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How do emergency managers use probabilistic weather forecasts in different weather situations

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Although meteorology has made considerable progress in developing reliable probabilistic weather forecasts, actual forecasts and weather warnings are still mostly communicated in a deterministic way. The current practice of withholding information impedes a shared decision-making between meteorological experts, institutions and the public: without probabilistic forecasts, user can only guess the uncertainty of the forecast. A main problem preventing a change is the notorious difficulty to communicate probabilities information to forecast users.

This study presents results from a longitudinal study investigating which risk representations promote the use of probabilistic information within a real-life, operational setting. We implemented different representations of probabilistic weather forecasts in parallel (probability of threshold exceedances, quantiles) within the fire brigade weather information system (FeWIS) of the German National Weather Service DWD. Here, we quantify which representations they rely upon under real operational constraints by analyzing what information emergency managers search for.

First, we compare search during severe weather events compared to more exploratory search under regular weather conditions.

Moreover, probabilistic forecasts allow to bridge the gap between more certain short-term warnings and earlier but less certain weather watches. Second, we can thus analyse the lead times at which user search for information (e.g. before, during and after an event to maintain sufficient staff and technical resources). Analysing search behaviour thus allows insights into which representations can support emergency managers decisions at different times.

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