CASE STUDY OF MCS OVER HUNGARY AT 29TH OF JUNE 2006 WITH SATELLITE AND RADAR DATA

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I. INTRODUCTION

On the 29th June 2006 a Mesoscale Convective System (MCS) with several storms forming a line swept across Hungary from the West to the East. Strong wind, heavy precipitation, and hail were reported from several places. It had just left the country when another huge convective system developed over the Julia Alps and Dinaric mountains, and arrived soon over Hungary from the South-west. So on the same day this second system also caused heavy precipitation, and strong winds. Extreme weather conditions appeared: at the lake Balaton more than 100km/hour wind speed was measured; broken trees felt over roads and railways, and some creeks caused flash floods. The cost of the resulting damage reached high sums.

II. PRESENTATION OF RESEARCH

The synoptic situation is shown in Fig 1 on the Satrep analysis.

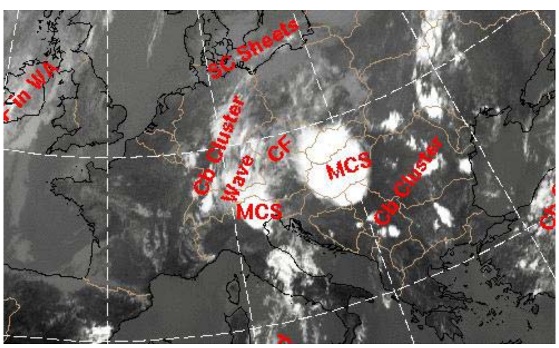

FIG.1. Satrep analysis of the synoptic situation on 29 June 2006 12UTC.

To follow the genesis and the development of the convective system we investigated the new generation Meteosat 8 images, the Hungarian radar network and the lightning data from the SAFIR detection system.

Meteosat images are taken every quarter hour. We investigated the time series of High Resolution Visible (HRV) and10.8um infrared (IR10.8) images as well as of some useful composite (RGB) images, namely the HRV cloud, HRV severe storm, the storm RGB and day microphysical RGB composite images. These RGB images were developed by EUMETSAT for investigating convection at daytime. We show an example in figs 2. and 3.

MODIS images were also analysed. Its spatial resolution is much higher. Using MODIS images we can better see the cloud top structure, but only two images per day are taken of the same area.

III. RESULTS AND CONCLUSIONS

On METEOSAT loops we can well follow the development of the atmospheric conditions. On the HRV images the locations of the overshooting tops can be perfectly identified, while the radar data show the precipitation structure. The location of the overshooting tops and the location of the heaviest, strongest precipitation was usually close to one another. The curve connecting the overshooting tops and the curve of the strongest radar cells also show similar shape.

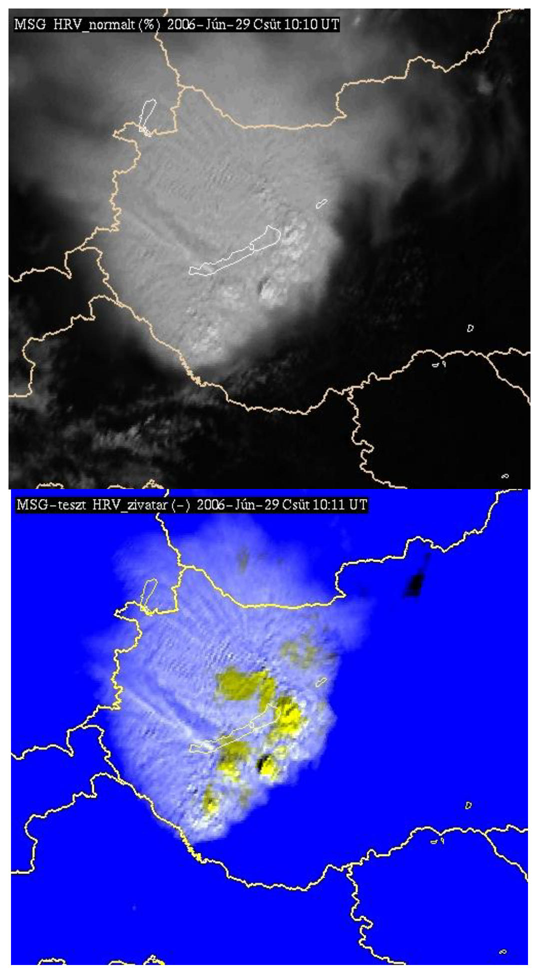

FIG.2. METEOSAT-8 data at 20.06.2006 10:10UTC. High Resolution Visible (upper) and HRV severe storm RGB image (lower).

