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Visualizing Probabilistic Forecasts - Exploring Opportunities

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The Goal: Add probabilistic information to our app's precipitation forecast map

One of the most popular features on MeteoSwiss' weather app for smartphones is the precipitation forecast map. It is presented as an animation blending radar obser-vations, nowcasting and local area model forecasts. Today the app shows deterministic forecasts only (Fig. 1) and we aim at including the more complete probabilistic information we have from our ensemble models (IFS, local area models).

The solution should
- be intuitively understandable
- enable to distinguish between low-probability, high-intensity events and medium-probability, low-intensity events
- convey information about uncertainty

Below are three alternatives for including probabilistic information. All visualizations show the same example situation, a day with scattered precipitation zones on 14. 5. 2023, forecast at a lead time of 22 hours, Fig. 2
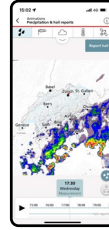
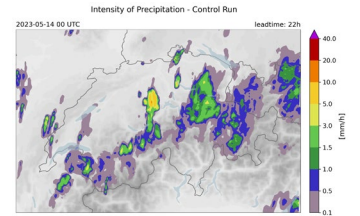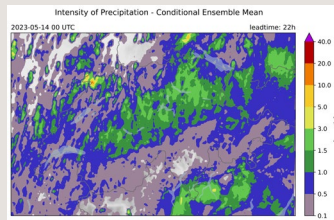

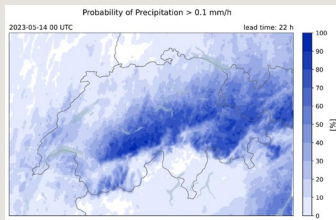Fig. 1: Precipitation forecast animation on weather app

Fig. 2: Use case: Predicted precipitation intensity on May 14, 2023

Option 1: Probability and intensity

Probability and intensity of precipitation are presented in parallel.
Left: Probability of precipitation
Right: Intensity, i.e. mean of ensemble members with precipitation > 0.1 mm, 'conditional ensemble mean'

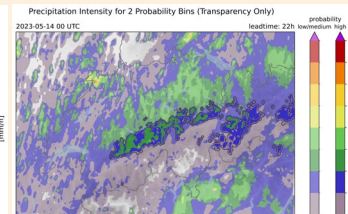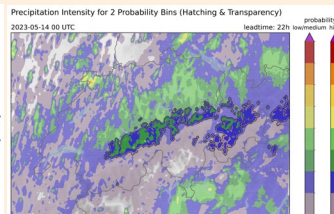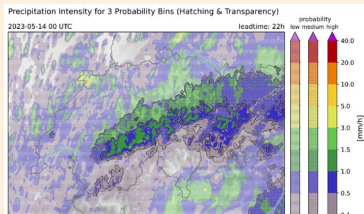## Option 2: Threshold probabilities

Probability of precipitation (left) and conditional probabilities* of precipitation > 2 mm/h (middle) and precip > 5 mm/h (right).

* Probability of > x mm/h precipitation given probability of precip >0
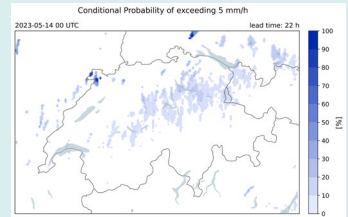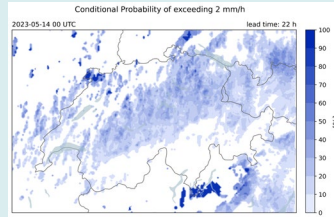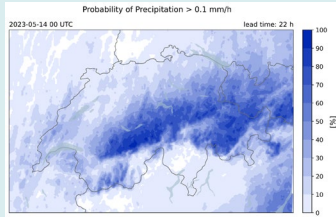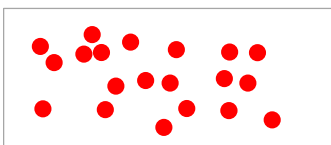

Option 3: All-in-one

Combined probability (hatching or transparency) and conditional ensemble mean (color scale). Left: three probability categories, middle and right: two probability categories, with hatching and transparency, respectively.

Rate these ideas!

Take the sticky dots and vote on the options shown above, add one dot per question/row

Question / Criterion	Probability and intensity	Threshold probabilities	All-in-one		
Which one do you prefer in terms of clarity?					
Best distinction between low-prob, high-intensity and medium-prob, low-intensity?					
Which one is closest to a visualization you use yourself?					

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