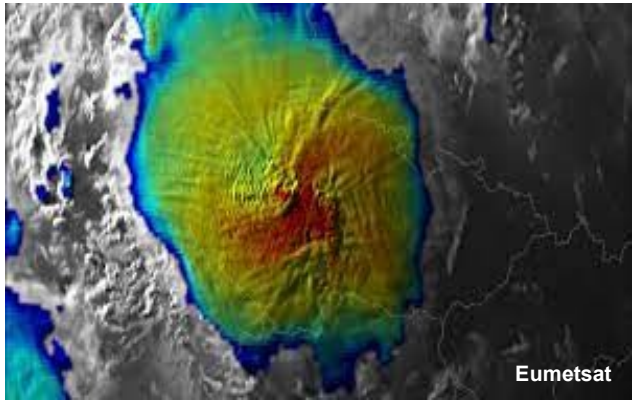
EGU General Assembly 2022

Session CL2.4: Local scale climate change impacts, processes and extremes.
Tuesday 24 May 2022

How much do Mesoscale Convective Systems (MCS) contribute to extreme precipitation over Europe?

N. Da Silva[1] & J. O. Haerter[1,2,3]



[1]Complexity and Climate, Leibniz Center for Tropical Marine Research, Fahrenheitstraße 6, 28359 Bremen, Germany.
[2]Niels Bohr Institute, University of Copenhagen, Blegdamsvej 17, 2100 Copenhagen, Denmark.
[3]Physics and Earth Sciences, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany.

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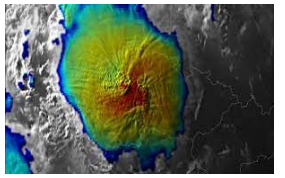
Introduction



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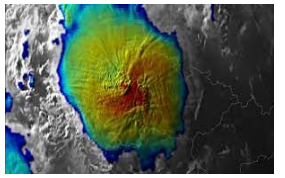

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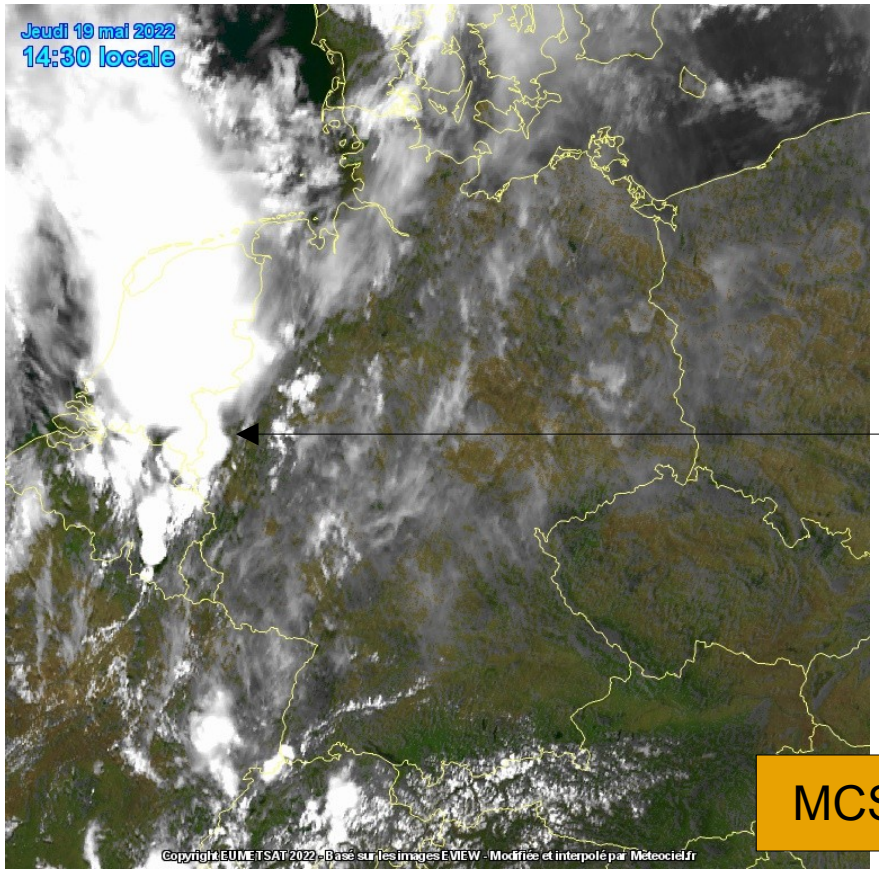

