FLASH FLASH PRODUCING STORM ON 23 MAY 2005 IN THE CZECH REPUBLIC

Milan Šálek[1]

[1]*Czech Hydrometeorological Institute, regional office Brno, Czech Republic, e-mail salek@chmi.cz*

(Dated: April 30, 2007)

I. INTRODUCTION

In the afternoon on 23th of May 2005 a pronounced convective development occurred in several region of the Czech Republic, especially in Czech-Moravian Highlands where a local flash flood along with intense hailstorm was observed. The convective development along with the forecasts and warning is described and evaluated with respect of the usability of the warning information.

II. METEOROLOGICAL ENVIRONMENT AND STORM DEVELOPMENT

The weather situation can be shortly characterized by a shallow slow moving trough visible at the surface pressure field, in which a cold front was passing central Europe (Fig. 1). The analysis of aerological sounding taken on this day over Prague did not show strong instability measured by CAPE that did not exceed 100 J/kg, but the local area NWP model ALADIN indicated in some places that CAPE could achieve values over 2000 J/kg.

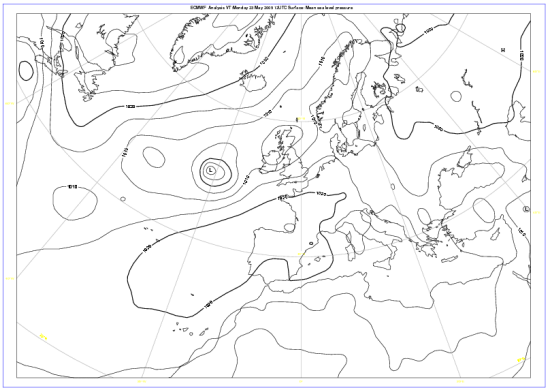

FIG. 1: Mean sea level pressure over Europe and surroundings on 23 May 2005, 12 UTC. Operational analysis of ECMWF.

First isolated convective storms appeared in south-western Bohemia at 11 UTC. Then the convective development intensified and peaked about 15 UTC (Fig. 2). The convection created a line structure, which can be associated with the cold front. The radar reflectivity exceeded 60 dBZ in the area depicted by the arrow at Fig. 2, which also indicated high probability of hailfall. Moreover, in the particular area the storm cells were quaststationary, i.e. the intensive convective processes took place over the same locations for at east 90 minutes (approx. from 14:50 to 16:20 UTC), allowing significant accumulation of precipitation. Only then the most active cells propagated north-eastward.

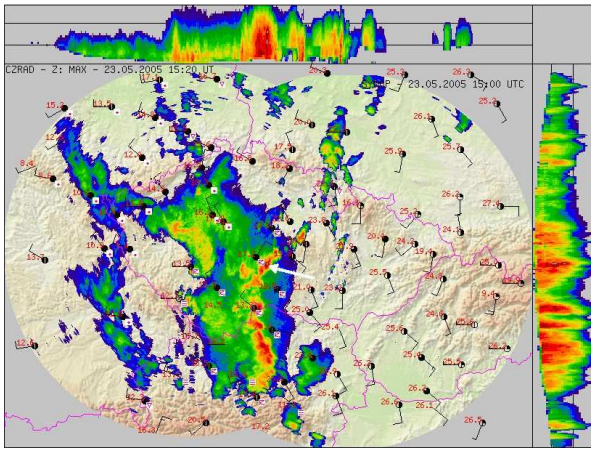

FIG. 2: Maximum radar reflectivity in vertical and north-south and west-east projections from the radar network CZRAD from 23 May 2005, 15:20 UTC. The white arrow points to the area hit by the flash flood and hailfall. The cloudiness, temperature, wind and significant weather of the surface measurements are indicated by simplified standard symbols. Source: JSMeteoView, P. Novák (CHMI).

II. IMPACTS OF THE SEVERE CONVECTIVE STORM

The convective storms caused especially heavy rainfalls and hail. The hailstones were only up to 2 cm in diameter but the hailfall was so intensive that the resulting hail depth was reported to be about 20-35 cm (Papež, 2005; see also Fig. 3).

FIG. 3: Accumulation of hail in Kojčice on 23 May 2006

More significant outcome of the storm was heavy rainfall, which accumulated 171 mm of precipitation measured by raingauge. Resulting local flash flood hit Kojčice (Fig. 4), a rather small community of about 300 inhabitants. Several private and public properties were damaged, but no casualty was reported. The total damage cost in Kojčice reached 300 000 Euro.

FIG. 4: Flash flood hitting Kojčice 23 May 2005, 18.27 UTC.

III. FORECASTS AND WARNINGS

Weather forecasters of the Czech Hydrometeorological Institute understandably anticipated the occurrence of the convection and probability of the severe weather. The preliminary alert was released at 11 UTC, but more specific (localized) warning against intensive convective storms and related phenomena was issued at 16 UTC. At 15.30 UTC, the forecaster on duty at the Regional Forecasting Office Brno asked the local public radio company for the possibility of live severe weather warning and immediately aired weather alerts message for the region over which the most severe convection was detected. The forecaster also contacted the Regional authority of the Region Vysočina (in English: Highlands) which had been better prepared for request for aid from the affected area.

IV. CONCLUSIONS

Warning against flash flood is still very difficult, but this case study shows that it is possible to issue a warning which not only alerts the public about the general possibility of severe convection, but is much more localized and also usable. However, the issue of warning regarding severe convection is usually lagging behind the actual development, which can rapidly diminish the value of this information. So far, the lead time for flash flood warning is usually the flood propagation time, while the places immediately hit by the storm are almost impossible to warn before the storm occurs. Some progress is being reported in Šálek et al who tested a nowcasting system connected with hydrological model.

IV. AKNOWLEDGMENTS

The author would like to thank to the authority of the Kočice Village and to Mr. Jan Papež for the provision of the flood report.

V. REFERENCES

Papež, J., 2005. Report of the flood occurring 23 May 2005 in the area of Kojčice village. Report made by KOORDINACE company (in Czech).

Šálek M., Březková L., Novák P., 2006: The use of radar in hydrological modelling in the Czech Republic - case studies of flash floods. *Natural Hazards and Earth System Sciences*, 6, p. 229-236.