region and data

Region

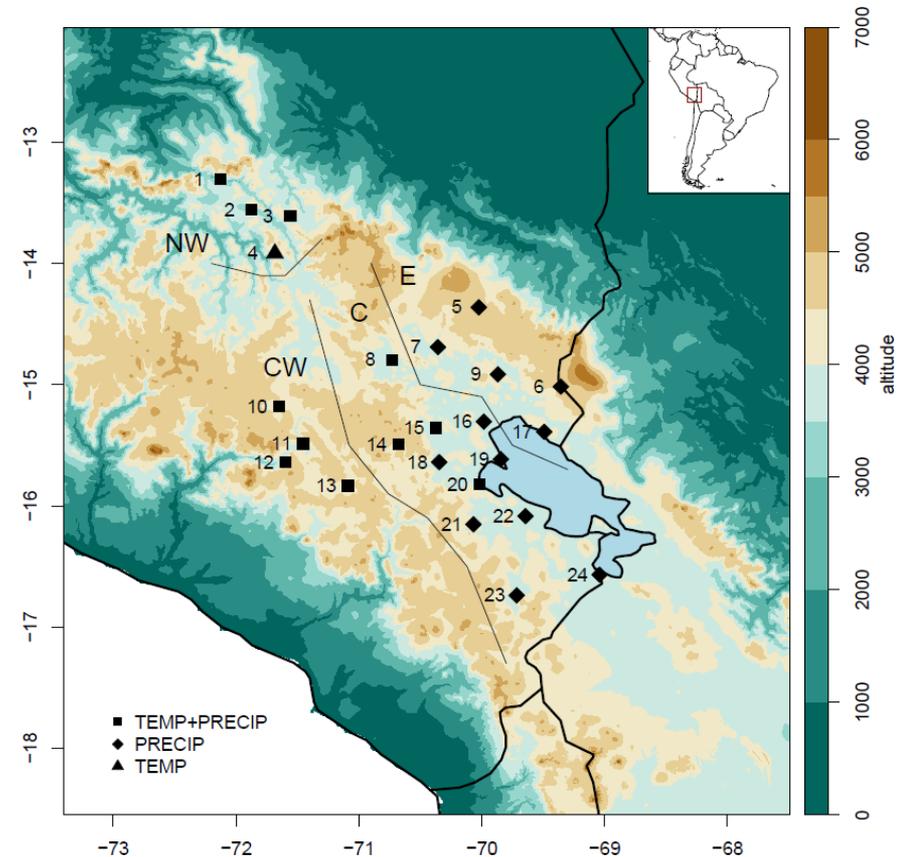
- Southern Peruvian Andes, region Cuzco and Puno

Data

- Station observations of SENAMHI Peru from 1964 to 2018
- Gridded dataset for daily precipitation PISCO^{1,2} from 1981 to 2016

References:

