Plausibility Check for Precipitation Measurement at the Weather Station Lauchäcker (Stuttgart)

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Abstract

Precipitation data plays an important role in hydrological modeling and water balance studies. They require high accuracy of the data. However, precipitation measurement is affected by both systematic errors and random errors, which lead to an underestimation of actual precipitation. In order to locate the errors in measurement result to evaluate the plausibility of the data set as much as possible, a procedure is designed by using the confidence interval, which is calculated under the condition of Student's T-Distribution. By using the data from Weather Station Lauchäcker, the procedure is validated and assessed. The script for the procedure is written in Matrix laboratory (MATLAB). Both daily and hourly data are used for processing. Graphs of the coefficient of variation and non-exceedance probability are drawn to analysis. The result showed that most of the errors can be located in daily data. As the level of precipitation goes down to below 0.2 mm, it is hard to distinguish whether it is error, thus further evaluation is needed with more accurate data.

Keywords: Plausibility check; Precipitation data; Confidence interval; Student’s T-Distribution