



CITIZEN OBSERVATIONS VIA THE RMI SMARTPHONE APP IN BELGIUM: DATA COLLECTION AND APPLICATIONS

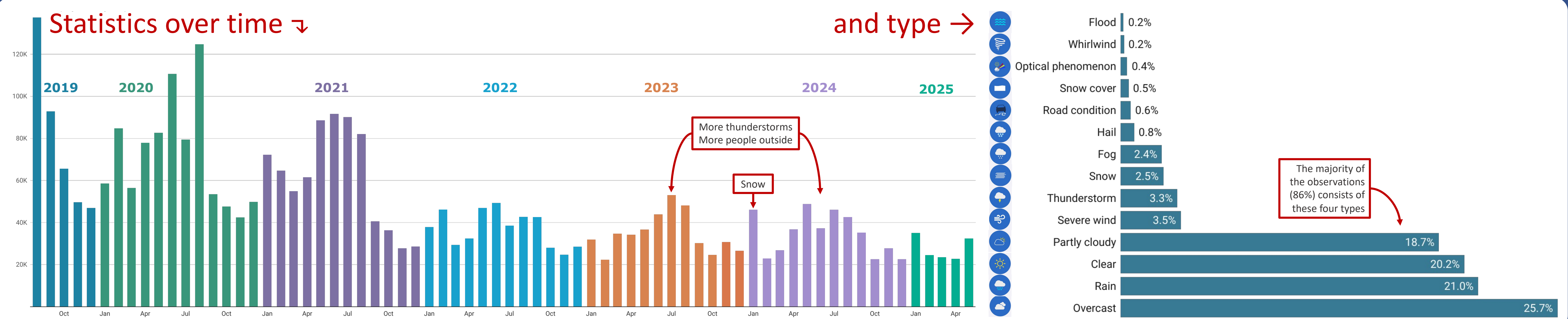
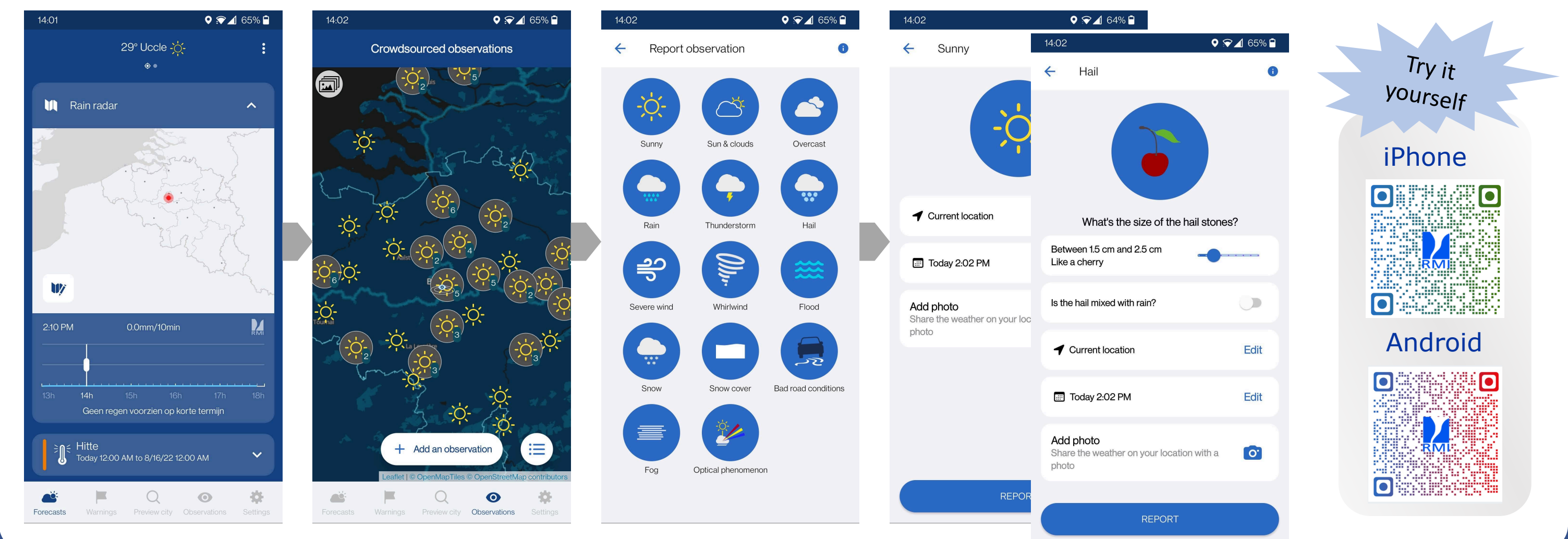
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Summary