- [1] Huerta et al., 2018
- [2] Aybar et al., 2019

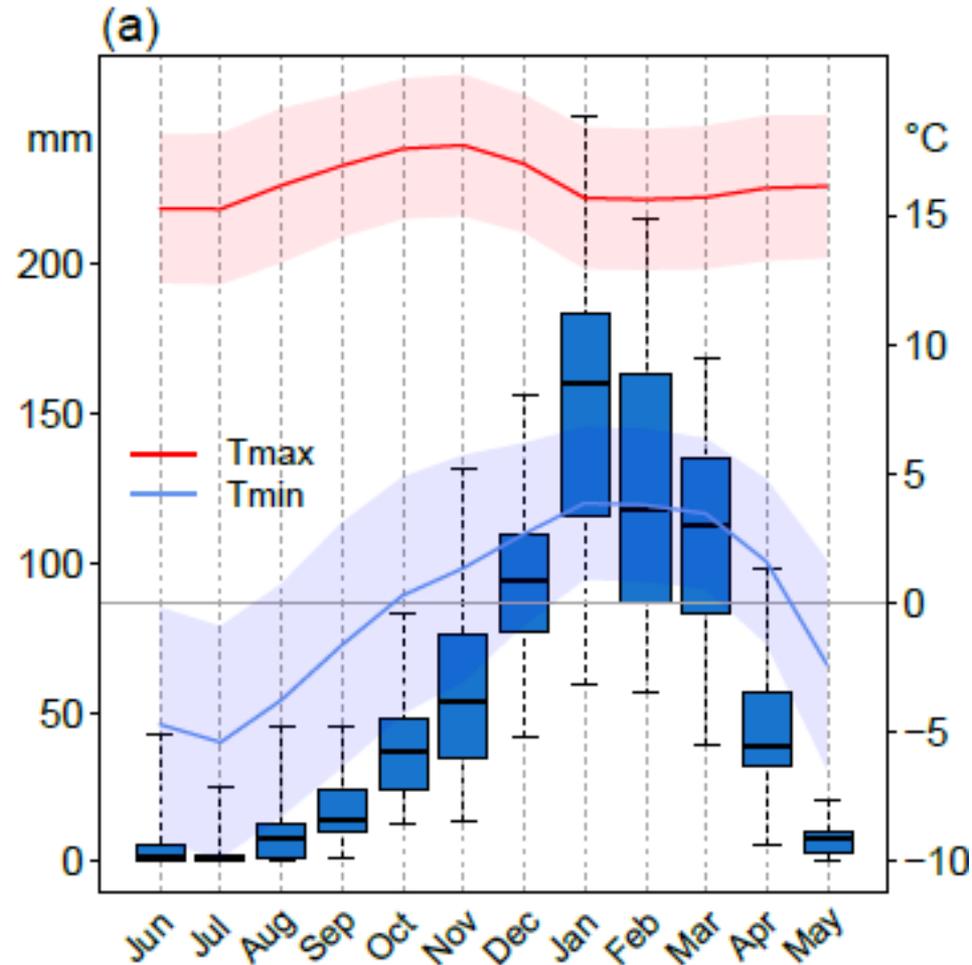


Temperature and precipitation climatology (1981-2010)

