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Thunderstorm climatology of Northern Europe in 2002-2013 based on the NORDLIS lightning location system

Antti Mäkelä[1]

Sven-Erik Enno[2]

Jussi Haapalainen[1]

[1]**Finnish Meteorological Institute**

[2]**University of Tartu**

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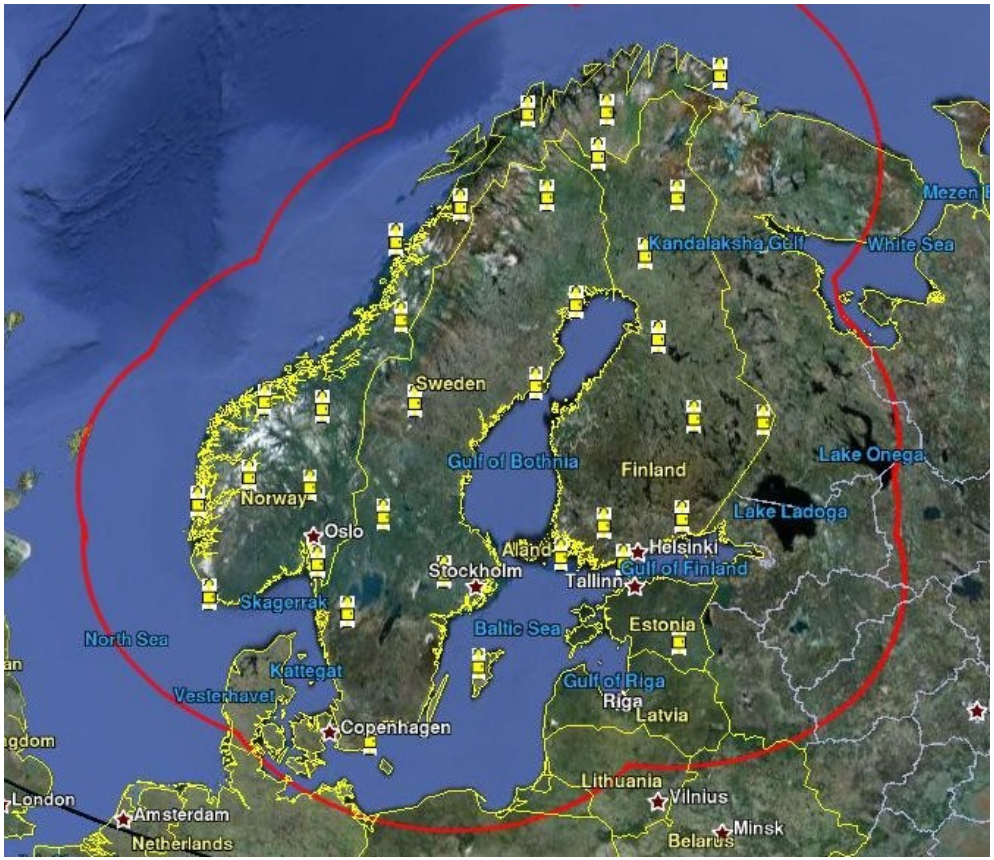
Contents

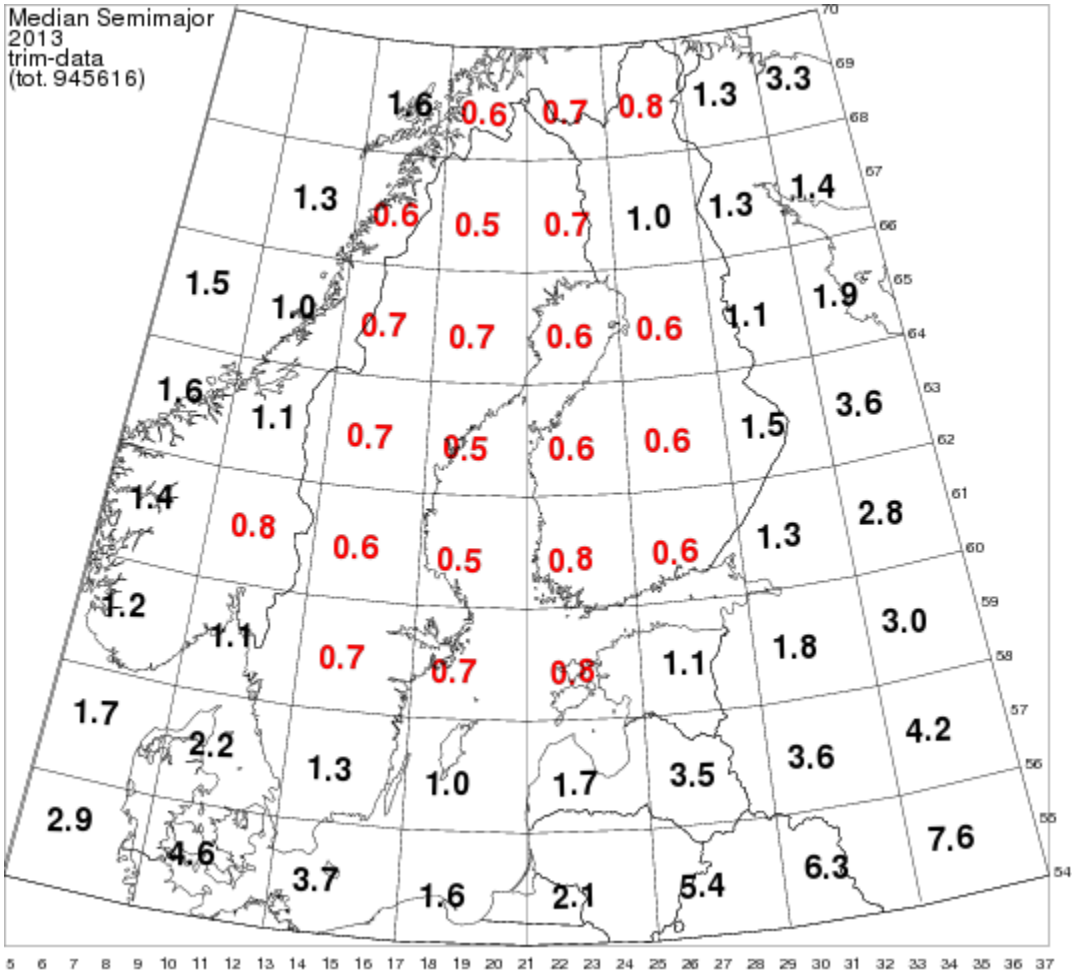
NORDLIS network

- NORDLIS is a cooperative lightning location network between Norway, Sweden, Finland and Estonia
- Full operation since 2002
- About 30 sensors; sensor reports are shared between the countries
- Countries process the data independently (except Estonia who gets the data from Finland)



