Comparison of May and August 2010 floods in Central Europe

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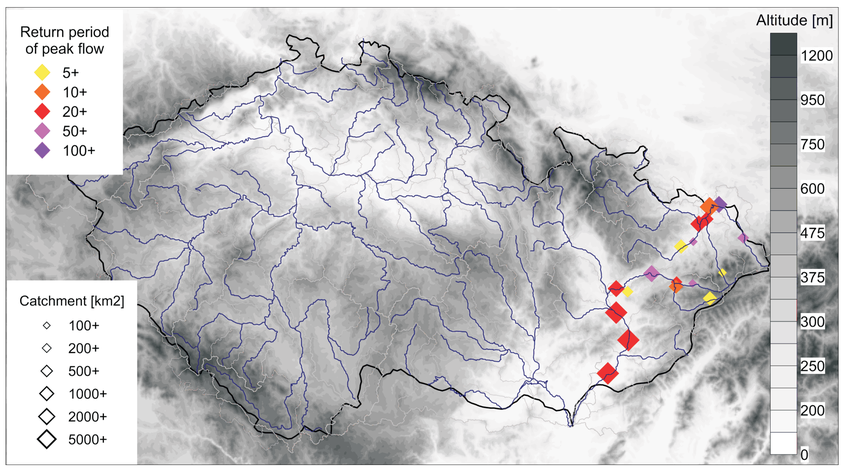
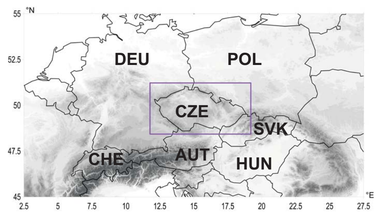
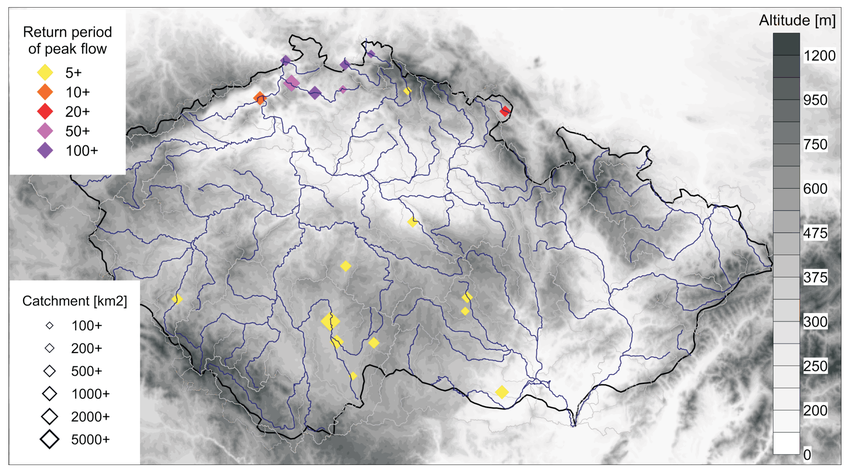