Annual cycle

Some characteristics

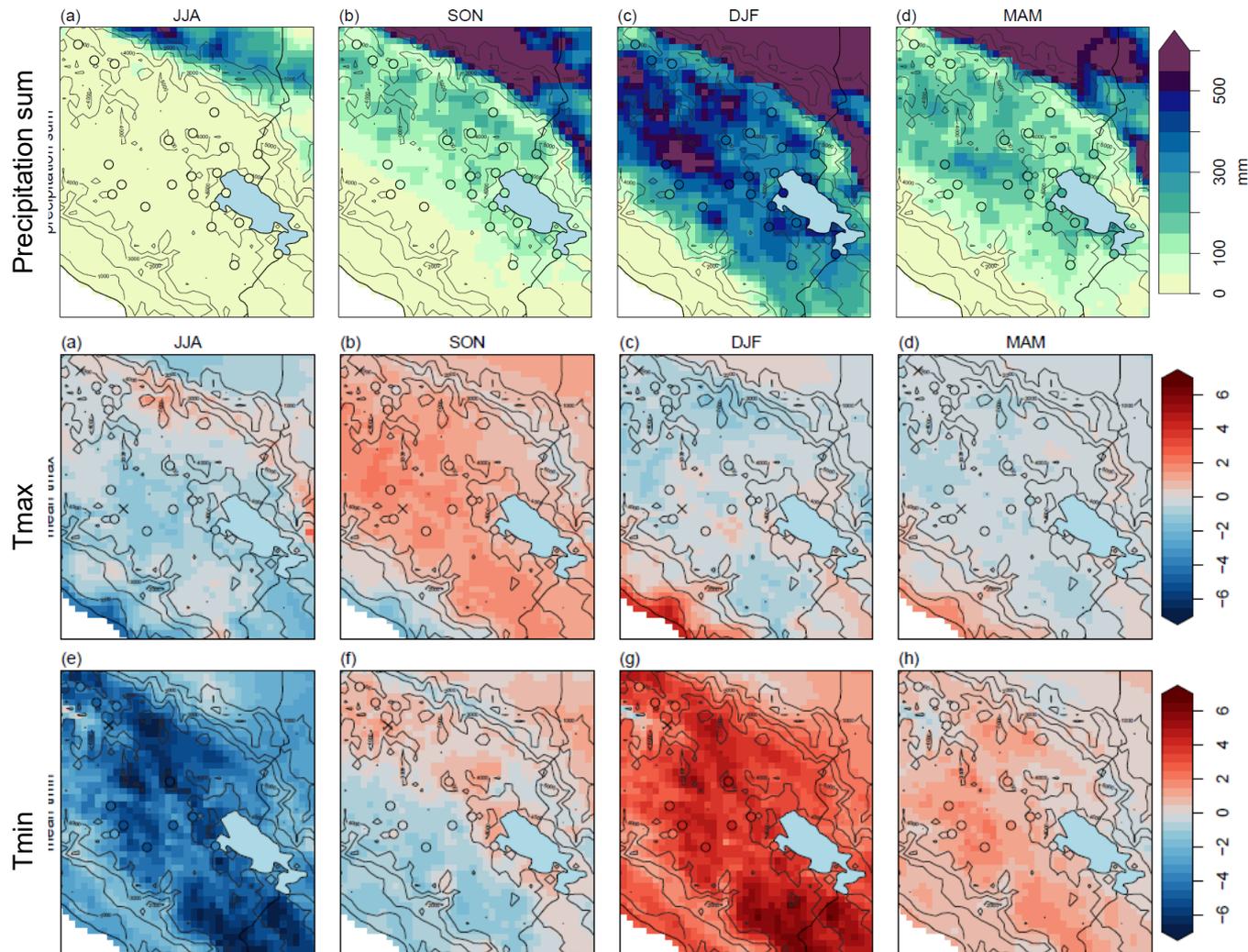
- Maximum temperature
 - Weak annual cycle (less than 3°C)
 - Peak occurs in spring
- Minimum temperature
 - Strong annual cycle of ~10°C
- Precipitation
 - clear seasonal cycle (rainy in summer – dry in winter)



Temperature and precipitation climatology (1981-2010)

Spatial patterns

- Spatial patterns of Prec, Tmax, and Tmin (shown as anomalies from yearly climatology for Tmax and Tmin)

