Homogenization in areas of sparse data networks: a case study applying HOMER

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Reliable climate change studies require high-quality climate data. The quality control and homogenization of surface observations is hence of utmost importance. In this study we highlight the influence of sparse data networks (a typical condition in development countries) on the homogenization process. Results are presented from the WMO Global Framework for Climate Services twinning project CLIMANDES (Servicios CLIMáticos con énfasis en los ANdes en apoyo a las DEcisioneS) and DECADE (Data on climate and Extreme weather for the Central AnDEs).

Relative homogenization methods assume that measurements of nearby stations (highly correlating data) face similar climate signals. However, networks in development countries such as Peru often suffer from a low station density. In combination with the high topographic complexity and climatic variability encountered in Peru, the results and errors of relative homogenization approaches need to be investigated. To quantify the errors related to the low station density, the performance of the semi-automatic homogenization procedure HOMER is tested on an artificially thinned Swiss observation network. HOMER is tested using different approaches: a fully automatic mode, a mode with human intervention, and two different approaches regarding the insertion of meta information. The homogenized data is compared to the benchmark dataset homogenized with THOMAS, the homogenization method developed and implemented at MeteoSwiss. In addition to the results obtained from the benchmarking procedure on the dense and sparse networks, homogenized data of two Peruvian catchments plus relevant climate indicators for the Andes are presented.