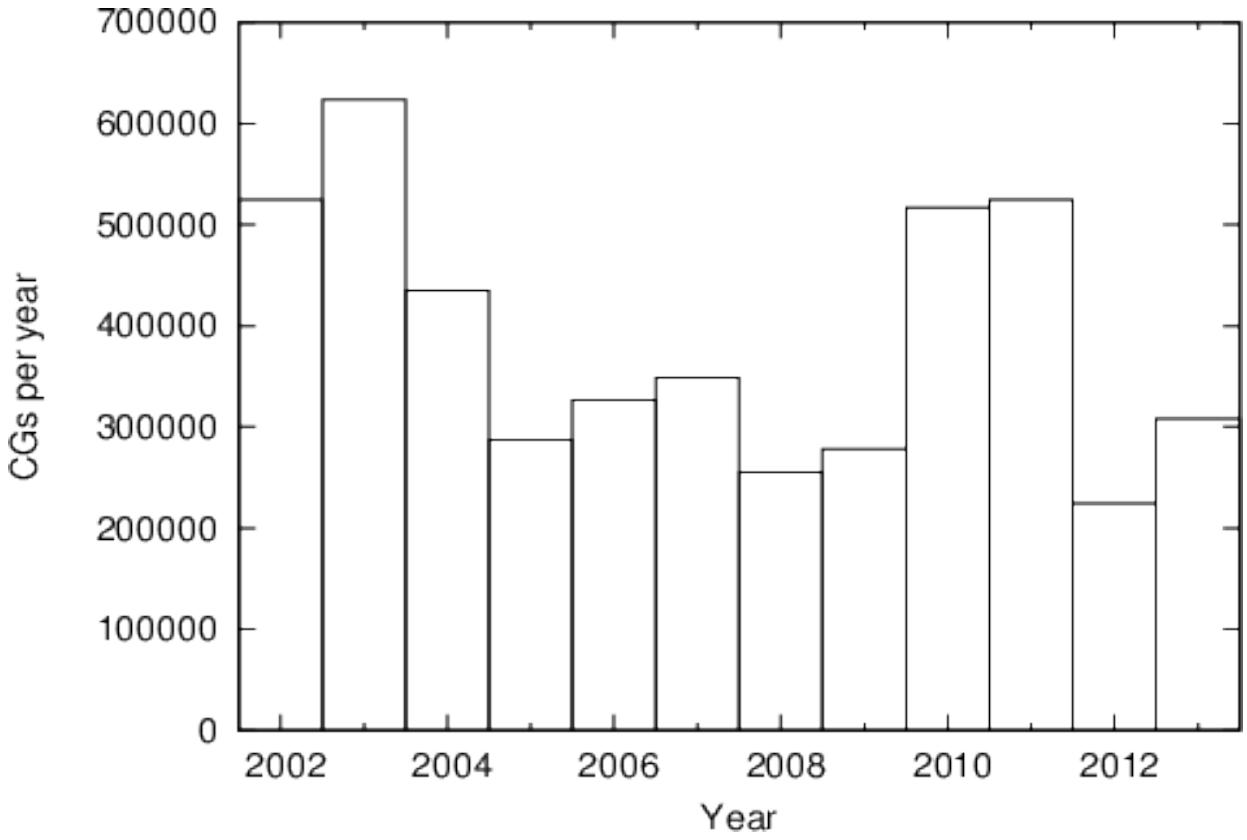
NORDLIS network performance

- The detection efficiency is estimated to be above 90% (even 95%?)
- Median location accuracy is ~500 m in the network centre, larger in the perimeter
- Peak current information also available