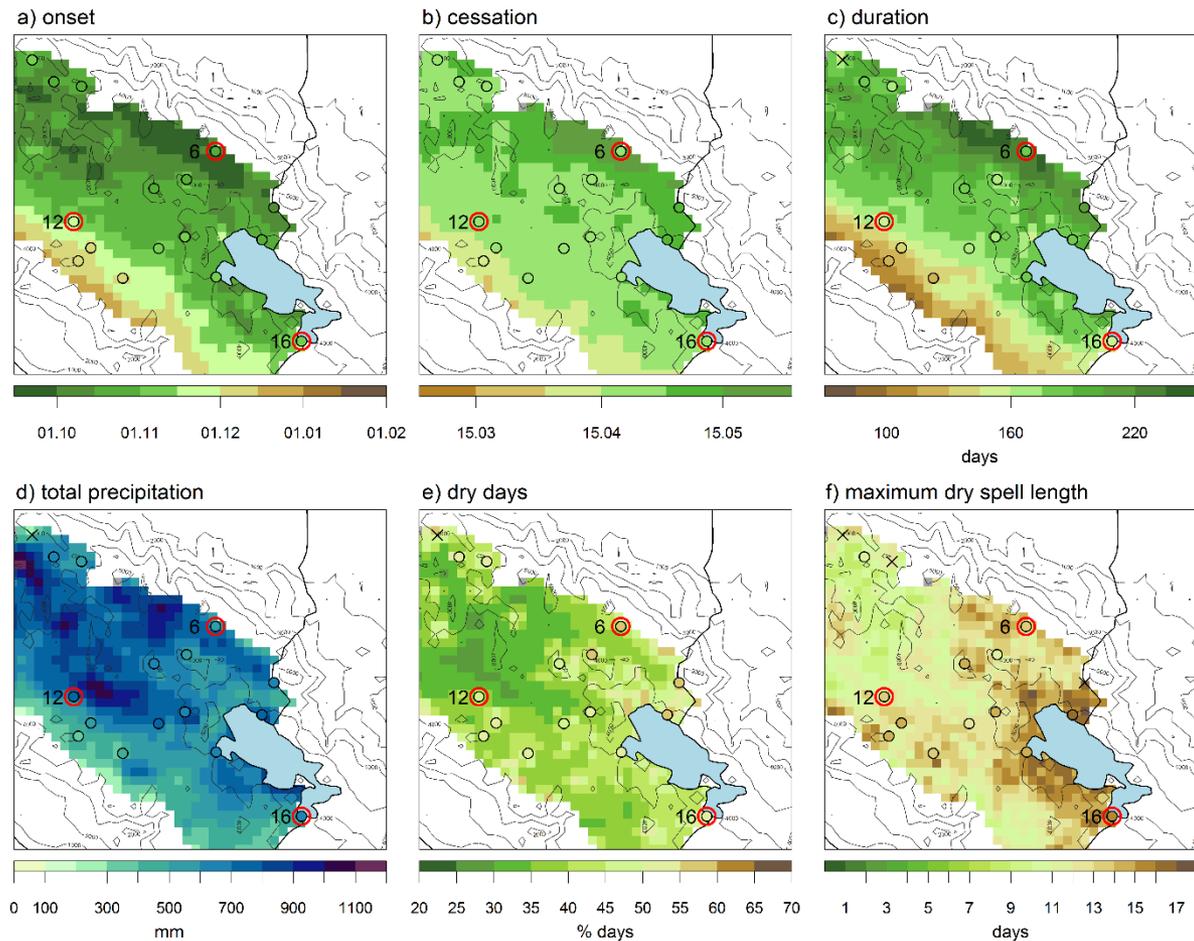


Findings:

- Similar pattern of Tmin and Prec in SON
- Positive Tmax anomaly occurs only in SON

