

# How much snow is not measured? Results of a Norwegian field study for determining the wind-induced loss of solid precipitation

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## Abstract

The systematic error of solid precipitation measurements, dominated by a substantial, wind-dependent under-catch, propagates into hydro-meteorological and climate models and makes it difficult to calculate and predict precipitation amount, available water resources and mountain hazards.

In 2010, an extensive test-site, Haukeliseter, was established at a mountain plateau in Southern Norway. The main goal of this national effort – a cooperation of the Norwegian Meteorological Institute and several hydropower companies – was the establishment of an adjustment function for precipitation data including a quantification of the remaining uncertainty suitable for Norway's climate. Accurate data are essential for evaluating and predict expected changes in precipitation patterns (both amount and type) and beneficial for Norway's hydropower production.

Precipitation data of automatic gauges at Haukeliseter test site are compared with a data set of an automatic gauge surrounded by a double fence construction to minimize wind impact. Additionally, a large number of sensors are monitoring supportive meteorological parameters.

As expected, the results from three winter seasons show a clear temperature dependency and a non-linear relationship with wind speed. By the means of advanced statistics, namely Bayesian method, an adjustment equation was derived for winter precipitation measured by automatic precipitation gauges. Input variables are measured precipitation, wind speed and air temperature. The equation can be used with wind measurements in precipitation gauge height or 10 m.

Beside its role for the described national project, acts Haukeliseter test-site also as a host-site within the World Meteorological Organization's Solid Precipitation Intercomparison Experiment (WMO SPICE) since early 2013.

## References

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