



A method to measure winter precipitation and sublimation under global warming conditions

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Winter precipitation and snow sublimation are fundamental components of the alpine moisture budget. Much work has been done in the study of these processes and its important contribution to the annual water balance. Due to the above-average sensitivity of the alpine region to climate change, a change in the importance and magnitude of these water balance parameters can be expected. To determine these effects, a lysimeter-facility enclosed in an open-field climate manipulation experiment was established in 2015 at AREC Raumberg-Gumpenstein which is able to measure winter precipitation and sublimation under global warming conditions. In this facility, six monolithic lysimeters are equipped with a snow cover monitoring system, which separates the snow cover above the lysimeter automatically from the surrounding snow cover. Three of those lysimeters were exposed to a +3°C scenario and three lysimeters to ambient conditions. Weight data are recorded every minute and therefore it is possible to get high-resolution information about the water balance parameter in winter. First results over two snow event periods showed that the system can measure very accurately winter precipitation and sublimation especially in comparison with other measurement systems and usually used models. Also first trends confirm that higher winter temperatures may affect snow water equivalent and snow cover duration. With more data during the next years using this method, it is possible to quantify the influence of global warming on water balance parameters during the winter periods.