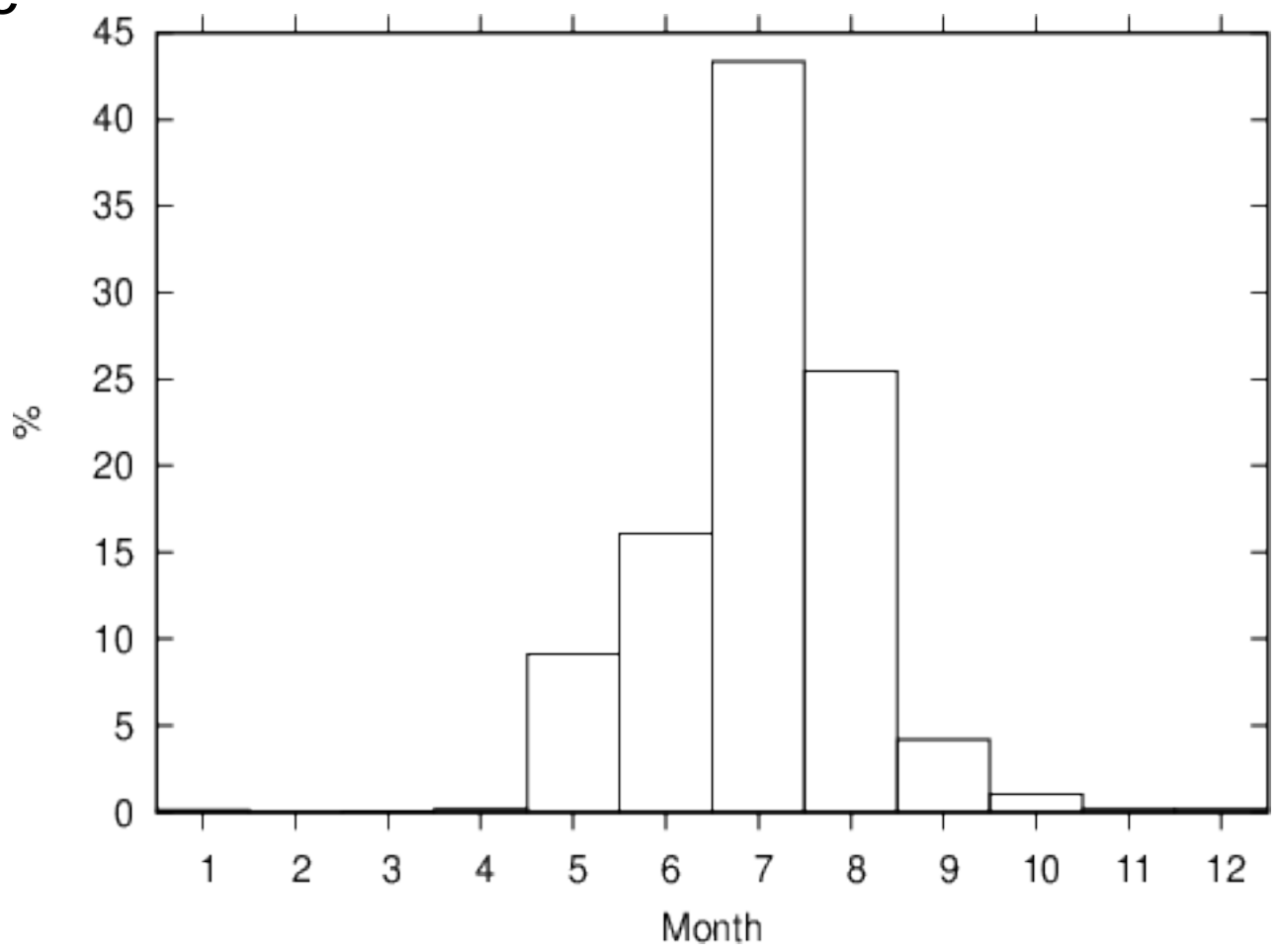
Annual variation

- The average of the period is 390 000 cloud-to-ground flashes (CGs) per year
- Large variation
- Peak year 2003

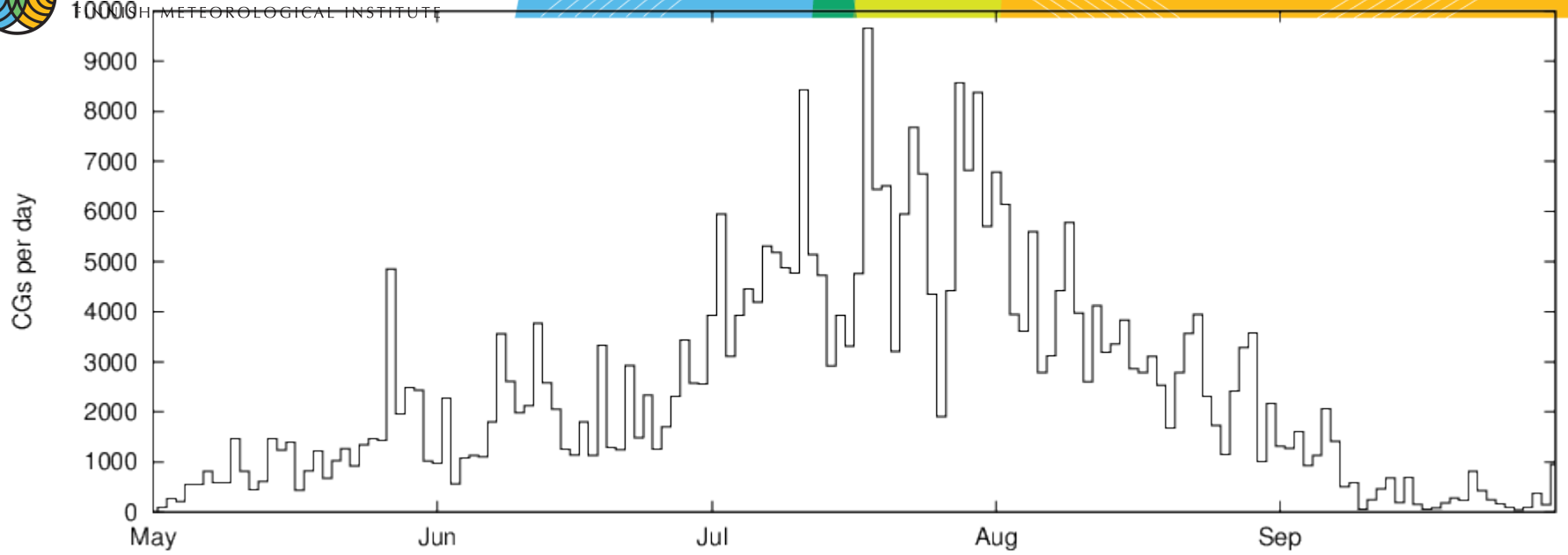


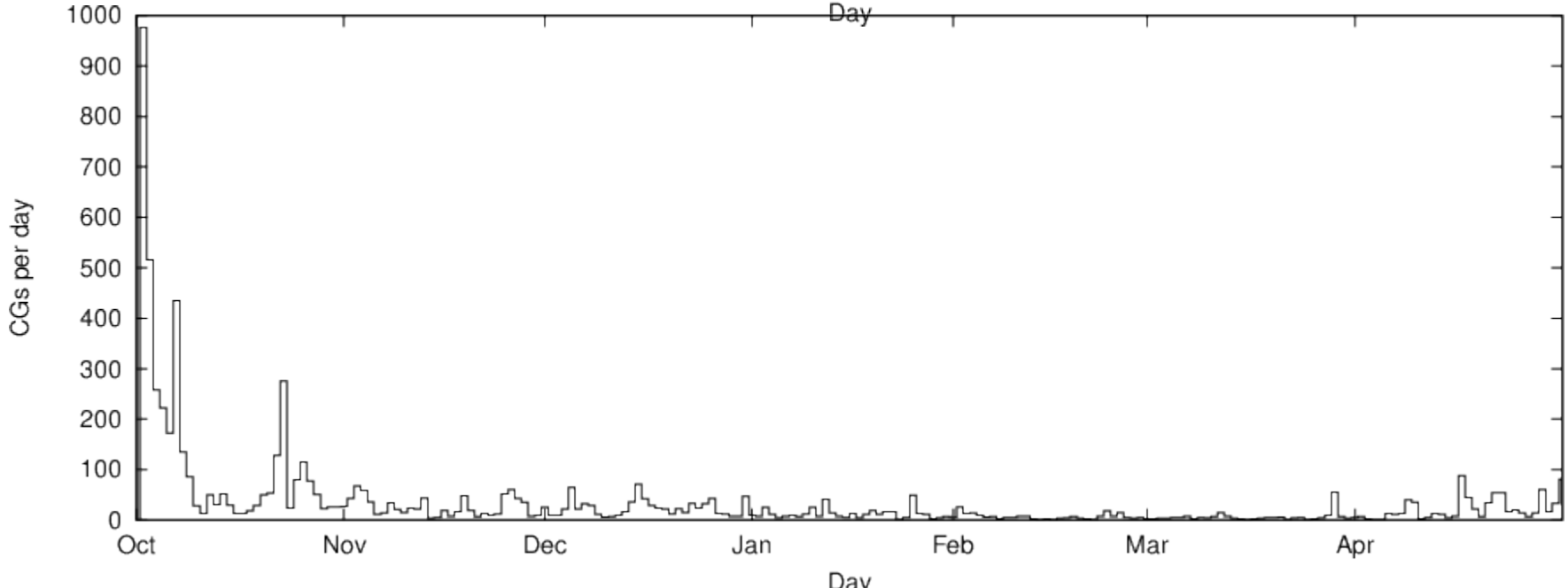
Average monthly variation

- July, August, June
- Large jump and drop from June to July and from August to September



