Estimating the Precipitation Climate of a Remote Semiarid Region

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In this study, we systematically compare a wide range of observational and numerical precipitation data sets for Central Asia. Data considered include two re-analyses, three datasets based on direct observations, and a regional climate model simulation driven by a global reanalysis. These are validated and intercompared with respect to their ability to represent various aspects of the Central Asian precipitation climate. In each of the datasets, we consider the mean spatial distribution and the yearly cycle of precipitation, the amplitude of interannual variability, the representation of individual yearly anomalies, and the precipitation sensitivity (i.e. the response to wet and dry conditions). The mutual agreement between the observations is used as an indication of how far these data can be used for validating precipitation data from other sources. In particular, we show that the observations usually allow for the qualitative detection of anomalies in individual years while it is not always possible to use them for the quantitative validation of the amplitude of interannual variability. The regional climate model is capable of improving the spatial distribution of precipitation. At the same time, it strongly underestimates summer precipitation and its variability, while interannual variations are well represented during the other seasons, in particular in the Central Asian Mountains during winter and spring. Therefore, the model output lends itself to further application in hydrologic studies.