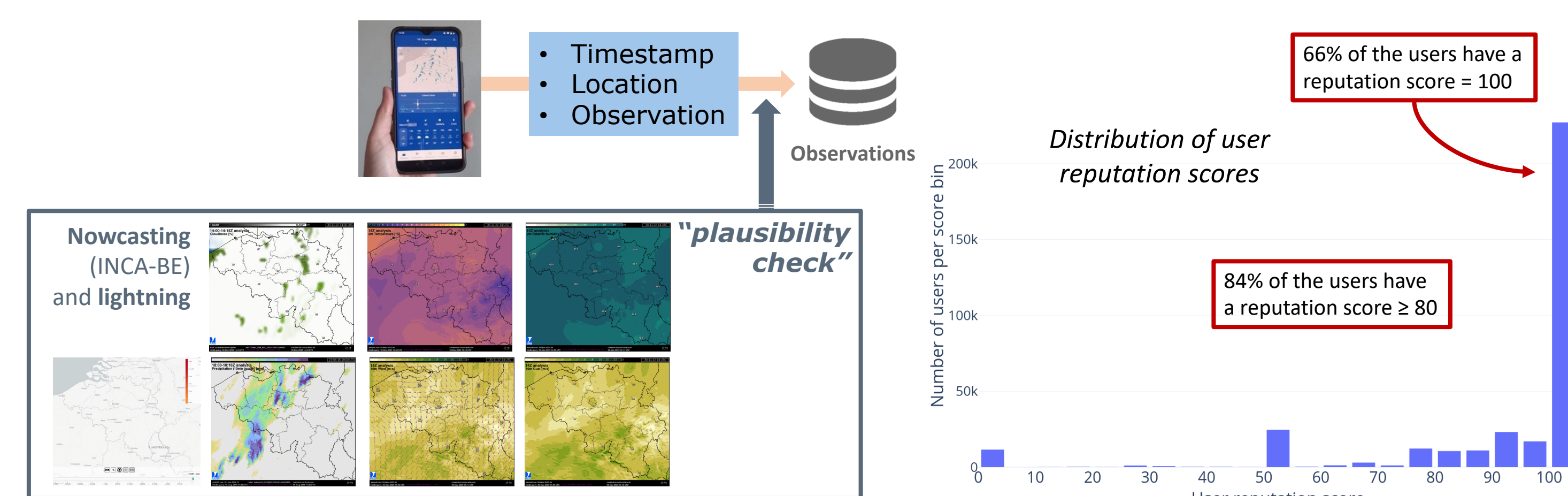
- Since August 2019, users can post a geolocated **weather report** in RMI's weather app.
- Observations **available** in the app, on wow.meteo.be, and as open data.
- 3,4 million observations** collected over a period of (almost) **six years**.
- Basic quality control** (plausibility check) is performed on every incoming observation, and a **user reputation mechanism** is implemented.
- Usage at RMI: validation of weather analyses and forecasts.**
- Added value** for competent authorities in **crisis response**.