From the bottom

MCS 19.05.2022

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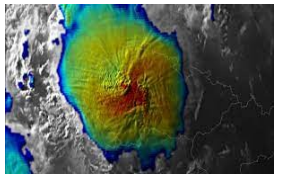

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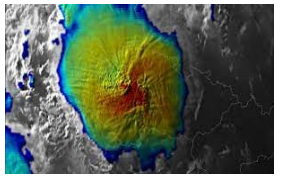

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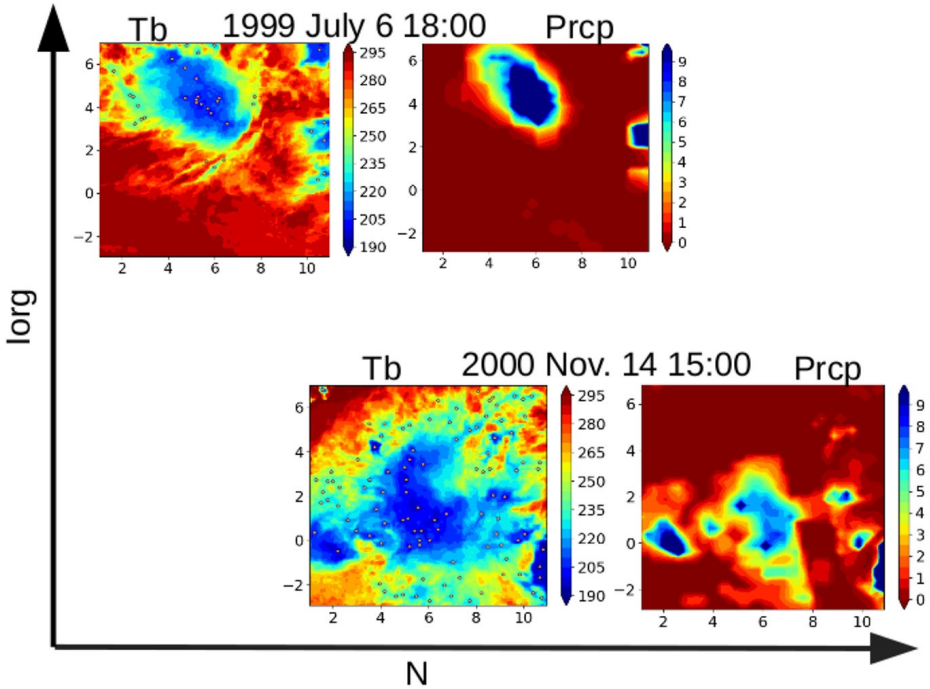
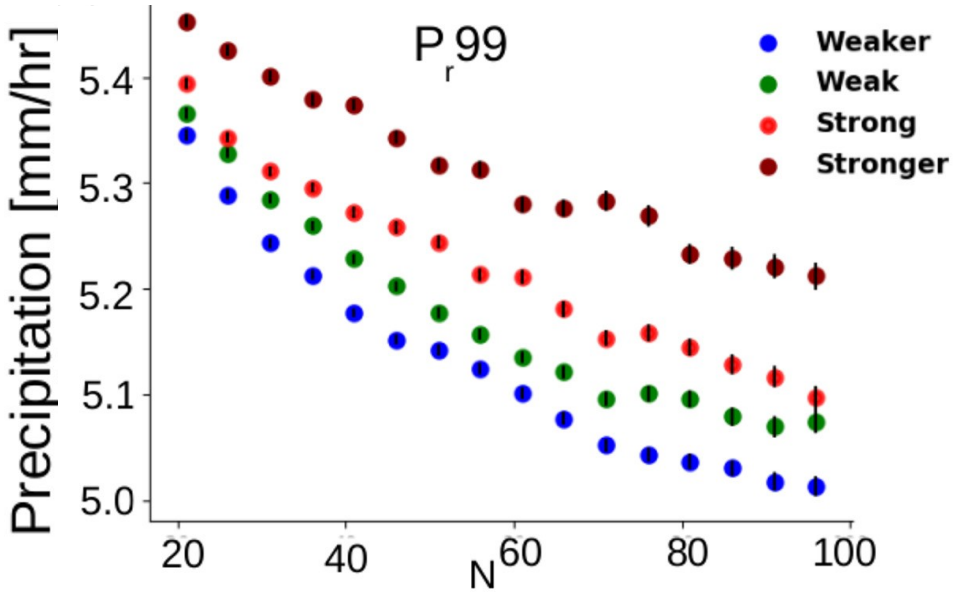
Figures from Semie and Bony (2020)





