

# Producing convection daily maps based on OPERA radar composites and EUCLID lightning data

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## Motivation

Hazardous weather, such as extreme rainfall, hail, and other dangerous phenomena associated with severe convective storms, can be clearly identified in radar observations. Moreover, those convective storms generally produce lightning. Since those events may affect public safety, cause property damage, and/or induce economic losses, a daily overview of all areas in Europe affected by severe convective phenomena could be of interest to many stakeholders.

The goal of this recent ongoing study is to combine radar and lightning data for a selection of convective episodes simultaneously affecting several countries in Europe, in order to improve the mapping of convective precipitation in Europe.

## Data

- Pan-European weather radar composites with a time-resolution of 15 minutes are available through the EUMETNET Operation Programme for the Exchange of Weather Radar Information (OPERA). As such, daily pan-European maps can be produced based on the accumulation of the 15 minute rainfall OPERA products.
- In addition, probability of hail (POH) and severe hail (POSH), based on national radar observations, will be used as well where available.
- A thunderstorm daily map using data from the European-wide lightning detection network EUCLID (European Cooperation for Lightning Detection) is used. This in combination with the above products give additional information of the potential areas that experienced dangerous convective activity.

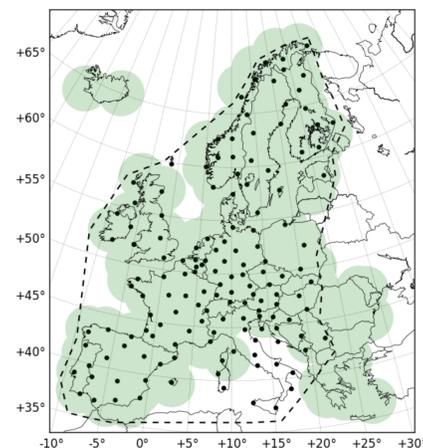


Fig: The locations of the EUCLID sensors are indicated as black dots, as well as an indication of the area within which EUCLID performs at its best by the dashed polygon. In addition, the collective detection range of the radars used within OPERA is indicated in green.

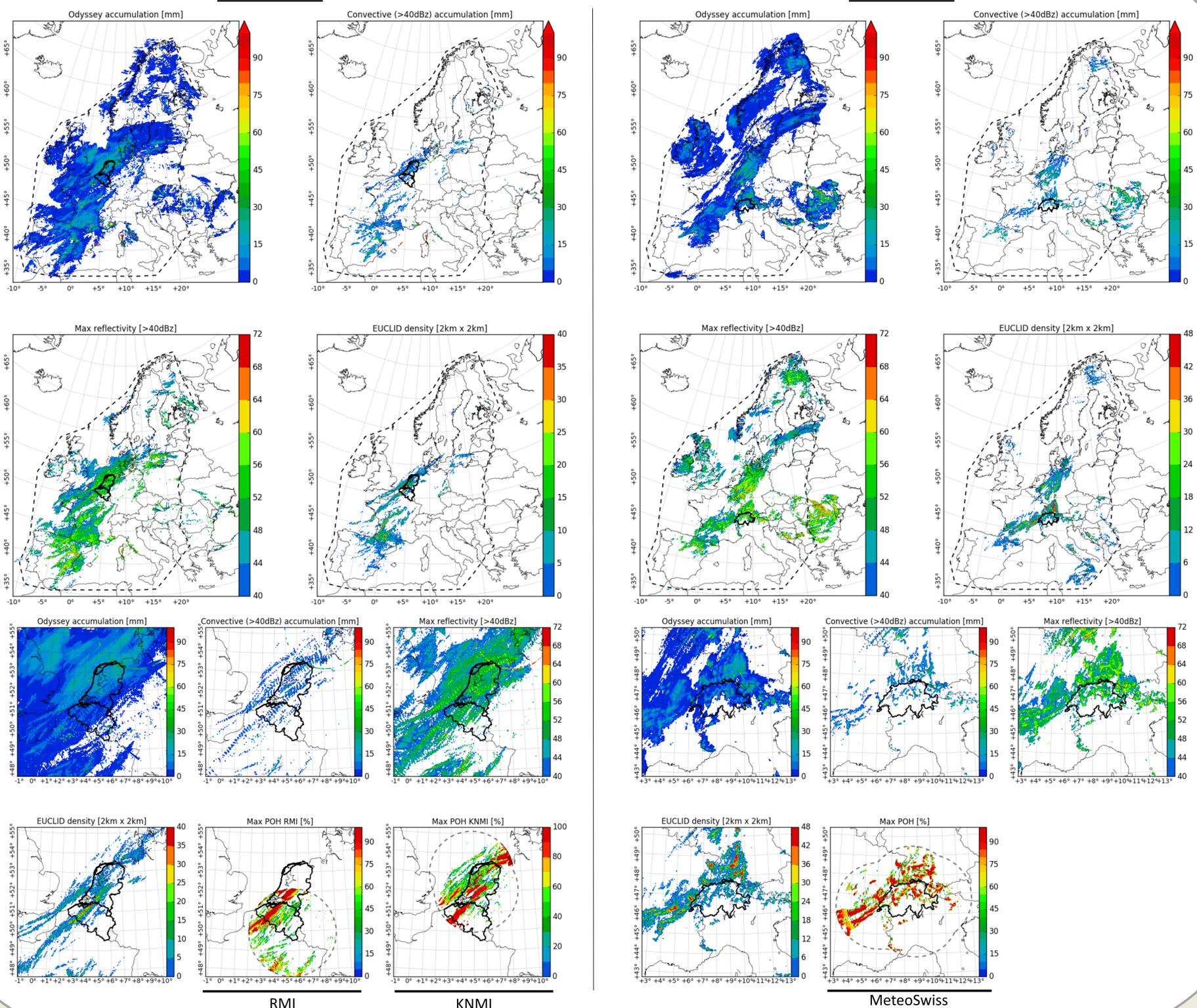
## Observations

31.08.2015

24.06.2016

Full field-of-view

Zoom-in



## Remarks

- A first step has been taken towards combining radar and lightning observations on a European level.
- It is clear that areas with increased lightning density have a corresponding counterpart in the radar observations. This is especially true for the maximum reflectivity and POH/POSH.
- In the near future, it is envisaged to combine those different sets of information to calculate a probability of convective activity.

## Acknowledgments

This work is conducted under the framework of the Eumetnet OPERA Programme OD19 'Convection daily maps'. We would like to thank KNMI and MeteoSwiss for providing their hail data and EUCLID to make use of the European lightning observations.

