The Meteorological Background the Severe Weather Events in Hungary on 20th August, 2006

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I. INTRODUCTION

We investigate the meteorological background and processes causing the catastrophe on the 20th of August 2006, which took the life of 5 people and injured 300 people. In Hungary, monumental programs feature the national celebration of 20th August in every year and, as a culmination, a spectacular fireworks closes the series of the events in the capital Budapest. This happened also in 2006, one and half million people got crowded for the evening fireworks in a small place in the centre of the city. However, the event having begun at 21 o' clock (19 UTC) was quickly interrupted by a rapidly moving cold front with its HP supercell (Browning, 1962) causing heavy rain and hail, as well as, producing around 120 km/h wind gusts.

II. PRESENTATION OF RESEARCH

We used the outputs of the ECMWF, ALADIN and GFS numerical models and visual, infrared, water vapour satelite images and applied Hungarian radar measurements. We analysed the interaction between the fronts and upper jet and between the fronts and the warm conveyor belt by the examination of the isentropic surfaces. Finally, we verified the obtained results with the various conceptual models, the documented relations and own experiences.

III. RESULTS AND CONCLUSIONS

Until the early afternoon hours of 20th August 2006, a stationary cold front near the surface was found over Eastern-Austria. Ahead of the front a WCB with anticyclonic curvature was stretching north-northeastwards, which could be clearly analysed on IR satellite images even the previous day. The left exit region of a jet stream at 400 hPa moved over the surface front leading to frontogenesis (Madox and Doswel, 1982). The fron was stationary until this moment began to move approximately together with the core of the jet stream. The acceleration of the jet core was also followed by the part of the surface front below the core of the jet stream (northern part of the surface front). The WCB stretching in the forward side of the front also played an important role in strengthening frontogenesis and convection. This WCB was lifted by the front resulting to increasing updraft. The northern part of the surface front moved from West towards East with an average speed of 70 km/h, while the southern part of the front from Northwest towards Southeast slightly slower. The HP supercells developed under large vertical wind shear, moved with the front and due to the straight hodograph, both the right and the left cell stayed alive. According to observations, a cell moving to the right in occluded phase, based on radar images reached Budapest. On the supercell occluding and becoming outflow dominant exactly in that time, a small-scale "bow echo" formed (Moller et al., 1990) and also on this cell bulging in a „banana shape" along the RFD, a rear-inflow jet (RIJ) could be detected. These processes were occurring exactly over the location of the event producing 116-km/h maximum wind gust. The most heavy windstorm of the day was measured a slightly southeast of Budapest (138 km/h).

IV. AKNOWLEDGMENTS

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V. References

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