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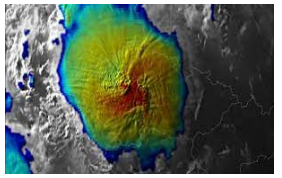

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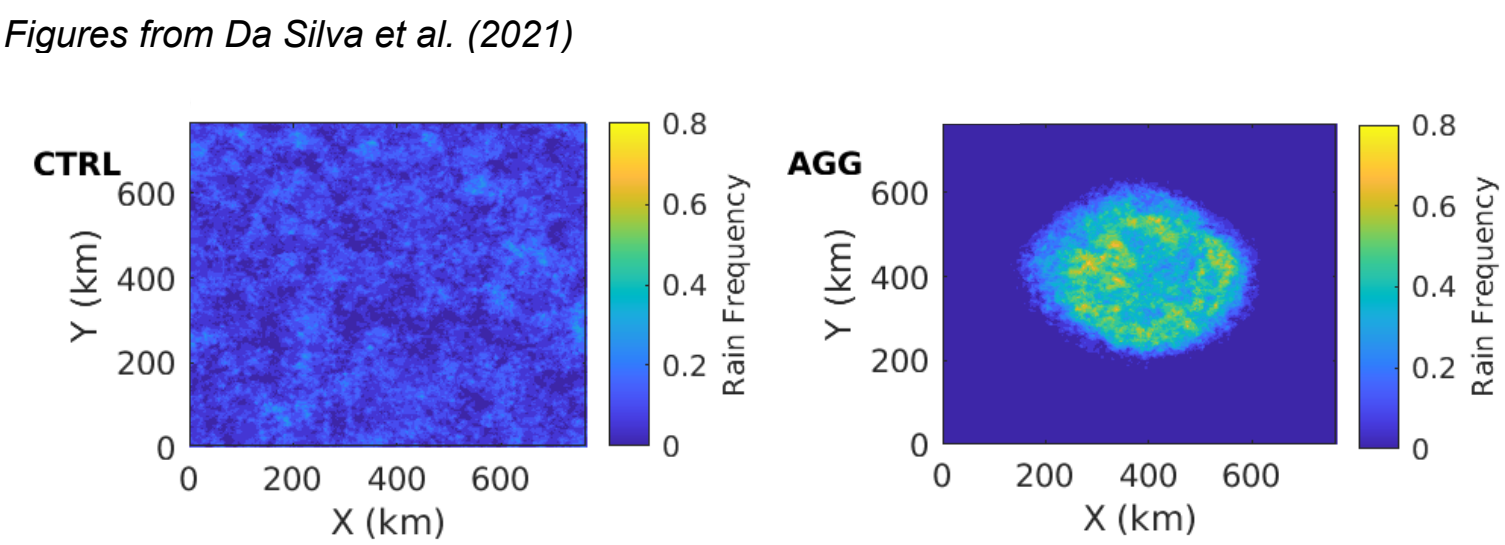