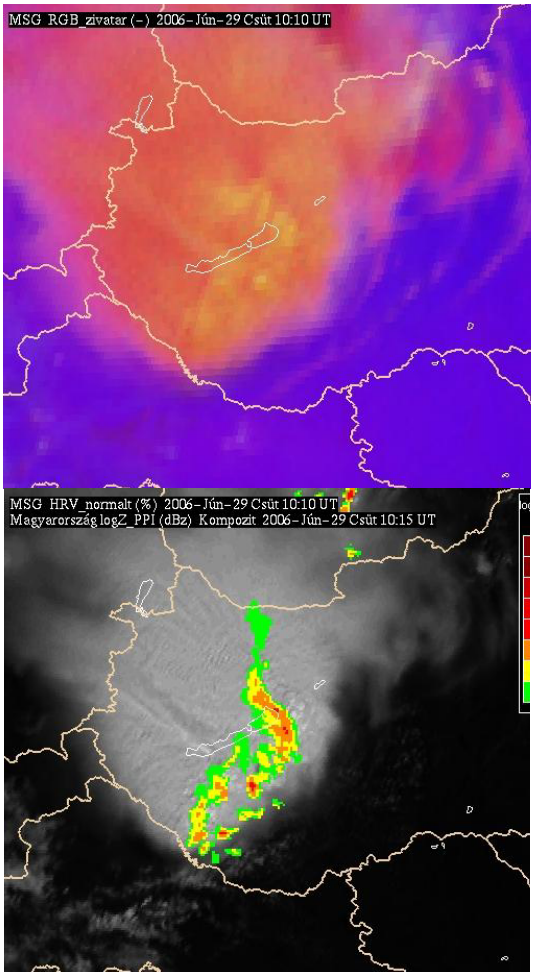

FIG.3. METEOSAT-8 data at 20.06.2006 10:10UTC. Storm RGB image (upper), High Resolution Visible overlaid by radar data (logZ>35dBz) (lower).

We overlaid the lightning data on satellite and radar images (see fig. 4.). Hourly or 10-minute lightning data were visualized. The hourly lightning data showed well the track of the system (see fig. 5.).

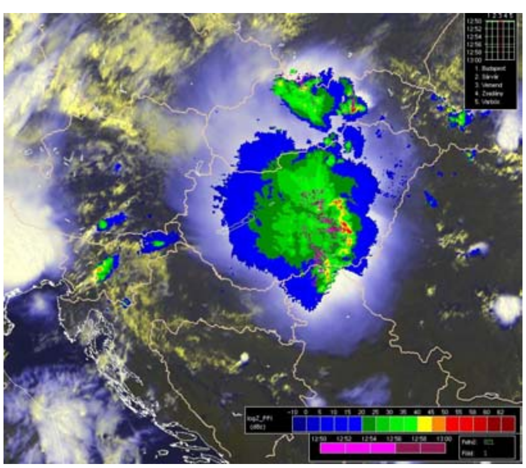

FIG.4. METEOSAT-8 data at 20.06.2006 12:55UTC. HRV cloud RGB image overlaid by radar image and 10-minute lightning data.

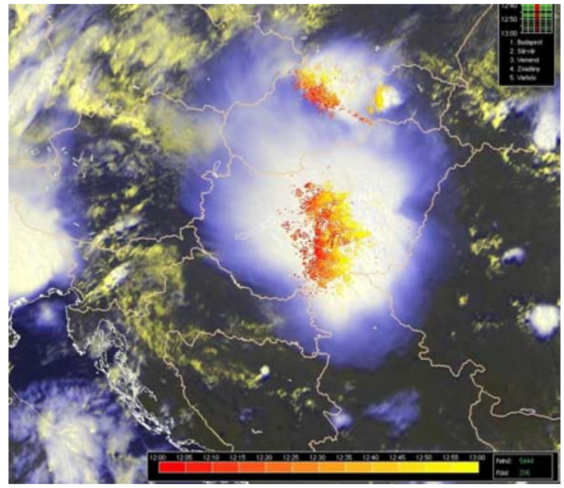

FIG.5. METEOSAT-8 data at 20.06.2006 12:55UTC. HRV cloud RGB image overlaid by hourly lightning data (right).

These images are visualized in the HAWK software, developed in Hungary for duty forecasters. It is a tool for analyzing different types of meteorological data together.

IV. ACKNOWLEDGEMENTS

The authors would like to thank to EUMETSAT for the beneficent training workshops on MSG applications on convection and to the lecturers on these workshops for their valuable instruction as well as to the authors of the MSG interpretation Guide.

V. REFERENCES

Kerkmann J., Lutz H. J., König M., Prieto J., Pylkko P., Roesli H. P., Rosenfeld D., Zwatz-Meise V., Schmetz J. 2004: MSG channels Interpretation Guide, weather, surface conditions and atmospheric constituents, on DVD and html://www.eumetsat.int.