Send an observation in a few simple taps



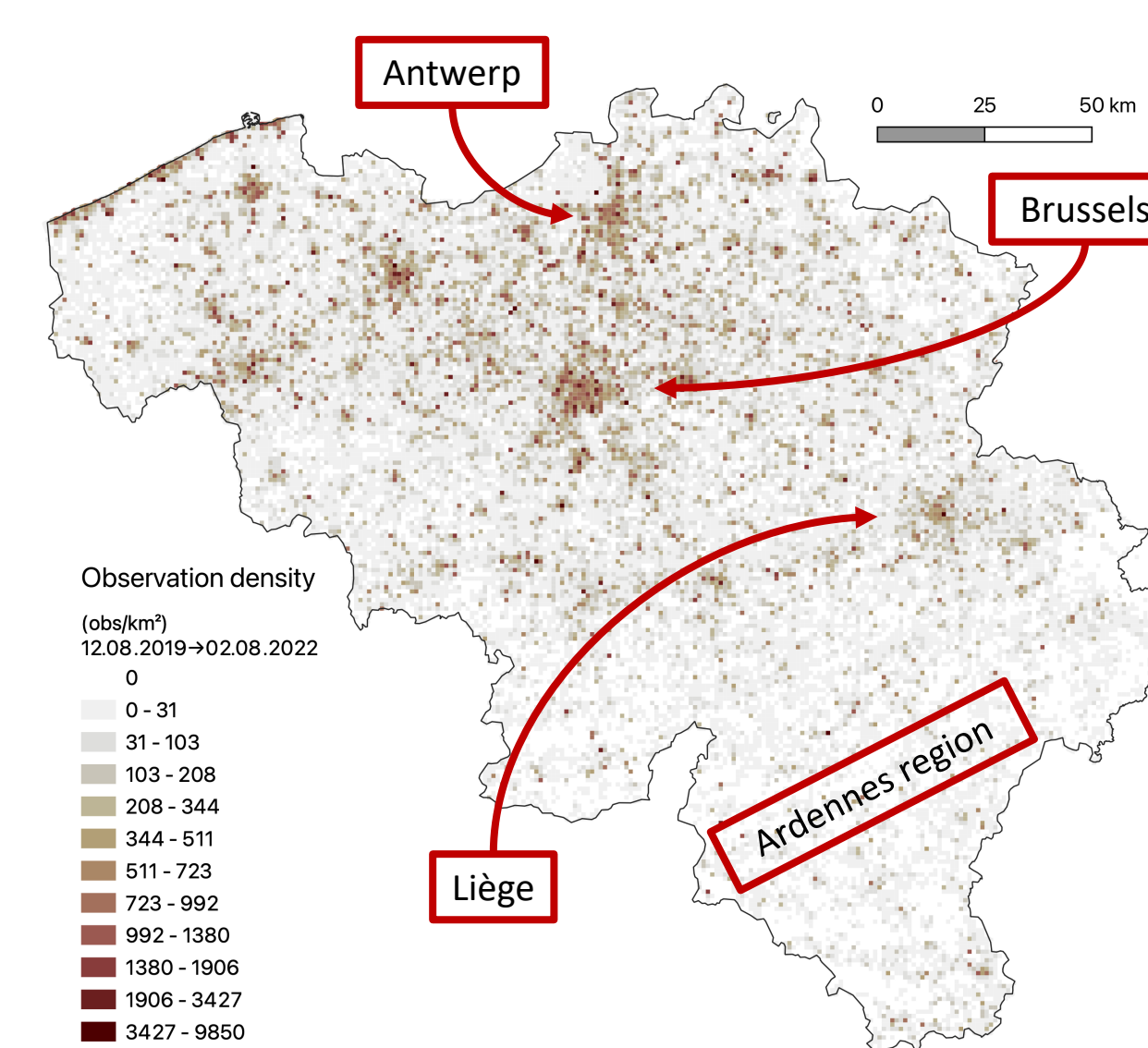
What about the quality?

- A **plausibility score** is assigned to almost* every observation.
- Scoring based on comparison with INCA-BE nowcasting system (Reyniers et al., 2021).
- Currently three plausibility scores are possible:
 - plausible* (score=100)
 - doubtful* (score=50)
 - false* (score=0)



