



Investigating potential precipitation changes with impacts on small-scale farming in mountain villages, Cordillera Blanca, Peru

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Small subsistence farmers on the slopes above the city of Huaraz in the Peruvian Cordillera Blanca assign recent challenges in agricultural production – beyond other factors - to decreasing precipitation during the early crop cultivation period in August and September. In general, local climate is characterized by low annual variation in air temperature but a strong seasonality in precipitation. While driest conditions prevail in June and July, precipitation increases gradually towards the October to April wet season with strong topographically induced gradients. Because seeding occurs soon after the core dry months, cultivation is highly vulnerable to potential alterations in the transition period from dry to wet conditions.

Within this study we try to find “data-based” evidence for changes in precipitation patterns, even though the availability of meteorological information for proving precipitation trends is generally poor for this region. We currently investigate the respective potential of connecting approx. 10 years (2003-2013) of ground measurements (weekly resolution with some gaps) with ERA-interim total precipitation output (0.75 deg. resolution) by (1) selecting those adjacent model grid points that explain measured precipitation variability best and by (2) fitting the data from the selected grid points to the measurements with quantile mapping. Uncertainties arising from the transfer functions are assessed with a cross validation approach.

Our preliminary results suggest that (1) ground measurements are fairly explained by ERA interim data (despite the very complex topography), that (2) no significant trends in precipitation at the end of the dry season (August, September) are detectable for the period 1979-2013, but relatively high year-to-year variability occurs and that (3) process based limited area modeling might be required to effectively assess specific requests of user groups related to local precipitation variability.