DETECTION AND ANALYSIS OF SUPERCELL – CASE STUDY MAY 22ND 2007

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(Dated: 15 September 2009)

I. INTRODUCTION

This paper contains analysis of supercell that occured on May 22nd 2007 using radar and satellite observations. Tracing of supercell is obtained by satellite. Its characteristic values are measured by radar. Analysis of weather maps and sounding is done. Also, images from Doppler METEOR 500 S-band radar (MAX product, 3D purview), and EUMETSAT satellite images of the visible spectrum radiation (0.8µm) are used.

II. SYNOPTIC SITUATION

Three low pressure systems were present on the European map that day. One low over Scandinavia with a trough and cold front affecting northern parts of Western/Central Europe, one low over the Iberian Peninsula and one low over the Aegean Sea. Between these lows, a large unstable saddle area with weak flow through a deep layer and only local forcing was present, allowing for mostly isolated thunderstorms. There was northeast circulation at the higher altitude above territory of Serbia (the material was taken from *www.wetter3.de/Archiv/).*

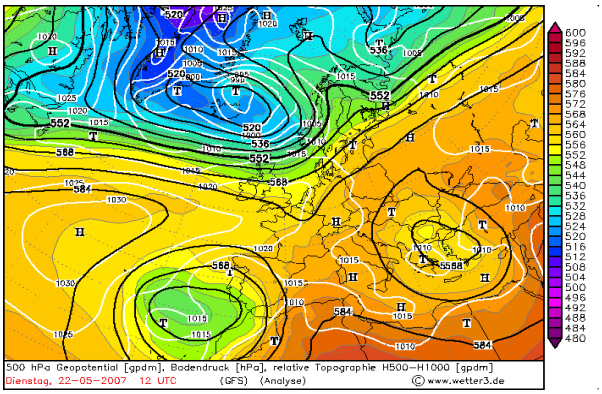

FIG. 1: 500 hPa Geopotential, relative Topographie H500-H1000 (gpdm)

Non-gradient field of low pressure was observed over Balkan.

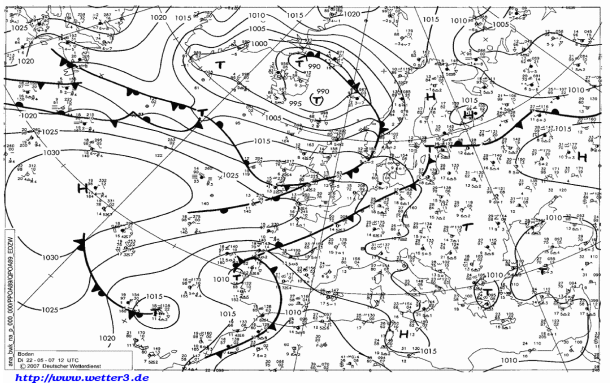

FIG. 2: DWD surface analyses

Over the territory of Serbia the atmosphere was very unstabale. 12 UTC sounding showed high value of Convective available potential energy (CAPE=1764 J/kg). Sounding was downloaded from *http://62.202.7.134/hpbo/sounding_create.aspx*