Average daily variation





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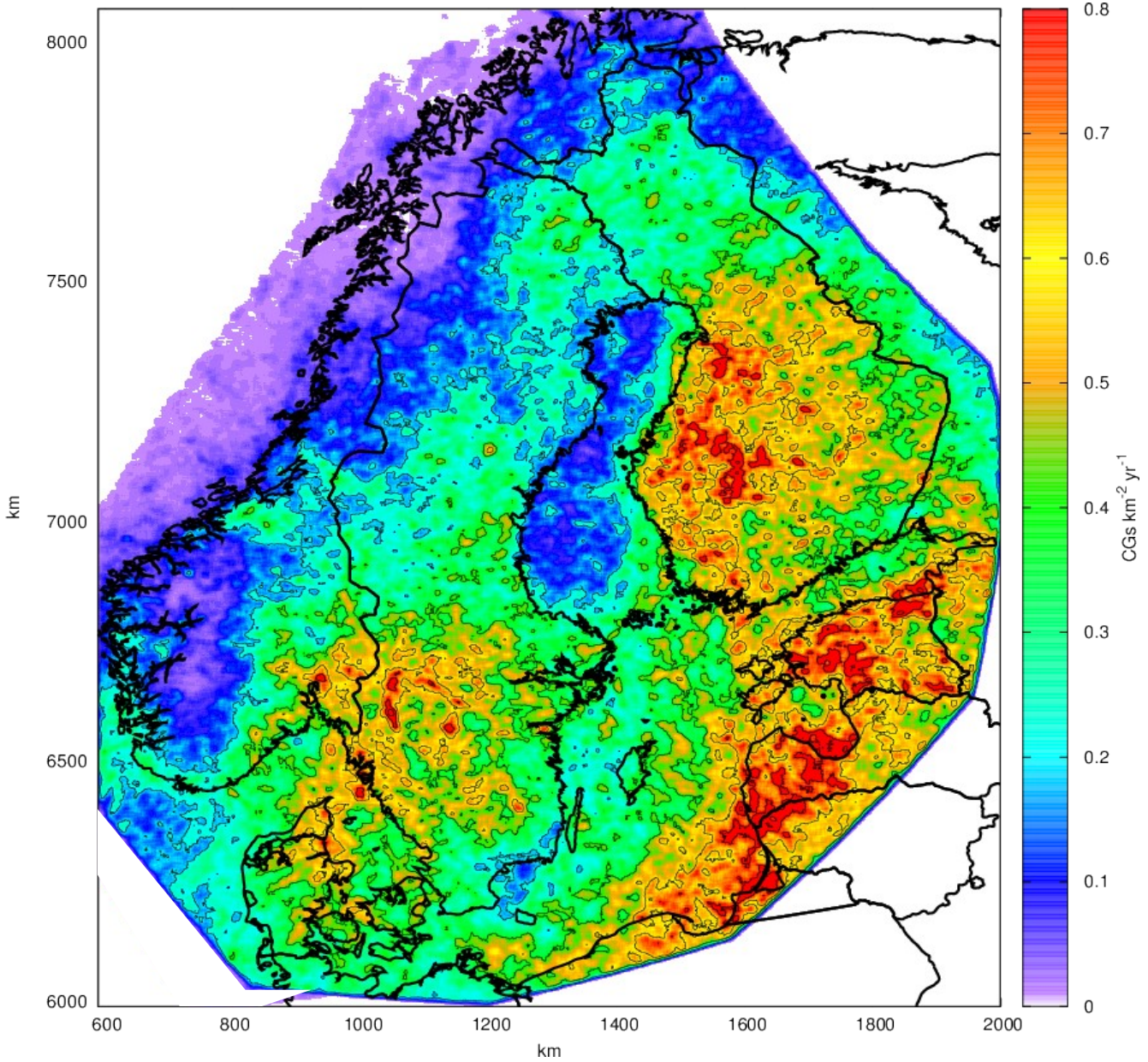
Average CG flash density



Average number of thunderstorm days

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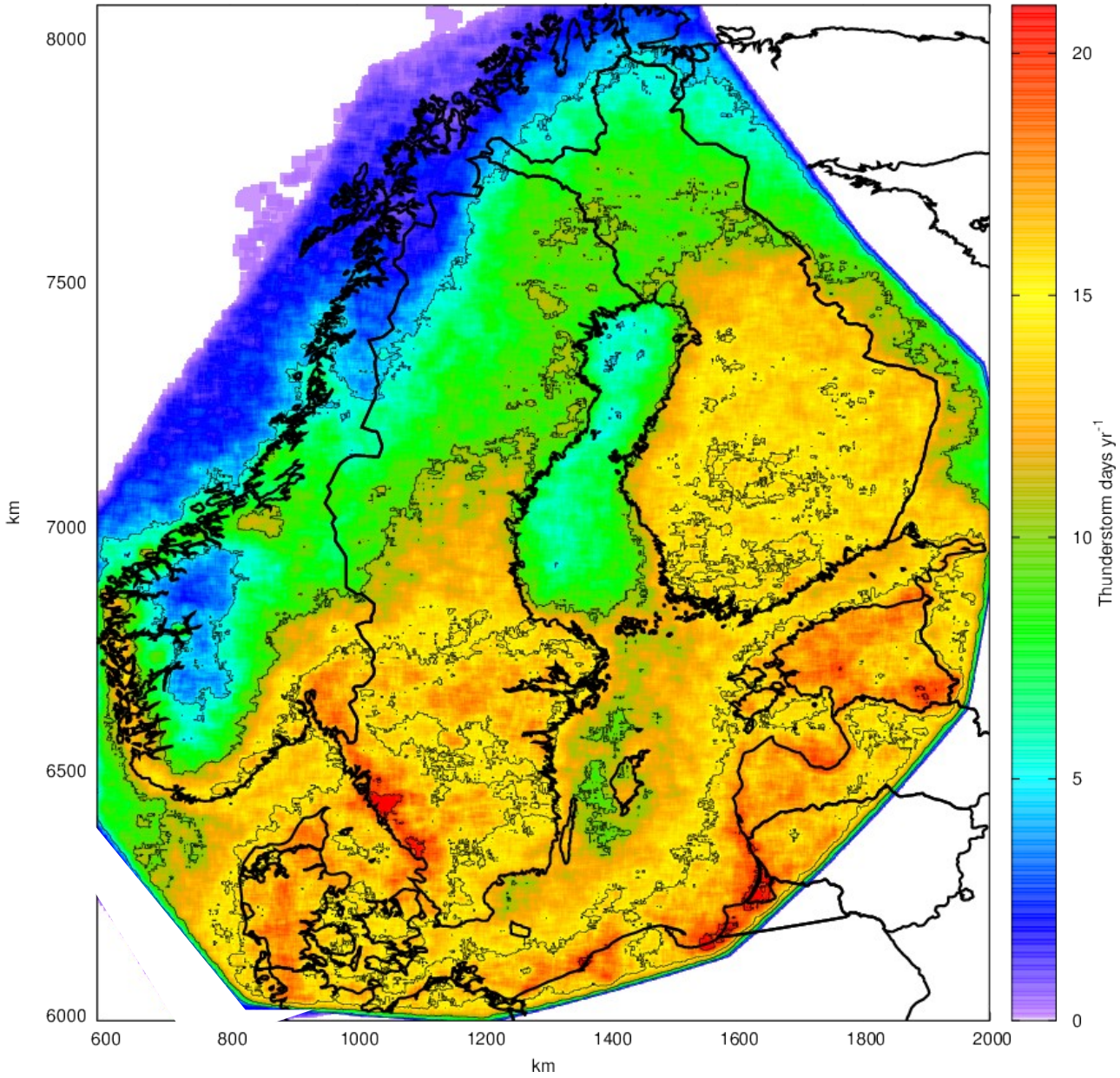