Data generated by humans

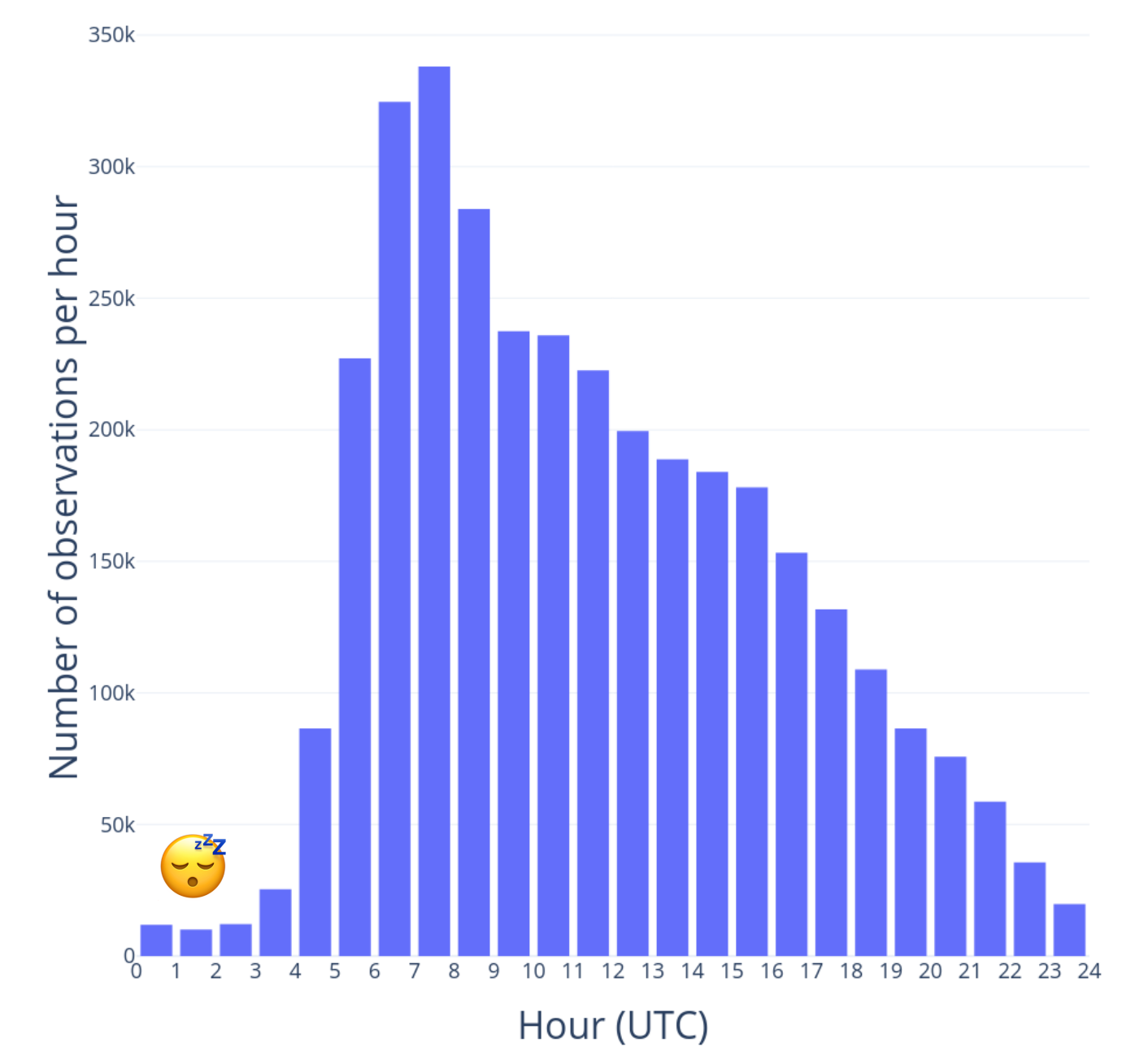
[1] Strong population density bias



[2] Overrepresentation of events with more impact

Some types will be **proportionally more reported than others** compared to climatology, for example hail more than rain.

[3] Strong human-induced diurnal cycle



[4] App design and default values influence reporting behaviour

No information on how users actually use the app.