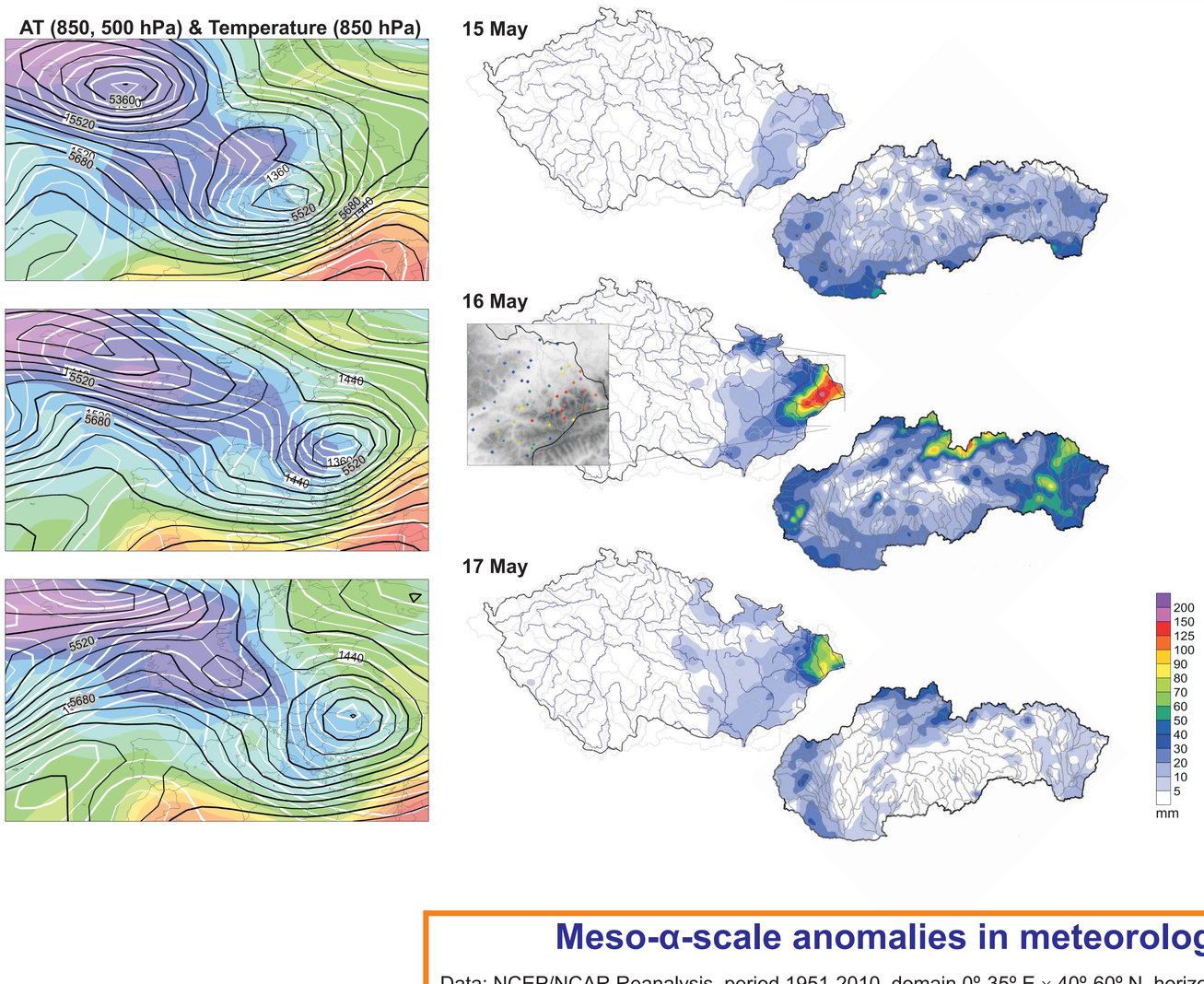
May 2010
Flooding occurred in a large part of Central Europe in the second half of May. Heavy rains were caused by a cyclone passing from Mediterranean over Balkan to Ukraine. Most affected river basins were Vistula, Oder, and Danube. The water stages were even higher than during the catastrophic flood in July 1997 in some regions, mainly in Poland. At the beginning of June, another heavy rain and flood episode followed in the same region (not studied in our presentation).





August 2010
Major flooding occurred in a rather small region at the state border among Germany, Poland and the Czech Republic in the first decade of August. Heavy rains were connected with a shallow cyclone passing from Mediterranean to the north. Most affected river basins were Lausitzer Neisse (a left-sided tributary of Oder) and neighboring right-sided tributaries of Elbe. Due to precipitation intensity, water stages were maximum ever recorded at some gauges.

