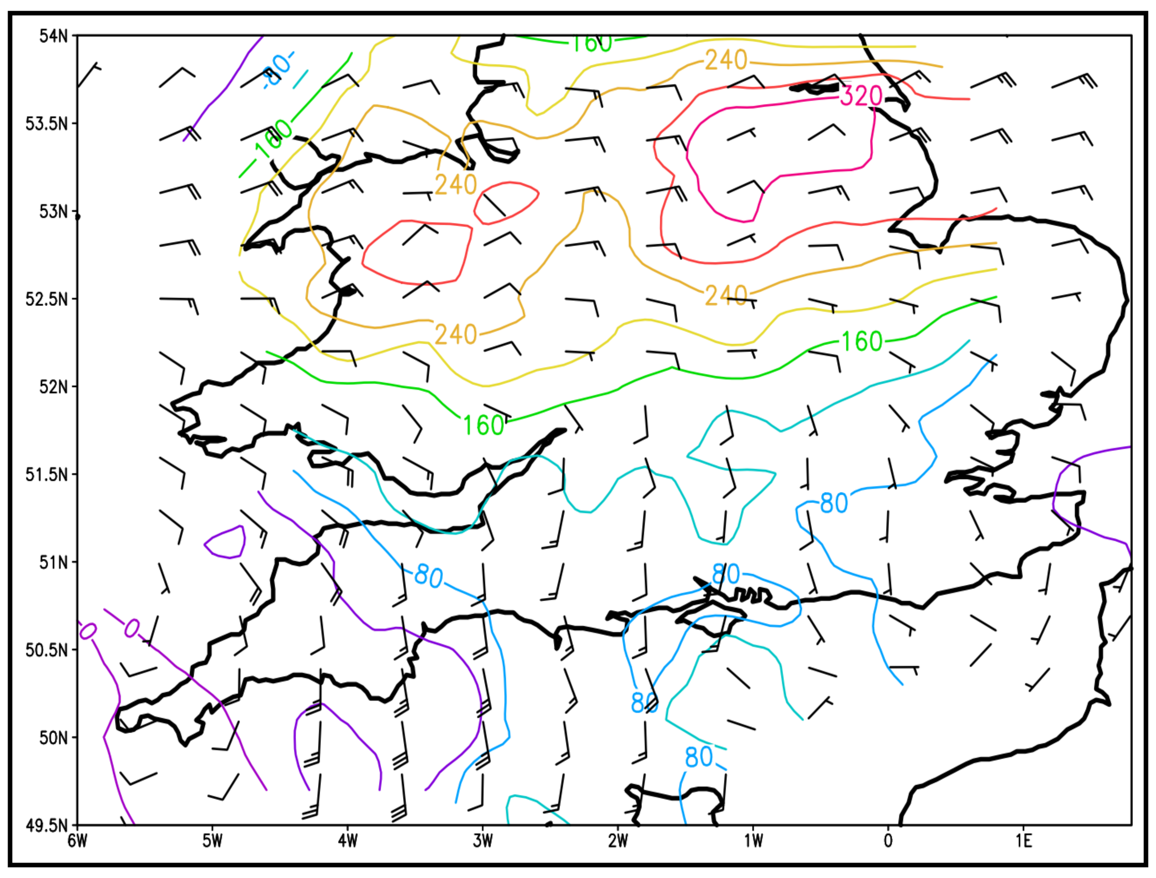
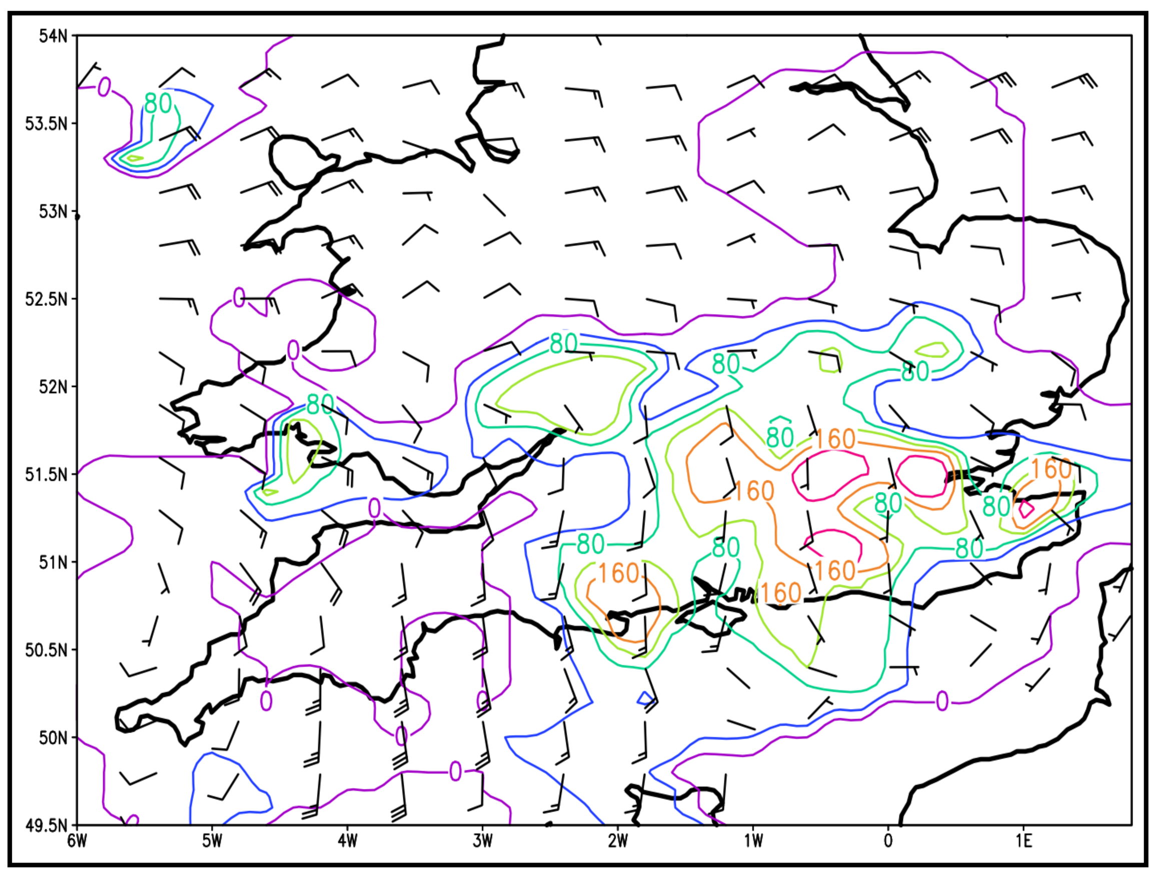
Observational mesoscale analysis