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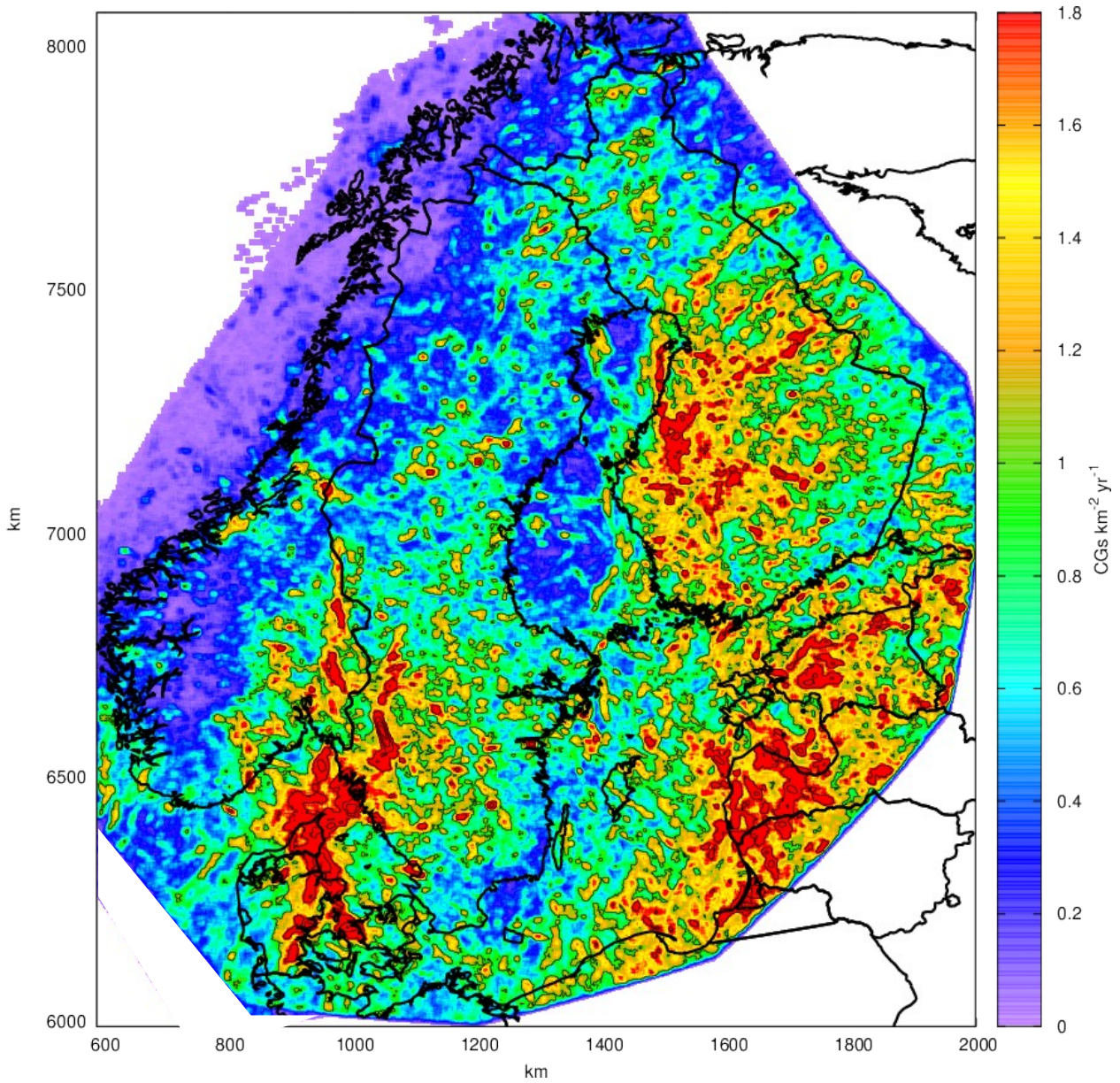
Maximum annual CG flash density