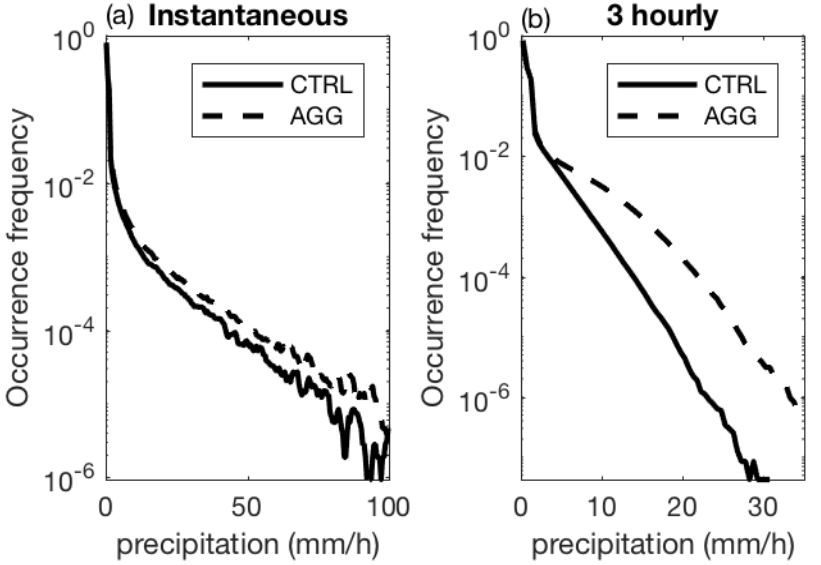

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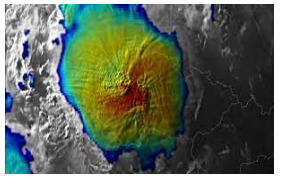

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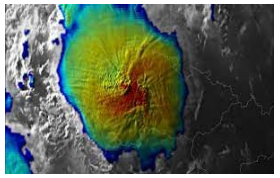

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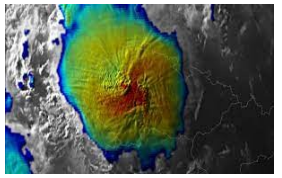

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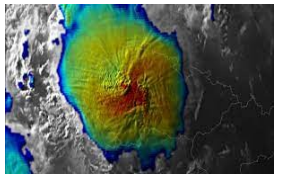
Objectives of this study:

Building a MCS climatology over the whole Europe
Characterizing MCS contribution to precipitation extremes

MCS tracking method



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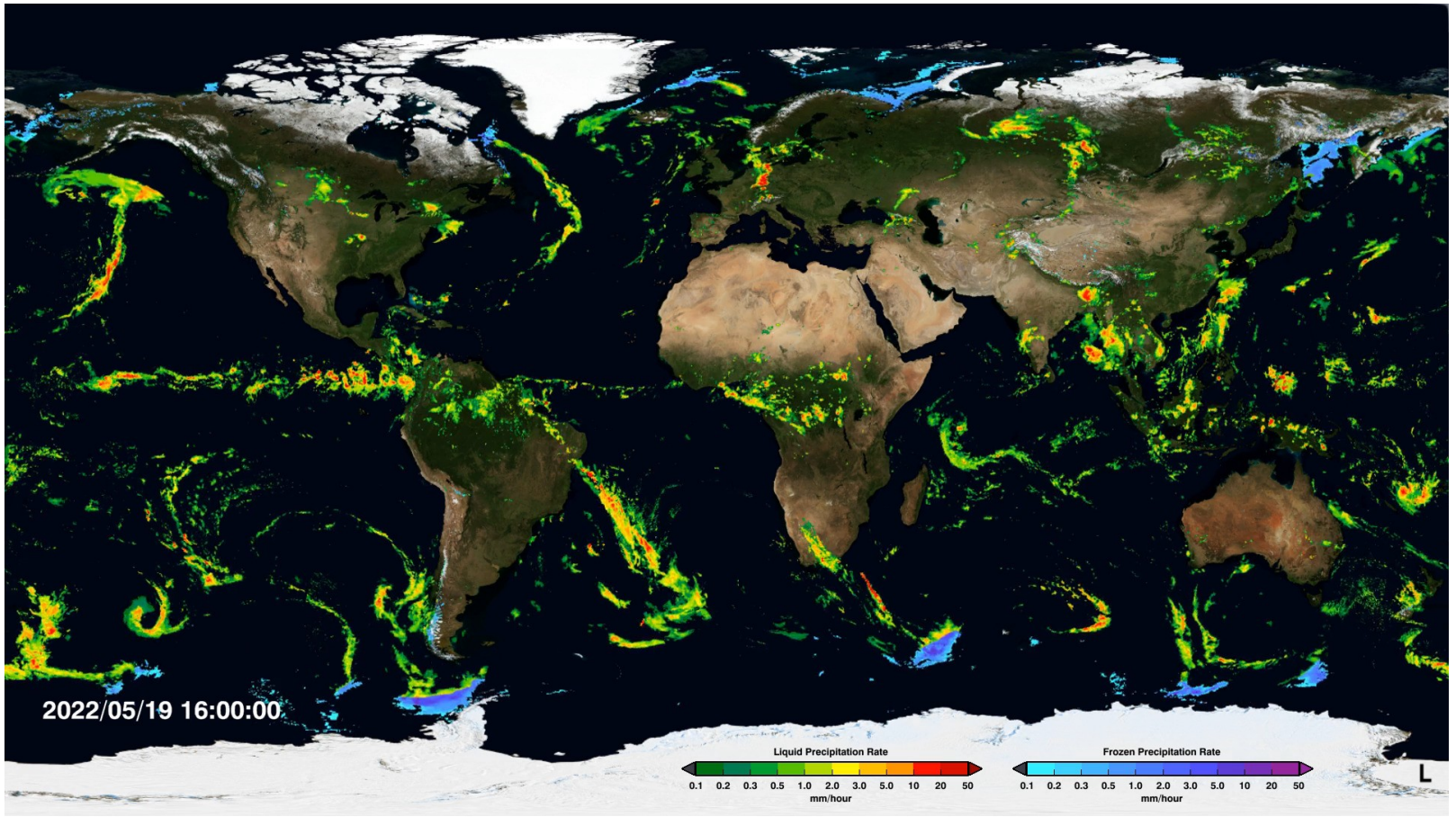