Use case: validation of dual-pol precipitation type schemes

Precipitation type diagnosis as combination of

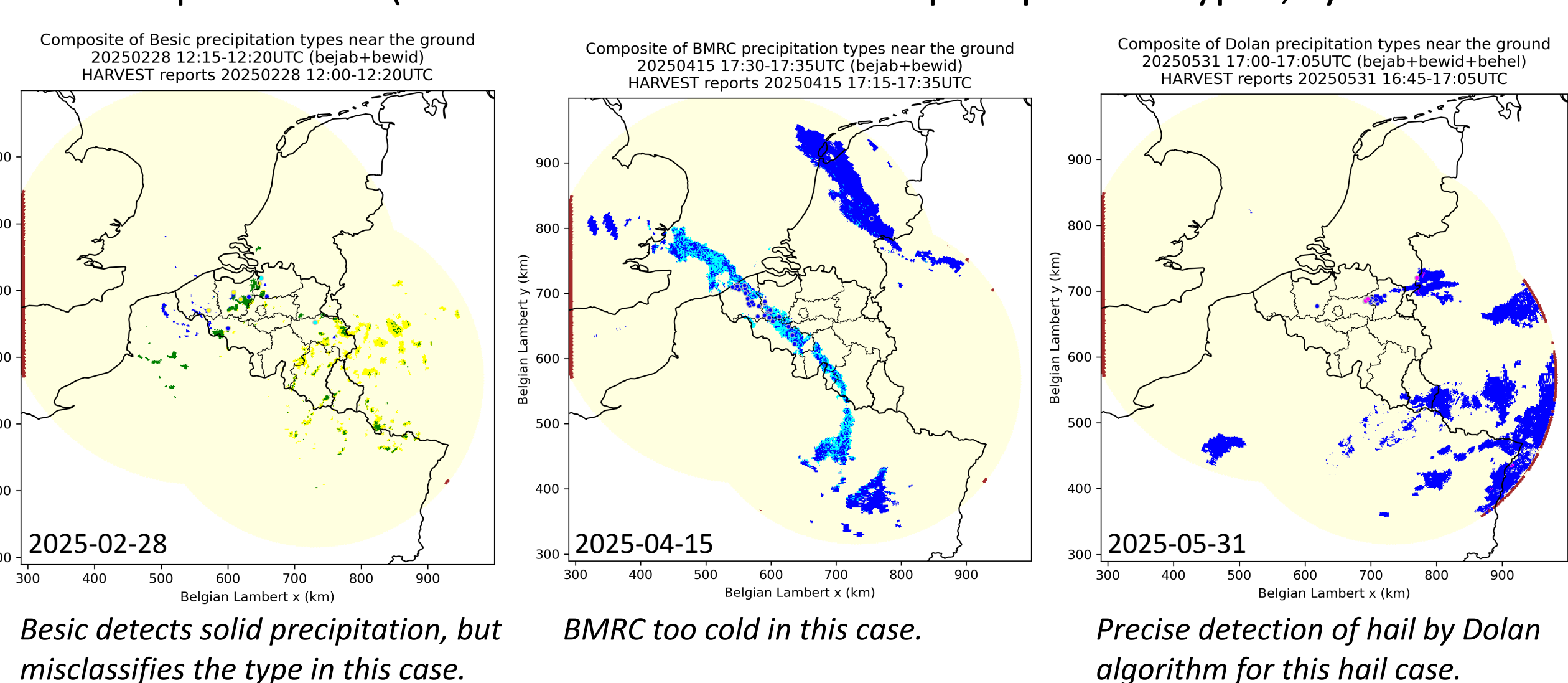
- dual-pol based hydrometeor classification algorithm (HCA) at radar beam height, and
- melting scheme along the vertical (Steinert et al., 2021).

Current HCAs in test:

- the algorithm from the Australian Bureau of Meteorology Research Centre (BMRC) based on Keenan et al. (2003)
- the Dolan et al. (2013) algorithm
- the Besic et al. (2016) algorithm
- the algorithm by Zrnić et al. (2001) implemented in the Python library wradlib