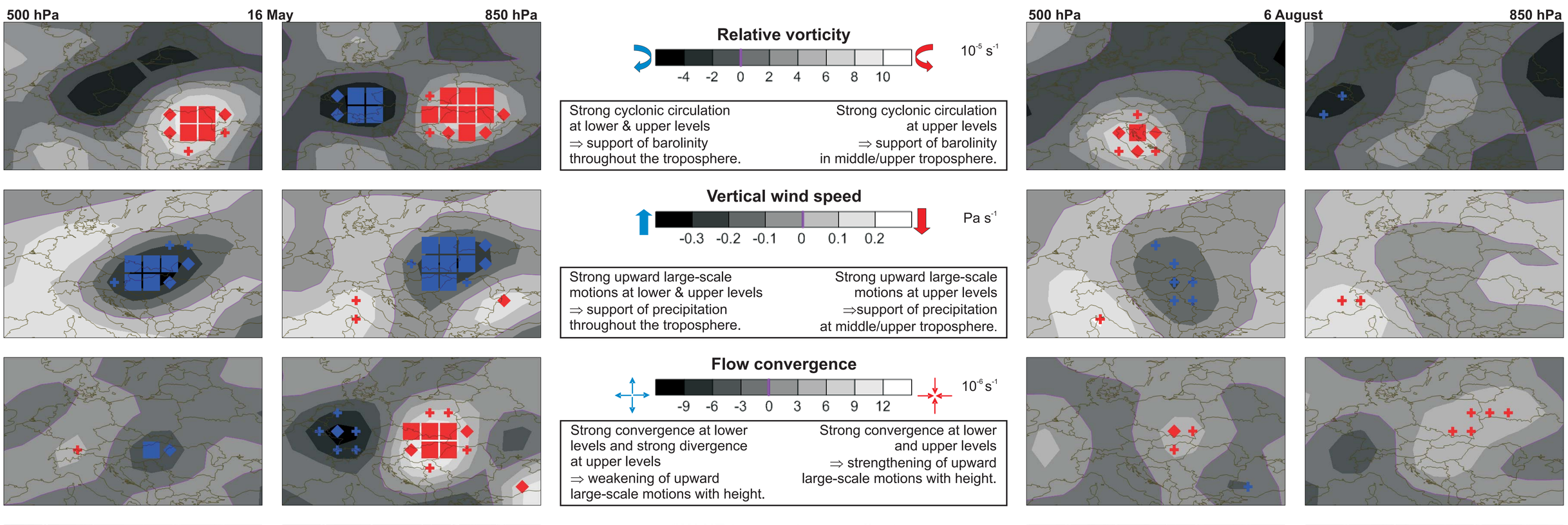
Synoptic setting & Precipitation totals



Meso-α-scale anomalies in meteorological variables

Data: NCEP/NCAR Reanalysis, period 1951-2010, domain 0º-35º E × 40º-60º N, horizontal resolution 2.5º
Method: point estimation of probability of not exceeding the daily mean of a variable in each grid point P = i/(N+1),
N = number of daily means available (N = 21915), i = the ranking in the set of daily means in ascending order.

Probability of not exceeding
0 - 0.001
0.001 - 0.003
0.003 - 0.01
0.999 - 1
0.997 - 0.999
0.99 - 0.997



Conclusions

Rain flood events in May and in August 2010 were caused by a cyclone traveling from the south across Central Europe.
Spatial distribution of precipitation totals and affected area were different due to the different trajectory of the cyclone.
In May, the cyclonic processes were stronger than in August and extended throughout the troposphere.
In May, the most intense rainfalls were located in the low-level cold sector of the cyclone for the duration of the event.
In August, the most intense rainfalls were initially located in a baroclinic zone of strong horizontal temperature gradient.
In May, the orographic enhancement of precipitation which was supported by a strong north moisture flux to the rainfall area is well apparent.

Acknowledgments

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