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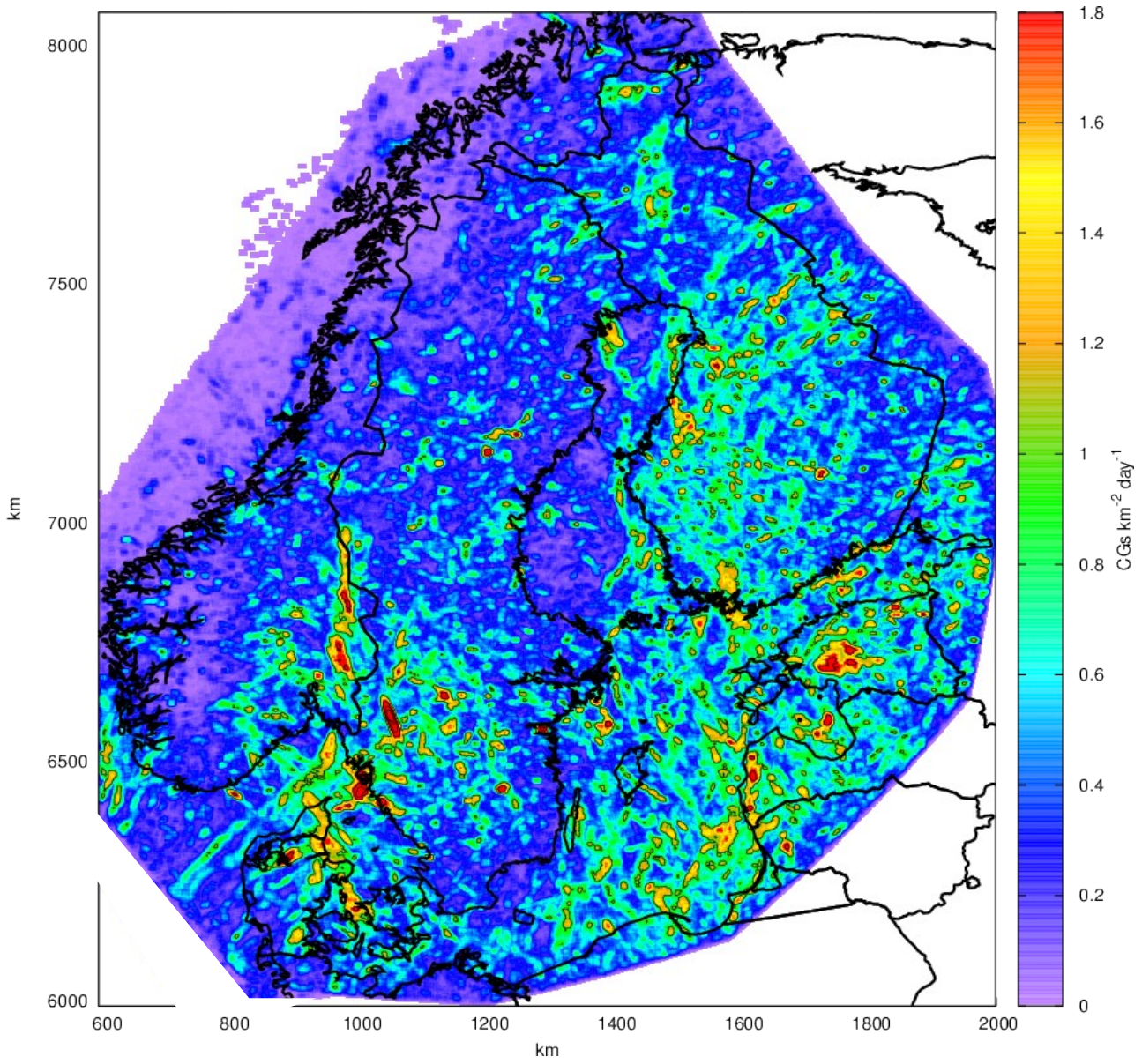
Maximum daily CG flash density



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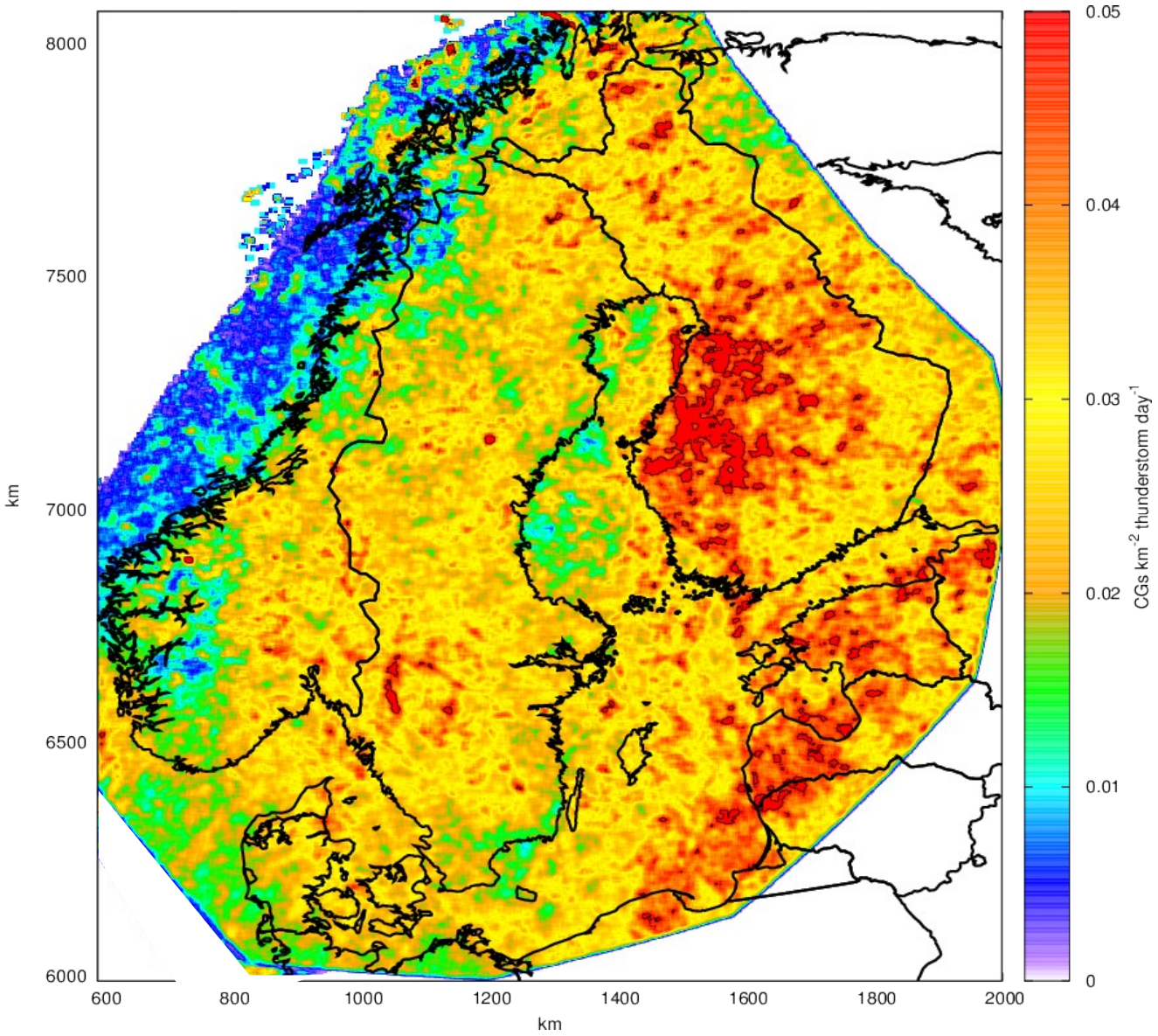
CG flashes per thunderstorm day



