

Operational programme for the exchange of lightning location data: feasible or not?

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Introduction

Lightning location data from a total of 8 national European lightning location systems have been combined to establish an **European lightning location composite**. This study is a test whether such a composite could be successfully used over Europe, similarly as the European weather radar composite (OPERA).

After homogenizing the data into similar format, the following steps have been made:

- 1) Plot the individual flashes as points on a map (Fig. 1).
- 2) Calculate a flash density matrix of 10 km x 10 km squares with 15-minute intervals: if several networks cover the same bin, we consider the largest reported density value for that bin.
- 3) As point (2) but limiting the density values between 0...1 (Fig. 3): this method indicates areas with and without lightning, but does not indicate the lightning intensity. The method is more robust for the variations of the network performances.

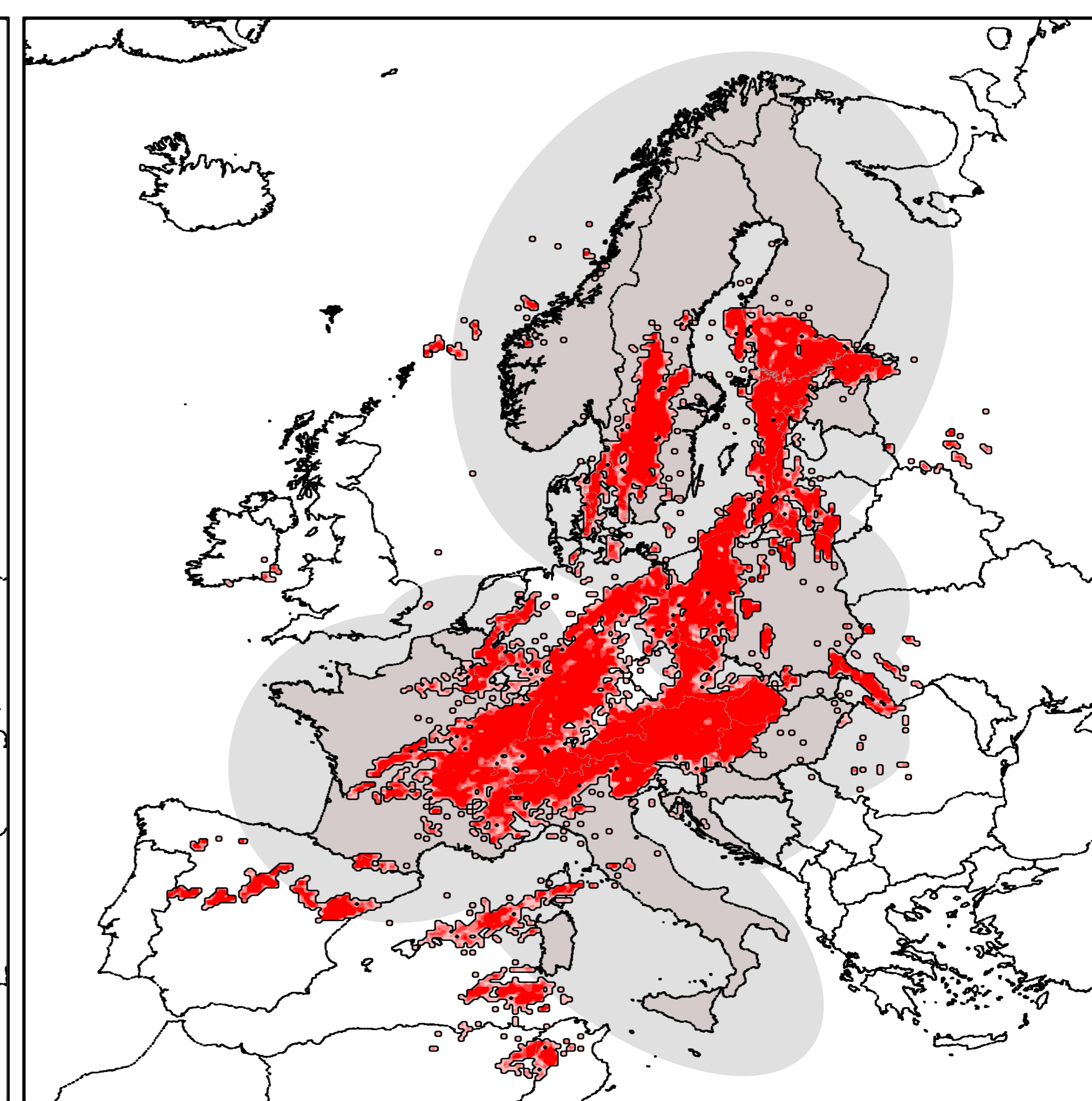
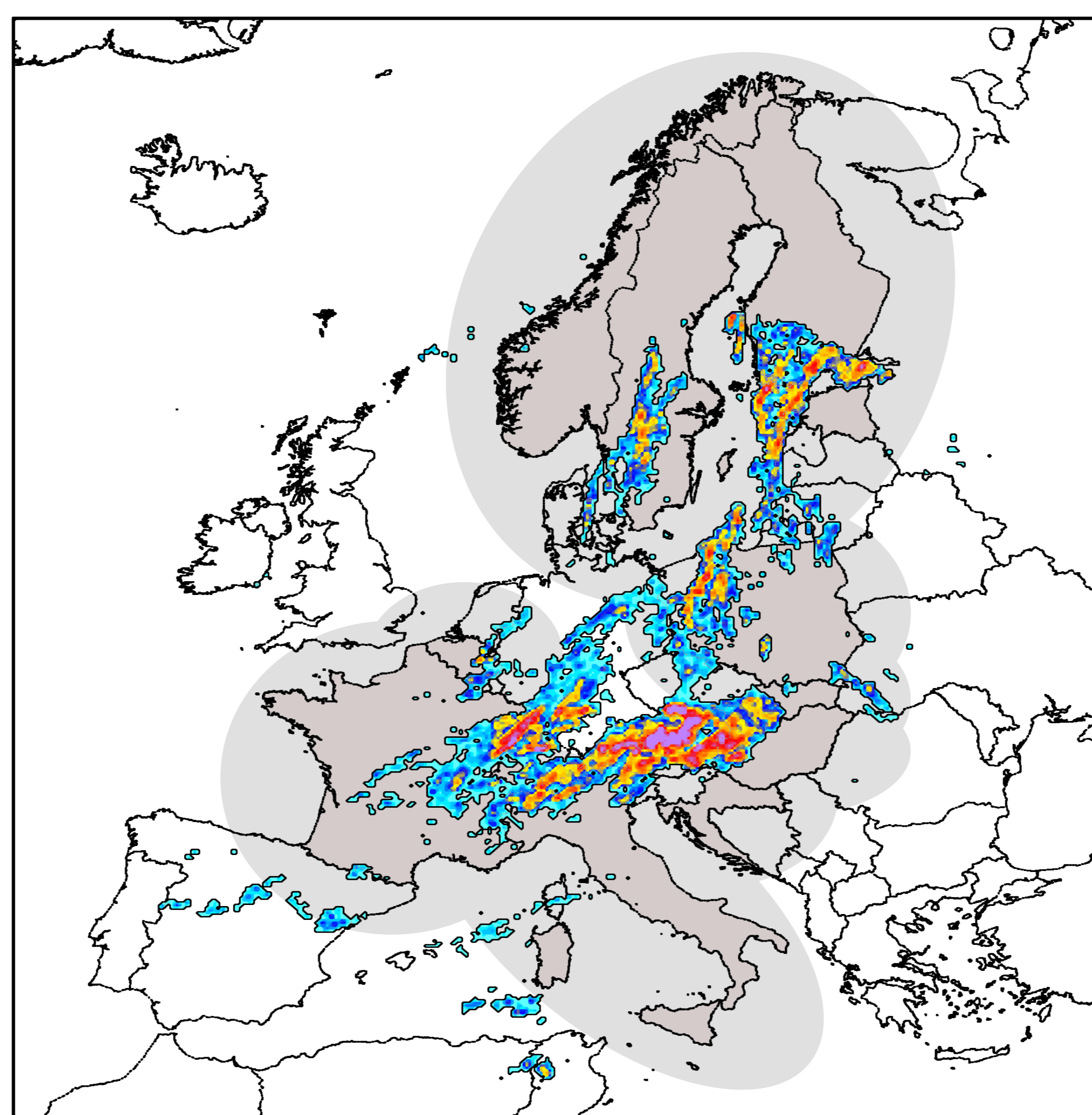
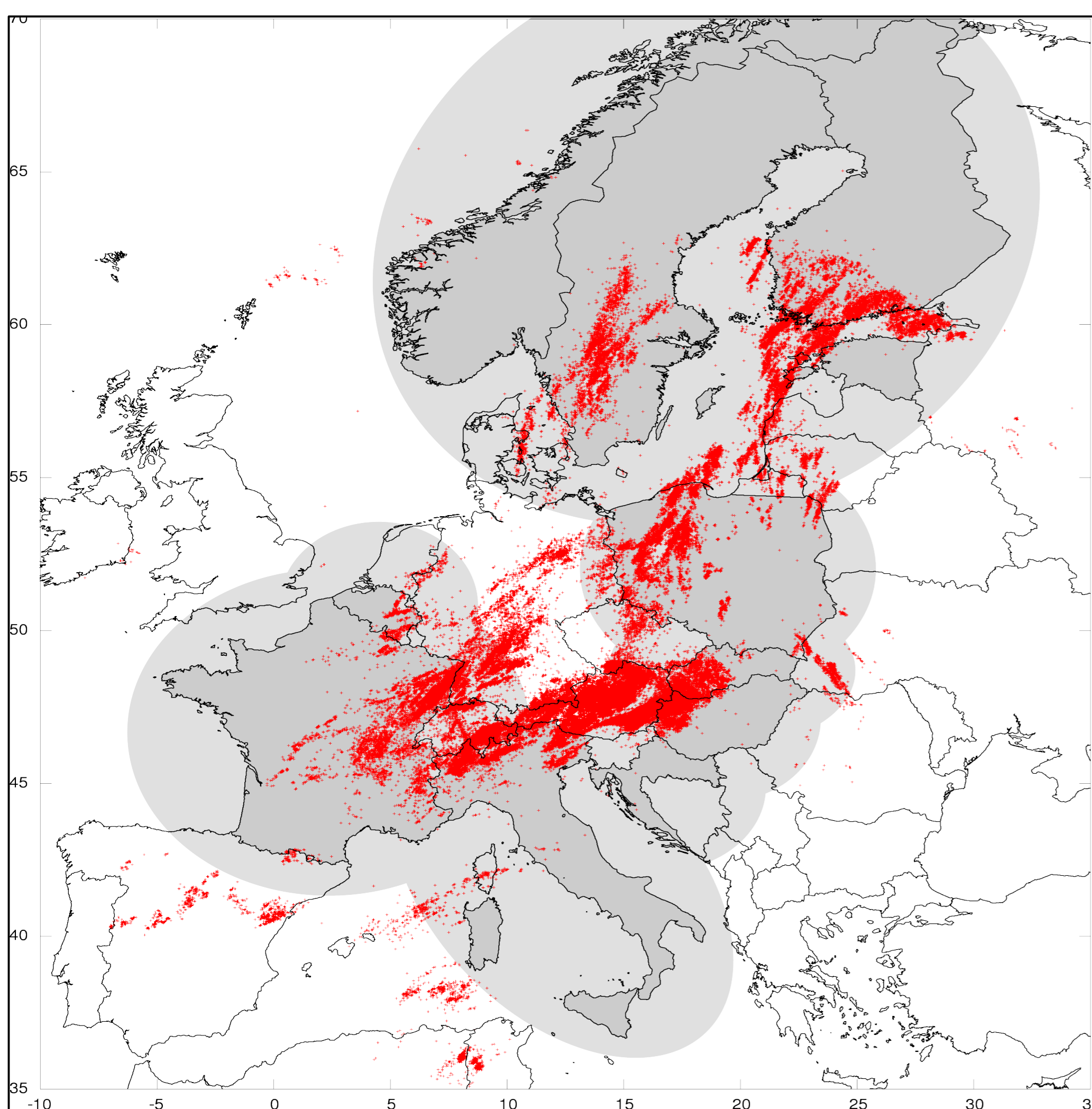


Fig. 1: Located flashes from the combined data set plotted on a map on July 28, 2012.

Fig. 2: Ground flash density on 10 km x 10 km squares on July 28, 2012. The unit is ground flashes per 100 km² per 24 hours. Purple colors correspond to values larger than 100.

Fig. 3: As Fig. 2, but the values are relaxed between 0 (no lightning) and 1 (lightning, red squares).

Discussion

Although practically the whole Europe is covered with lightning location systems (LLSs), a common European composite is not available largely because the commercial use of LLS data makes the interchange of the data difficult. However, as we have shown in this study, **such a composite could be easily done even despite the large heterogeneity of the national and regional LLSs.**

If the European NHMSs or a sub-group of them would indeed show a green light for an operational lightning location data composite, **that would be possible to do.** One way for **distributing** the composite would be **as a table within the OPERA weather radar hdf5-file.**

Here we have shown some methods how the data could be composited, what kind of end-products could be made, and what kind of issues need to be considered when making the composite. Our preliminary results presented in this paper could be considered as a first step towards such a composite.

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