Geophysical Research Abstracts
Vol. 20, EGU2018-14508, 2018
EGU General Assembly 2018

Comparison of summer precipitation obtained from different instruments at a mountain lysimeter station

Steffen Birk (1), Veronika Slawitsch (1), Aleksandar Bijelic (1), Christina Lubas (1), and Markus Herndl (2)

(1) Institute of Earth Sciences, NAWI Graz Geocenter, University of Graz, Austria (steffen.birk@uni-graz.at), (2) Institute of Plant Production and Cultural Landscape, Agricultural Research and Education Centre Raumberg – Gumpenstein, Irdning-Donnersbachtal, Austria (Markus.Herndl@raumberg-gumpenstein.at)

This work aims to compare and evaluate various types of precipitation measurements at a mountain site. For this purpose, we use data from the station Stoderzinken (Austria), situated within the Northern Calcareous Alps at 1830 m above sea level. The station is equipped with four storage gauges, a weighing precipitation gauge (Ott Pluvio), a disdrometer (Ott Parsivel), and a weighable lysimeter. The calculation of precipitation from the water balance of the lysimeter is based on the assumption that precipitation and evapotranspiration do not occur at the same time. As the snow cover prohibits a correct measurement of the lysimeter weight during the winter, only the summer precipitation is evaluated here.

First results suggest that the precipitation measured by the lysimeter tends to be higher than that obtained from the storage gauges and the weighing precipitation gauge. This is generally expected because the elevated gauges are affected by wind-induced errors, which are absent in ground-level gauges such as a lysimeter. For a two-month period in the summer 2015, the storage gauges and the weighing precipitation gauge recorded approximately 35 to 40 percent less precipitation than the lysimeter. This deviation appears very high compared with typical errors caused by the systematic wind field deformation of elevated gauges (e.g., 2 to 10 percent for rainfall according to WMO, Guide to Meteorological Instruments and Methods of Observation, 2010). Interestingly, the precipitation measured by the disdrometer is even slightly higher than that of the lysimeter for the aforementioned two-month period. Yet, this finding should not be generalized, as splitting the time period in two shorter periods is found to yield larger and reverse deviations between disdrometer and lysimeter. These results highlight the need for further investigations into the causes of the deviations between the measurement techniques and the careful consideration of the adequate instrumentation of mountain sites.