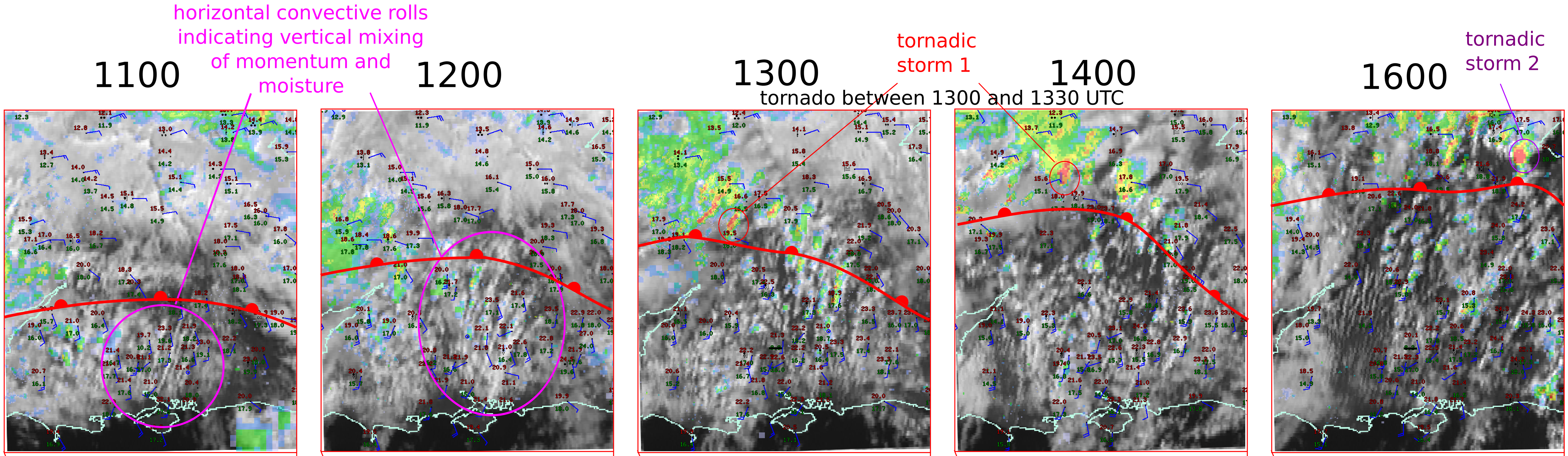
0-1 km storm-relative helicity m²/s² and wind at 10 m AGL
storm motion according to Bunkers (2001)