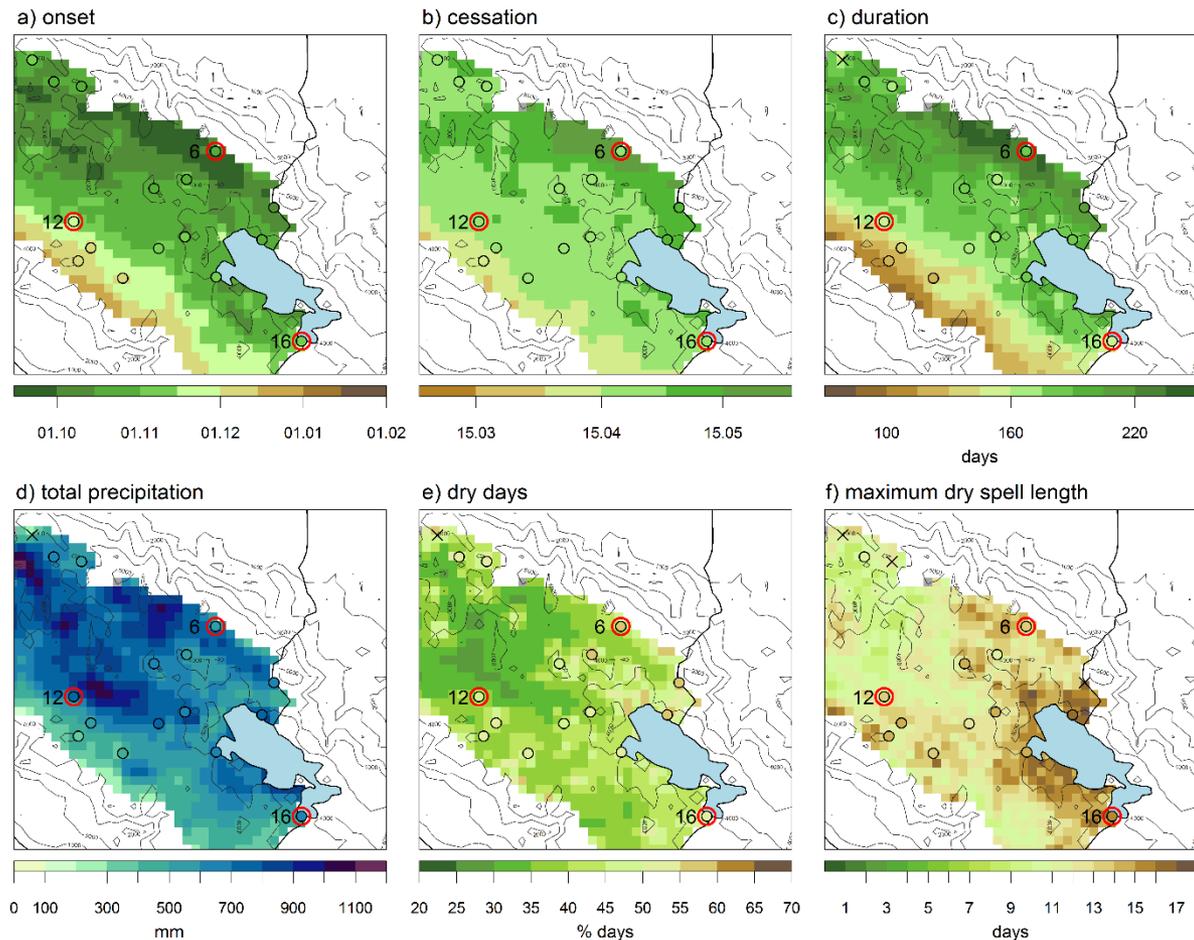
Some climatological characteristics of the rainy season (1981 – 2010)

- Onset of rainy season (a) has a clear spatial pattern
 - Rainy season starts in October in region close to the Amazon, and in December in south-western regions
- Cessation (b) is spatially more homogeneous than onset, and occurs mostly in April
- Regions lying close to the Amazon have a longer rainy season (and therefore a longer growing season)



Some climatological characteristics of the rainy season (1981 – 2010)

- Total precipitation (d) patterns only weakly relates to the onset of the rainy season
 - Most rain falls in Dec. to Feb.
 - Onset of rainy season does not allow to predict amount of precipitation during the rainy season
- The region around Lake Titicaca is drier (f) than Cuzco, which is probably due to topographic effects



