



## Towards automated multi-sensor thunderstorm warning suggestions

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A thunderstorm nowcasting algorithm including the prediction of thunderstorm intensity has been developed by MeteoSwiss during the last year (Zeder et al, 2018). It applies machine learning techniques to a comprehensive database consisting of satellite, radar and lightning observations as well as NWP model forecasts. In this contribution, we discuss the procedure to integrate these thunderstorm nowcasts into the operational warning procedure. Additionally to the deterministic nowcasting of thunderstorm intensity, we use quantile regression to estimate the uncertainty via prediction intervals. The predicted quantiles can be used to estimate skill scores for an automatically generated warning with specific warning levels, e.g. the probability of detection and the false alarm ratio. In this way, the algorithm can choose to generate a warning suggestion or to wait for the results of the next time step to be more certain about the development of the thunderstorm. The requirements for the necessary nowcasting skill are defined by the needs of different stake holders. Once the warning suggestion is generated, the forecaster has the possibility to reject or modify the automatic warning suggestion within a certain time limit. The forecaster can also issue new warnings that the automatic system has not suggested. At the end of this presentation, we discuss the performance of the automatic system in comparison to the warnings issued by the forecasters.