Avg. cold season (Oct-Apr) CG flash density

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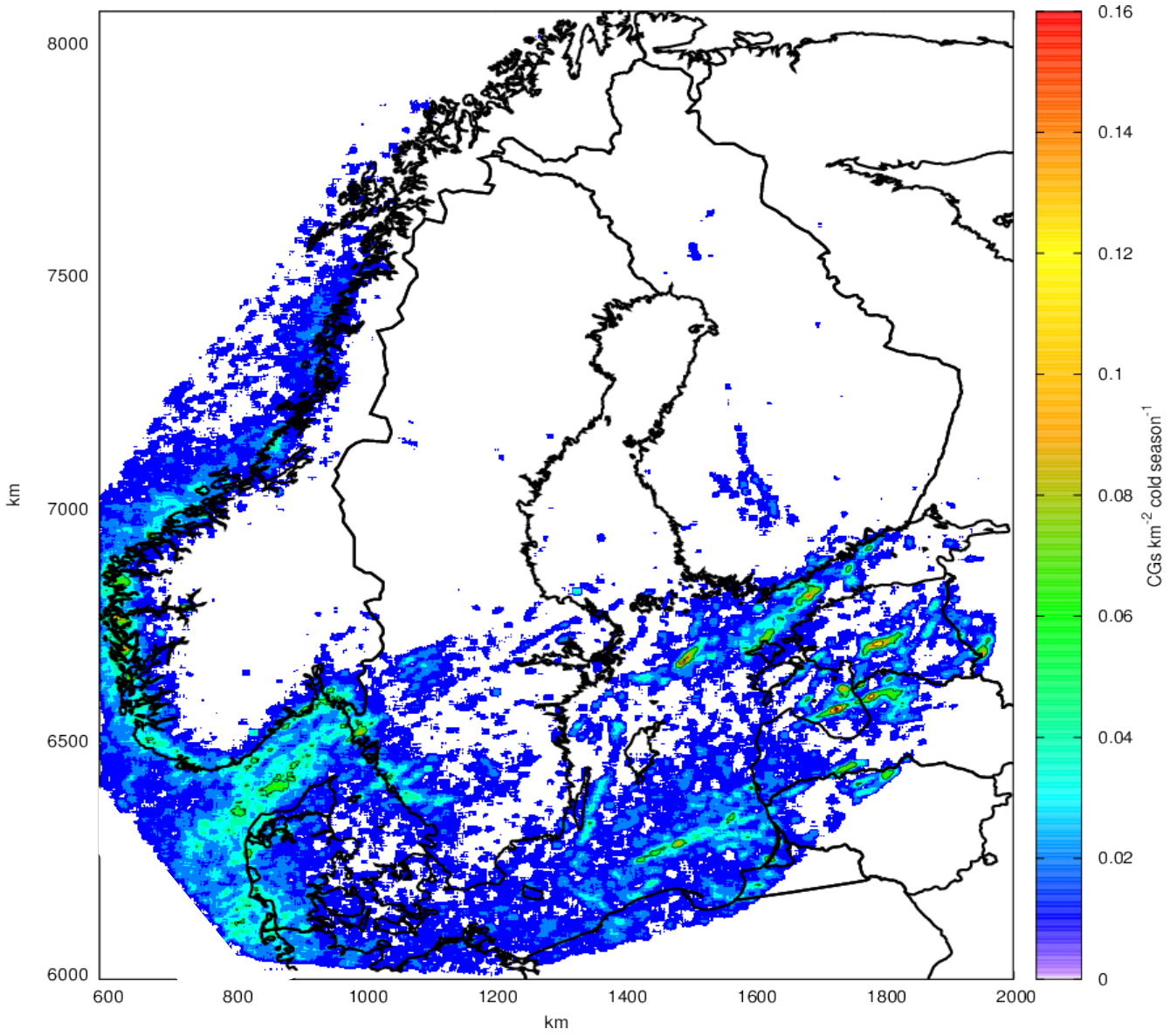

Avg. cold season (Oct-Apr) thunderstorm days

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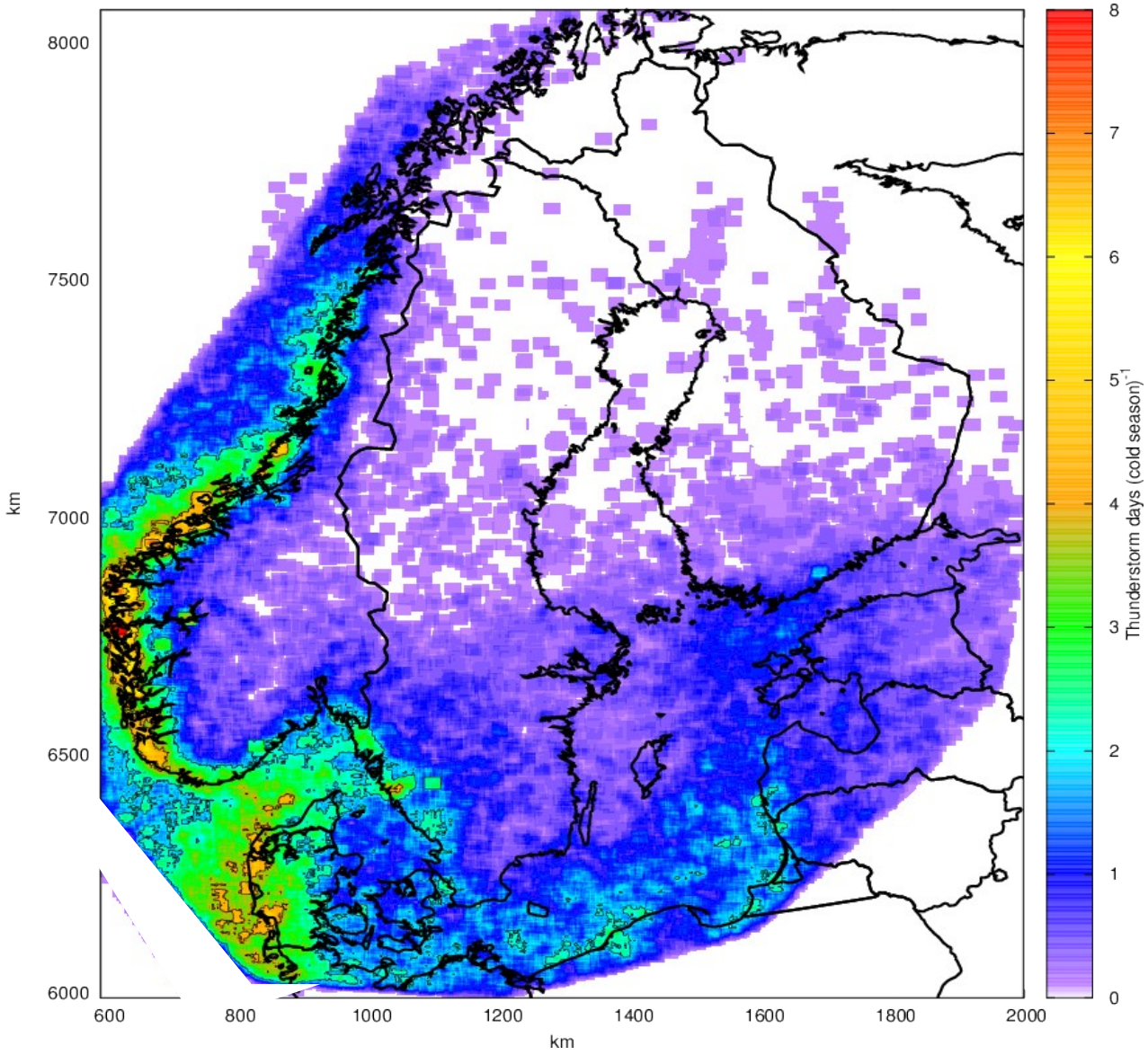