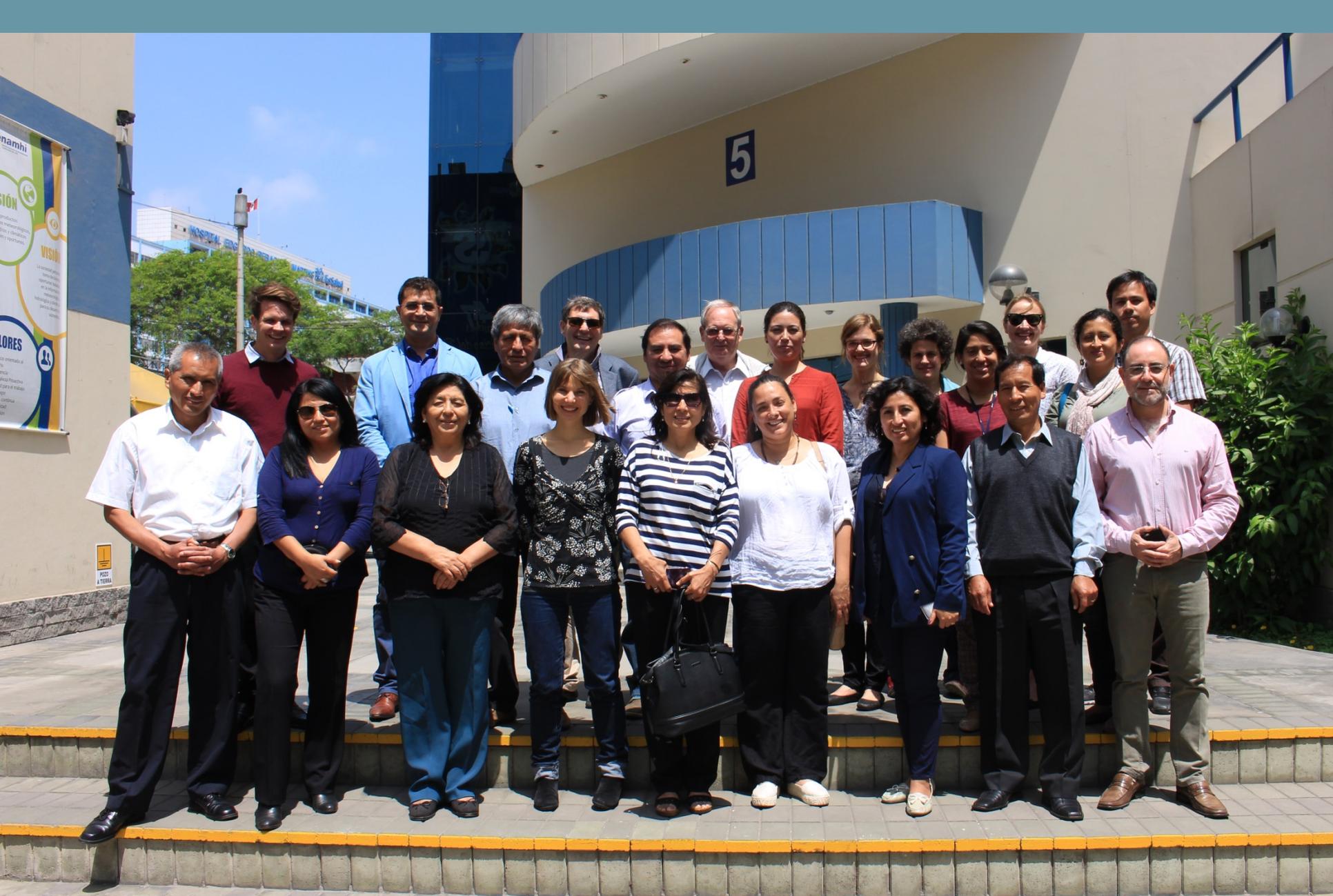
Short conclusions

- In the southern Peruvian Andes, precipitation and minimum / maximum temperatures are strongly related **through cloud cover**, both spatially and temporally
 - Remark: This is even the case when regarding trends (not shown)
- The onset and the duration of the rainy season show a clear spatial pattern
 - longer growing seasons in regions lying close to the Amazon
- The total amount of precipitation falling during the rainy season is only weakly related to the onset
 - The onset of the rainy season does not allow to predict precipitation amounts at the seasonal scale
- The region around lake Titicaca is comparably more dry than other regions (e.g., Cuzco)
 - Total precipitation and dry days are mostly determined by topography

The publication of results is in preparation:

Imfeld et al., «A combined view on precipitation and temperature climatology and trends in the southern Andes of Peru» (submitted to the Int. Journal of Climatology)

Sedlmeier et al., «The rainy season in the southern Peruvian Andes» (in preparation)



Gracias por su atención!