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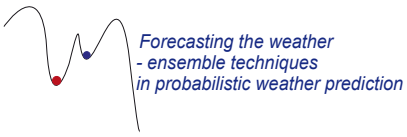


# Probability forecasts for intense precipitation based on upscaled, high-resolution limited-area ensemble forecasts

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High-resolution limited-area NWP models are capable of predicting localized, heavy precipitation, although both intensity and location are uncertain. Especially the latter poses a problem for forecasters. Use of high-resolution limited-area ensemble forecasts emphasizes the location uncertainty, and with horizontal resolutions of ∼5km or better the location of the intense precipitation tend to not overlap for the members in the ensemble. Consequently, at any grid point, at most one or two members tend to predict the event, and so probabilities for high intensity precipitation become very low. This problem is similar to that of verifying localized precipitation in high-resolution NWP models. On a regional scale (∼50-100km) the ensemble-based probability that a high-intensity precipitation event will happen somewhere in the region is much higher than the raw grid point probability, and the location of the highest probabilities correspond well to the location of the observed precipitation. It is illustrated how upscaled probability forecasts provide better guidance to forecasters by case studies and objective verification for a 25-member limited-area ensemble prediction system.