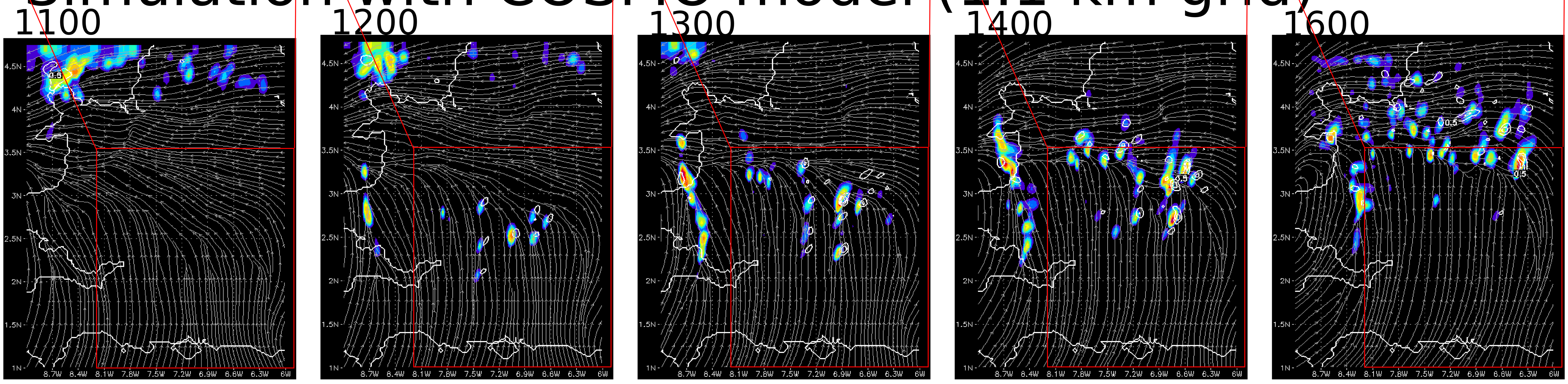
SBCAPE released below 3 km (J/kg) and wind at 10 m AGL

These maps are based on interpolated surface data and radiosonde data between 1115 and 1230 UTC.

Interpolation method: Barnes Objective Analysis, in case of radiosonde data without a correction step.



Simulation with COSMO model (1.1 km grid)



Conclusions

CAPE was present south of the warm front, but also directly north of it. Storms developed from horizontal convective rolls south of the front. As they encountered the helical low-level inflow north of the front, some began to rotate and produce tornadoes.

A decoupled shallow moist zone allowed for a backed low-level flow and sufficient low-level buoyancy for surface-based convection.

The COSMO model (Steppeler et al.) was run on a 1.1 km grid.

It was one-way nested in a 2.8 km run that also allowed treated deep convection explicitly, which was in turn started with initial and boundary conditions from ECMWF

References

Browning, K.A. and coauthors, 2007: The Convective Storm Initiation Project, Bull. Amer. Met, Soc., **88**, 1939—1955.

Marshall, T.P. and S. Robinson, 2006: The Birmingham, UK Tornado: 28 July 2005, *23rd Conference on Severe Local Storms, St. Louis, MO, USA*.

Steppeler, J., and coauthors, 2003: Meso-gamma scale forecasts using the nonhydrostatic model LM, Meteor. Atm. Phys., **82**, 75—96.

Barnes, S.L., 1964: A Technique for Maximizing Details in Numerical Weather Map Analysis, J. Appl. Meteor., **3**, 396—409.

Bunkers, M., 2000: and coauthors: Predicting Supercell Motion Using a New Hodograph Technique, Wea. Forecasting, **15**, 61—79.

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