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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Investigating MSG data as an additional predictor source in the KNMI probabilistic (severe) thunderstorm forecasting system

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Thunderstorms can be a serious threat to society. In the Netherlands, the Royal Netherlands Meteorological Institute (KNMI) is responsible for issuing a weather alarm for severe thunderstorms, based on high total lightning intensity, to the public. To help forecasters decide whether they should issue an alarm, a Model Output Statistics (MOS) system was developed. This system uses logistic regression equations to predict both the probability of thunderstorms and the conditional probability of severe thunderstorms for twelve regions of 90 km by 80 km over the Netherlands, and makes forecasts for 6-h periods up to 2 days ahead. Predictors are obtained from ECMWF and HIRLAM model output and from ensembles of advected radar and lightning data, the latter only for the 0-6 h forecast projections. The system has been operational since 2006 during the warm half year, from mid-April to mid-October.

In this study we investigate an ensemble of Meteosat Second Generation (MSG) data as an additional predictor source for the 0–6 h projections of the MOS thunderstorm forecasting system. Data of interest are MSG derived Cloud Physical Properties (CPP) and the Rapid Development Thunderstorm (RDT) product of Meteo France, based on MSG. The CPP variables are advected using vectors derived from previous MSG images and from HIRLAM 700 hPa wind vectors. The ensemble is created by varying the magnitude and direction of these vectors. A description is given of the best predictors calculated from CPP and RDT data. It is investigated whether these predictors from MSG can further improve the skill of the current KNMI (severe) thunderstorm forecasting system. Therefore, new MOS forecasting equations are derived using these new predictors and those from the current system as potential predictors. The verification results of the current and new MOS system will be presented.