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Statistical approach to the snowfall height forecast problem in eastern Alps

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The eastern Alpine region is subjected to frequent snowfalls, during the cold season, that can have deep impact on human activity, roads, power lines, avalanches, etc. The typical synoptic and mesoscale patterns that lead to snowfalls and the complex orography of the region, characterized by a steep mountain ridge crossed by closed east-west oriented valleys, lead to low predictability of the snowfall events, mainly due to the difficulty in forecasting snowfall height and intensity. In this work a statistical approach is proposed for forecasting the snowfall height, based on a stepwise multiregression with a set of candidate predictors. To estimate the observed snowfall height, it has been used a relation between hourly temperature and precipitation measured by surface stations at different altitudes. This relation has been tested using official reports of the snow height at ground made by human observers. The candidate predictors have been selected amongst some outputs of ECMWF deterministic model and other derived variables, both used in previous works and developed as new tools.