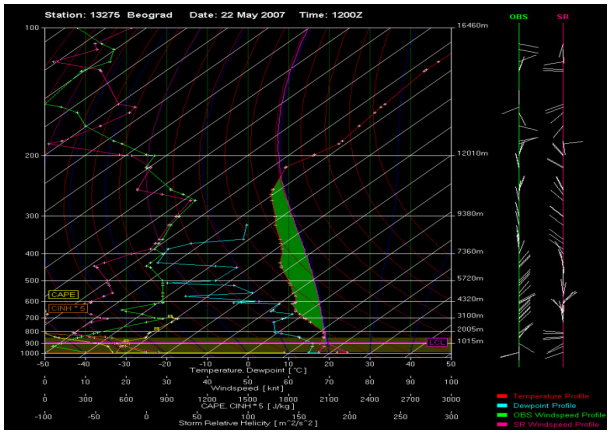

FIG. 3: 12 UTC sounding for the Belgrade station

III. ANALYSIS OF SUPERCELL

Supercell is characterized by the zonal moving from the east to the west, from the territory of Romania to the northeast of Serbia. It moved with the speed up to 43 km/h. High values of radar reflectivity was recorded, 70 dBZ at 6.3 km (0 °C isotherm was on a 3.0 km), which indicated high concentration of hail in the cloud. Cloud top was at 12 km. Images below shows recruitment of high reflectivity region. Radar picture contains horizontal projection of maximum reflectivity (in the centre), vertical cross-section north-south (on the top) end west-east (on the right).

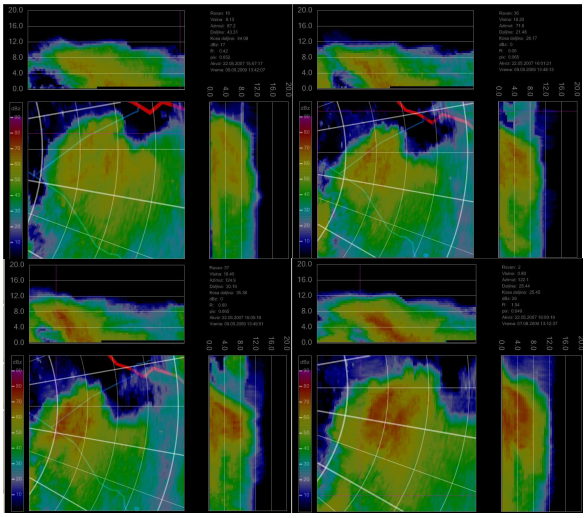

FIG. 4: 2D purviews of supercell derived from multiple volume scans (13:57, 14:01 UTC first row; 14:05, 14:09 second row)

3D image below depicts the radar echo intensity, with the red and purple colours indicating the regions of heaviest precipitation.

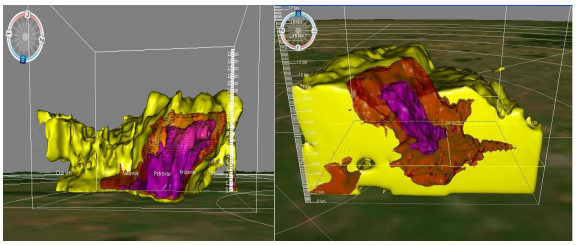

FIG. 5: 3D purview of supercell at 14:01 UTC (left) and 14:09 UTC (right)

Moving of the supercell can be seen at the visible satellite images which are provided by EUMETSAT.

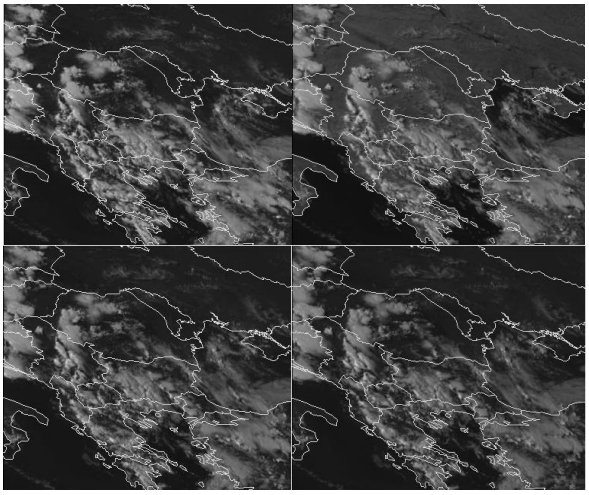

FIG. 6: Visible satellite images (13:57, 14:12 UTC first row; 14:27, 14:41 UTC second row)

IV. CONCLUSION

It was long-lived supercell which moved relatively fast over the territory of Serbia. On the trajectory of this supercell, appearance of the hail, up to 2 cm in diameter, is recorded. Moving over the agricultural areas, the hail has caused serious damage to crop plants.

V. REFERENCES

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