Conclusions

- NORDLIS network has now a data set of more than ten years → we can draw some conclusions of the Scandinavian thunderstorm climate
- Annual variation is large (as is the case for many other meteorological parameters)
- Although on average the Scandinavian thunderstorm climate is “modest”, individual thunderstorms and thunderstorm days may be violent
- Questions:
  - The anticipated changes in the thunderstorm occurrence in Scandinavia in the future?
  - How will the NORDLIS network evolve in the future?

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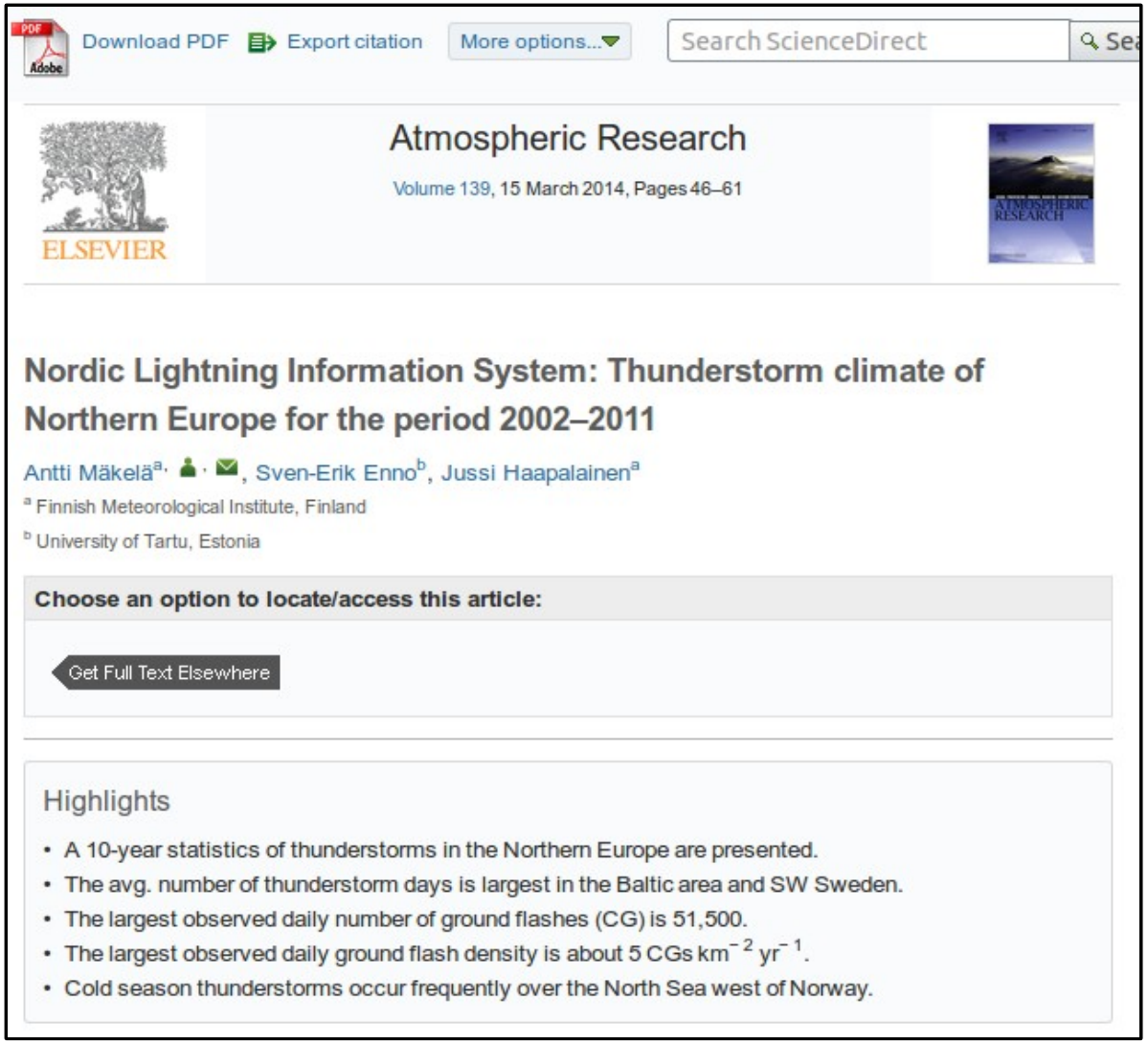
Further reading

- A recent paper available (for the period 2002-2011)
- Poster in this conference!



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Nordic Lightning Information System: Thunderstorm climate of Northern Europe for the period 2002–2011

Antti Mäkelä[a], Sven-Erik Enno[b], Jussi Haapalainen[a]

[a] Finnish Meteorological Institute, Finland

[b] University of Tartu, Estonia

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Highlights

- A 10-year statistics of thunderstorms in the Northern Europe are presented.
- The avg. number of thunderstorm days is largest in the Baltic area and SW Sweden.
- The largest observed daily number of ground flashes (CG) is 51,500.
- The largest observed daily ground flash density is about 5 CGs km^{-2} yr^{-1}.
- Cold season thunderstorms occur frequently over the North Sea west of Norway.