9.1 STATISTICAL LEARNING OF OROGRAPHIC PRECIPITATION GROWTH AND DECAY PATTERNS FROM A 10-YEAR RADAR ARCHIVE IN THE SWISS ALPS

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Meteorological data archives are becoming more and more important for data-driven research. Useful information can be extracted from the data archives to improve the forecasting of weather in real-time, for example by using statistical post-processing techniques or by retrieving a set of similar analogue situations from the past.

Machine learning provides an algorithmic approach to solve classical statistical learning problems, which allows finding robust solutions to non-linear classification and regression problems in high dimensional spaces. Machine learning algorithms (MLA) are designed specifically to maximize the predictive performance without making strong assumptions about the data distribution (e.g. gaussianity), and thus they have a great potential to enhance the skill of weather forecasting models. This study employs MLA to derive orographic precipitation growth and decay patterns from a 10-year archive of composite radar images in the Swiss Alps. More precisely, the precipitation growth and decay is predicted for one hour lead time using as predictors the geographical location, the direction and speed of the mesoscale flows, and the freezing level height. This knowledge is used in a predictive framework to improve real-time nowcasting based on the Lagrangian persistence of radar precipitation echoes to account for the influence of orography.