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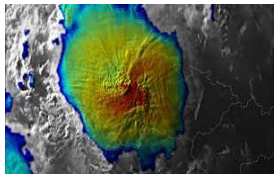

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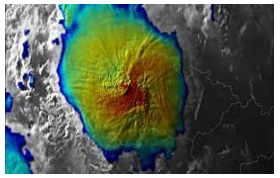

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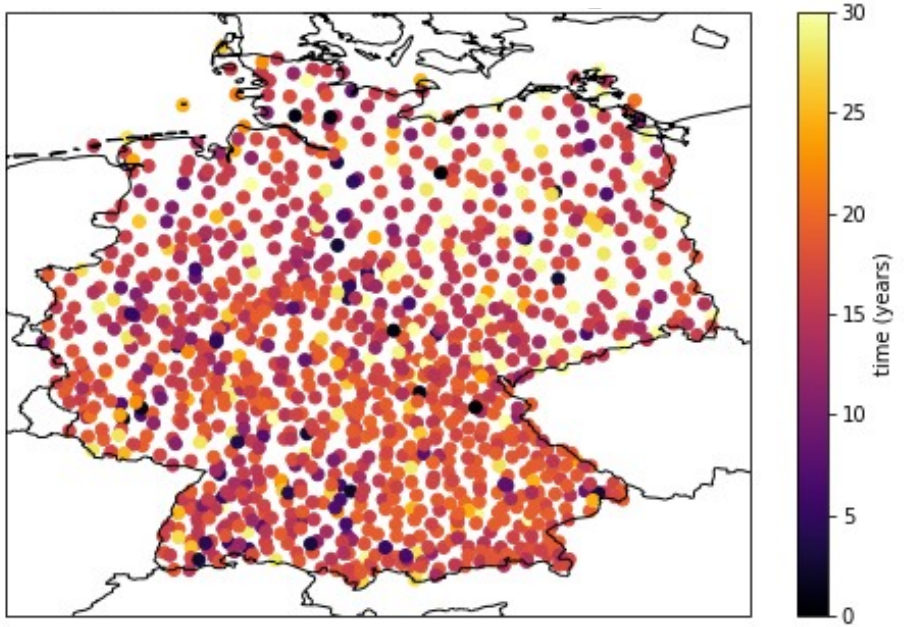

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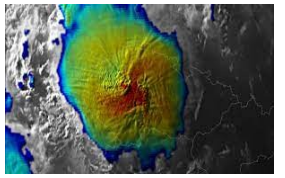

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→ Precipitation Features (PF)

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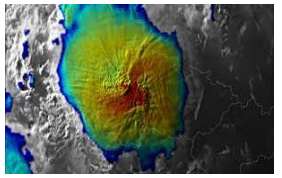

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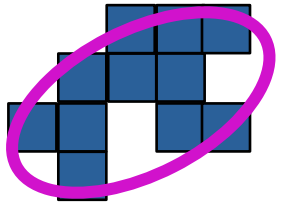

