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Uncertainty analysis of daily gridded precipitation dataset based on a dense rain-gauge network

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A statistical analysis was performed to examine the uncertainty in a daily gridded precipitation dataset based on a dense rain-gauge network over Monsoon Asia. This dataset has been created through the activities of the Asian Precipitation -- Highly Resolved Observational Data Integration Towards the Evaluation of Water Resources (APHRODITE) project, and is the only product with long-term (47-yr), high-resolution (0.25 and 0.5 degree), and continental-scale based on a dense rain-gauge network. In this analysis we used the latest version of the dataset (APHRO_V0902; Yatagai et al., 2009, SOLA; http://www.chikyu.ac.jp/precip/). We will show the results for the coming version of APHRODITE dataset in the presentation.

Using 10%-fold cross-validation method, the bias of gridded analysis and the temporal correlation between withdrawn rain-gauge data and corresponding gridded analysis were calculated. The time- and area-averaged bias is about -0.082 mm d^{-1}, suggesting good estimates in the analysis. The dependences of the bias on both of the spatial density and the elevation of rain-gauge are negligible. However, estimated daily precipitation tend to be a little overestimated and significantly underestimated in low and high rainfall area, respectively. The dependence of the temporal correlation between withdrawn rain-gauge data and corresponding gridded analysis on the spatial density of rain-gauge shows that denser gauge network can produce higher quality analysis, although the correlation still presents considerable variation even with denser rain-gauge network.

Keywords: daily precipitation, gridded dataset, rain-gauge, uncertainty, bias, cross validation