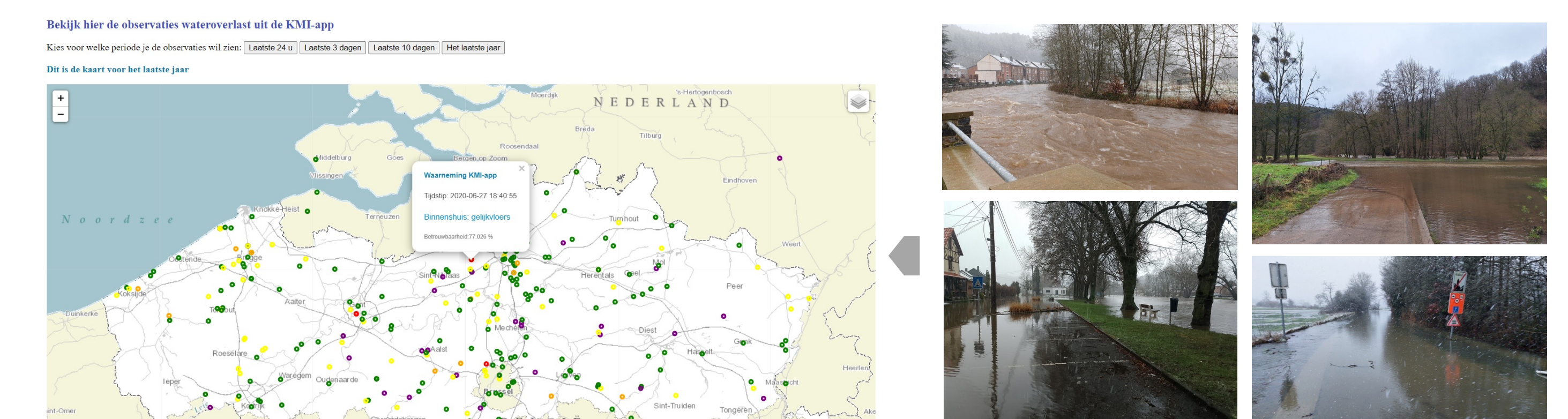
Qualitative validation

by comparing precipitation type product at time T with observations in [T-20', T] window. Three examples below (solid colours: radar-derived precipitation types; symbols: citizen obs.)

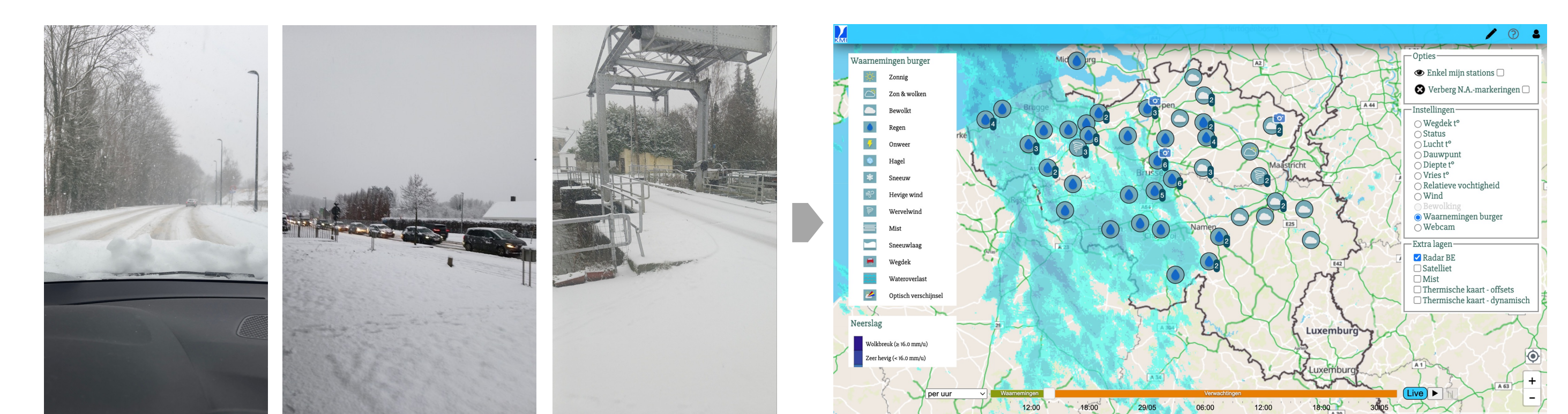


Added value in crisis response

[1] Flood monitoring by hydrological authorities



[2] Monitoring dangerous road conditions and snowfall by road management authorities



References

- Besic et al. (2016): [doi:10.5194/amt-9-4425-2016](https://doi.org/10.5194/amt-9-4425-2016)
- Dolan et al. (2013): [doi:10.1175/JAMC-D-12-0275.1](https://doi.org/10.1175/JAMC-D-12-0275.1)
- Reyniers et al. (2021): [doi:10.5281/zenodo.5798952](https://doi.org/10.5281/zenodo.5798952)
- Steinert et al. (2021): [doi:10.1175/WAF-D-20-0232.1](https://doi.org/10.1175/WAF-D-20-0232.1)
- Zrnić et al (2001): [doi:10.1175/15200426\(2001\)018<0892:TAPFAC>2.0.CO;2](https://doi.org/10.1175/15200426(2001)018<0892:TAPFAC>2.0.CO;2)