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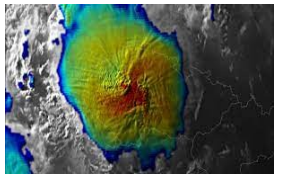

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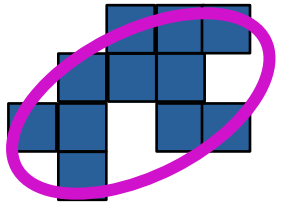
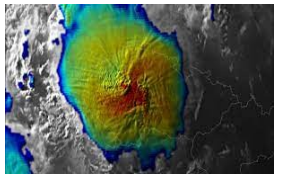


- Track: PF overlaps between consecutive time steps

MCS tracking method

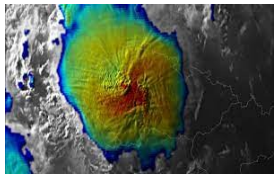


Convective PF
PF for which lightning was detected inside its ellipse (+ 5 km) at (at least) one time step

MCS PF
Convective PF with diameter of more than 100 km during at least 4h

Stratiform PF
All other PF

MCS tracking method



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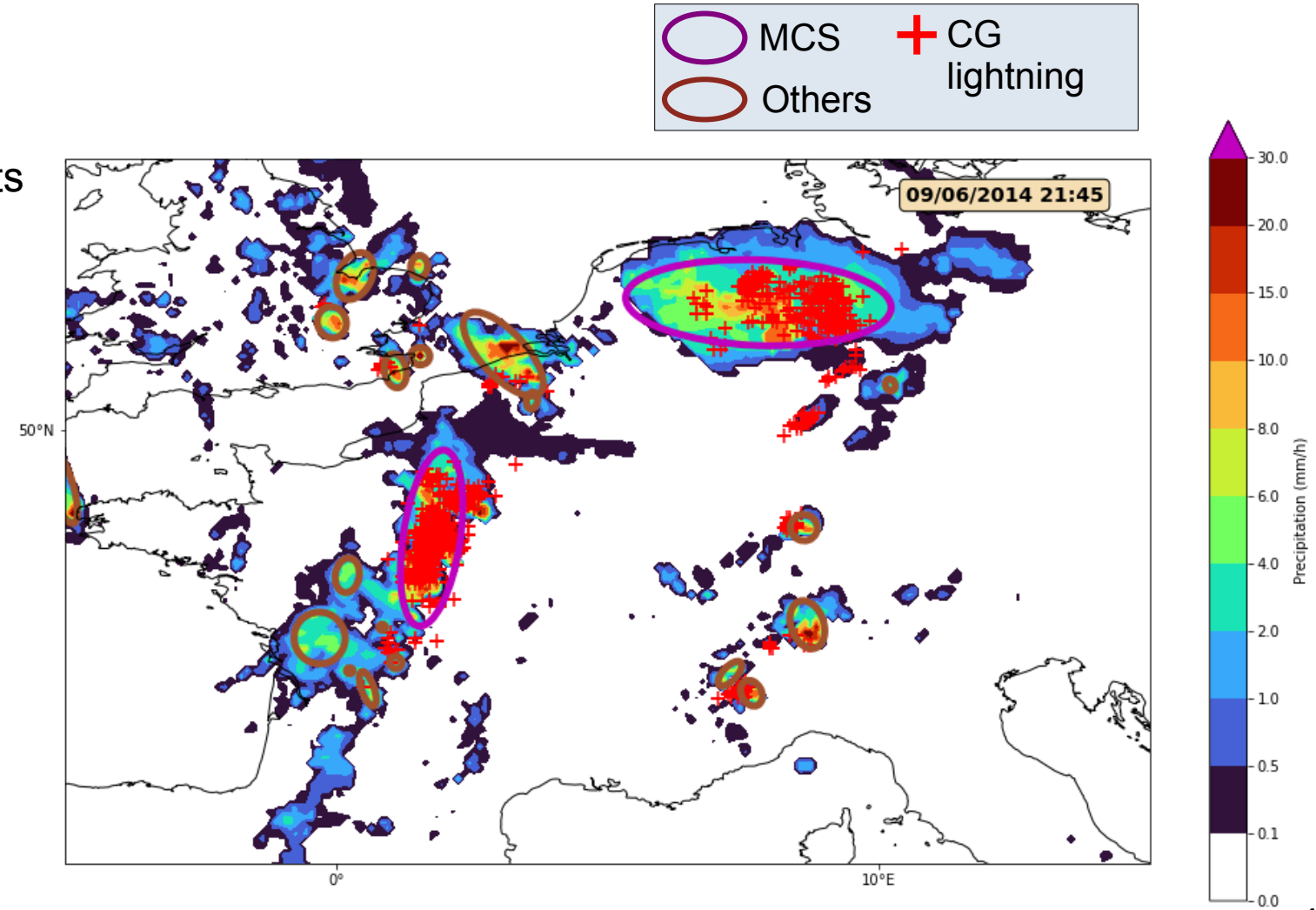
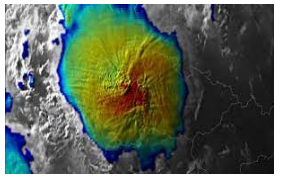
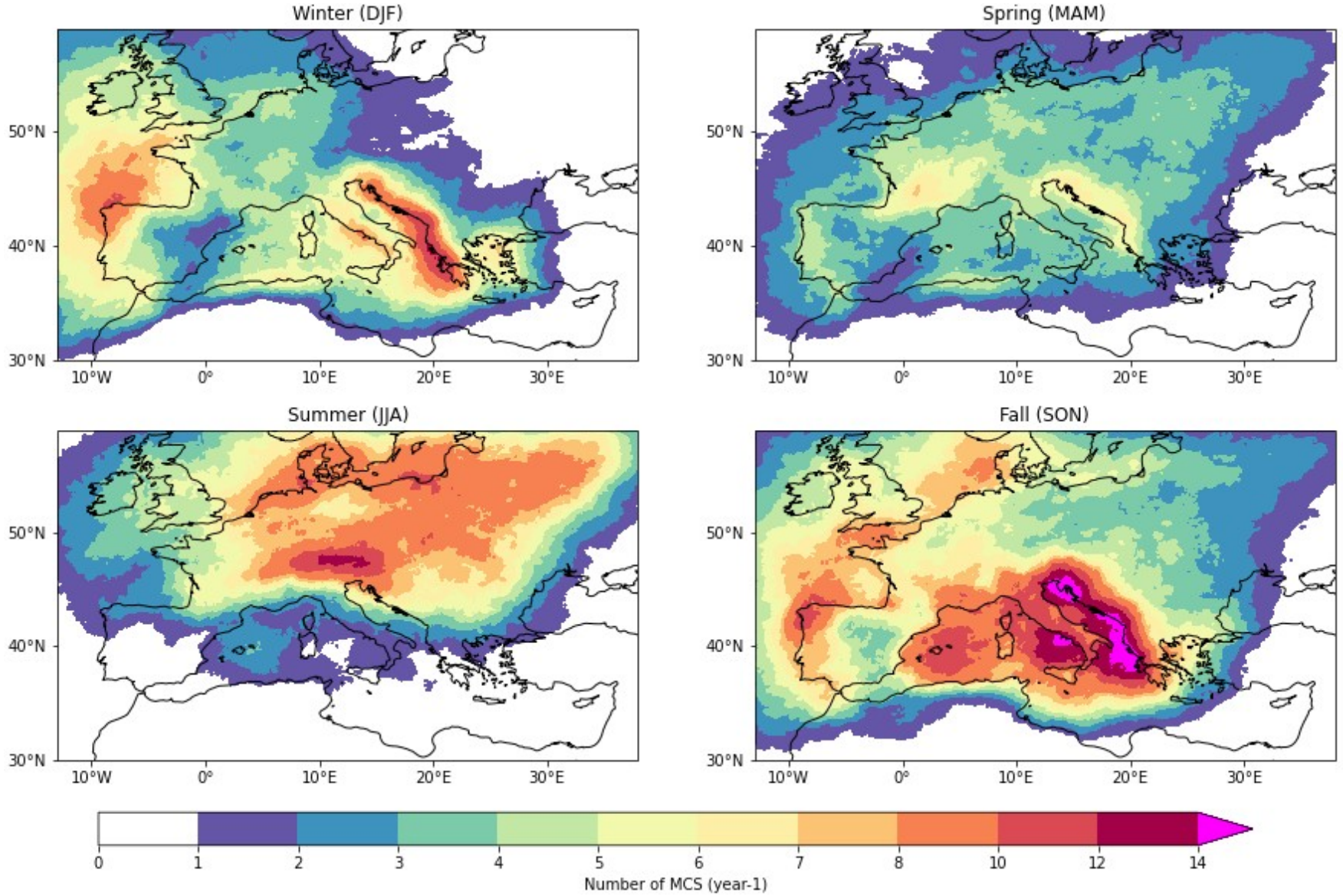
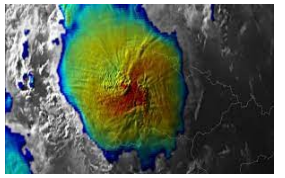


