



What do we know about orographic precipitation gradients in mountainous areas? A comparative analysis in Canada, France, Sweden and Switzerland

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Precipitation estimation may turn out to be very difficult in mountainous regions, for three main reasons: (i) systematic undercatch of precipitation gauges (especially during snowfall), (ii) altitudinal (orographic) effects on precipitation, (iii) and sparser measuring networks (due to the remoteness of high elevation regions). These three elements are strongly correlated: the higher the altitude, the more uncertain the altitudinal relation between altitude and precipitation (low stations density) and the more important the underestimation of the precipitation (high quantity of snow).

In mountainous regions, the low density of the precipitation gauging network often causes numerous problems (Barry 1992). Among others, Fortin, Therrien et al. (2006) and Sevruk (2000) worked on the underestimation of the precipitation in measurements, due to the combination of snowfall and wind, while Johansson (2000) and Sevruk (1997) studied the relation between altitude and precipitation.

Through an analysis of orographic precipitation gradients in four different countries (Switzerland, Sweden, France and Québec), we try to identify ways to improve the estimation of precipitation input to catchments in mountainous areas, and more generally in snow affected areas.

References

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