MCS are not rare over Europe





MCS tend to generate more short-duration precipitation extremes



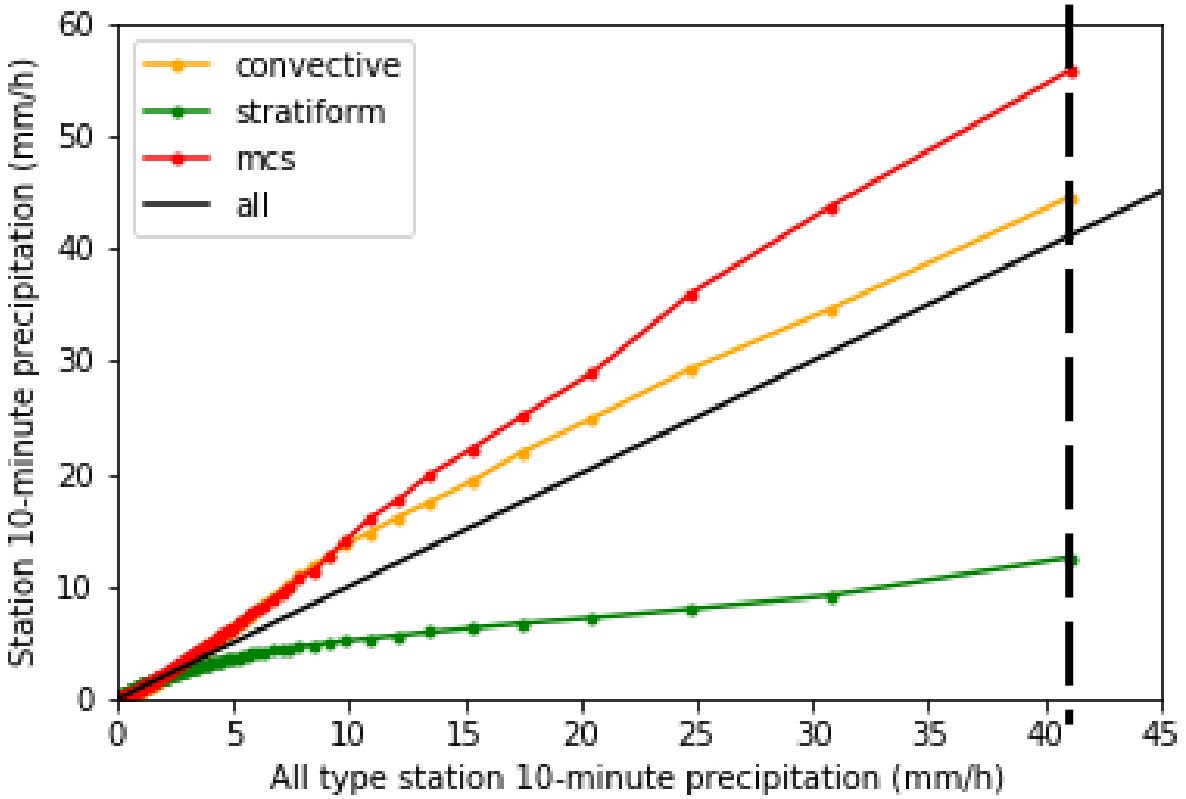
In-situ data over Germany

Maximum 10 min precipitation over a 30-minute window

keep only >0.1 mm/h

precipitation type defined using our tracking algorithm

99th percentile



To be continued …

Thank you for your attention

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