

Extreme storm on 6 August, 2012 over Lithuanian seashore

Over the past few years, it has been observed, that the number of severe storms cases in Klaipėda and in seashore of Lithuania, are increasing. This presentation will be presenting the severe storm case, which had been occurred on 6th of August, 2012.

The 6th of August, the weather conditions in Klaipėda become extreme. One of the biggest Lithuanian city was marked by supercell storm. Supercells are the most dramatic form of organized convection. They are relatively rare events, and are predominantly a midlatitude phenomenon. Even though it is the rarest of storm types, the supercell is the most dangerous and extreme weather events are generated. By virtue of their large, intense vertical drafts, supercells create a disproportionate share of the most intense forms of convective severe weather, excluding heavy precipitation.

Synoptic situation

On morning of August 6th the cyclone formed over Denmark and was slowly moving toward the North. After the midday, the centre of cyclone (1003 hPa) was above the Skagerrak and Southern Norway. In that case Eastern Baltic and Lithuania was into the warm sector of cyclone – the maximum temperature in Klaipėda reached 28,3degrees.

Due to strong convective processes there was forming really high cumulus clouds Cb and the cold front which was approaching from the Southwest, became even stronger and V-shape form Cb developed.

Strongly evolved powerful storm cumulus nimbus clouds with tops reaching 15km high, reached Klaipėda about 19:30 local time. Clouds tops temperature was minus 50 degrees. Despite the sudden squall and lightning, during 1 hour there was 46 mm precipitation.

After half an hour of storm in Klaipėda, the clouds of storm was moving toward Northeasterly direction, that's the reason why there wasn't any more strong storms in Western part of Lithuania. We may claim that there was regenerating mesoscale cells over South Baltic and Curonian Lagoon.

Forecasts

The meteorologists of Marine Forecasting Division the squall was waiting on the first part of the night on August 6th in Klaipėda, Curonian Lagoon and the Southeastern of Baltic sea. The models (HIRLAM, DWD, GFS) were predicting that on the second part of the day there would be average strength driving rain, but there wasn't any strong squall waited.

Fact

Within 3 hours there was 41 mm in Kretinga, 12mm in Palanga, 8 mm in Šilutė, 16 mm in Nida, 26 mm in Telšiai, 9 mm in Laukuva, 10 mm in Liepaja, 12 mm in Pionersk, 13 mm in Baltiysk and just 1 mm precipitation in Kaliningrad.

The strongest wind gusts in Klaipėda were fixed on 19:25 19:30 19:35 (31, 32, 32) in ten meters above surface , and in the twenty four metres high, the wind gusts seeked (39, 39, 37) m/s.

Survey on the stratification & stability parameters

There are numerous parameters to calculate the stability of the present air mass. To give a quick insight into the air mass stratification, I am going to use the most common ones: the Showalter-Index, the Lifted-Index and the CAPE-Index. They represent e.g. the potential for severe convection and should support the forecaster making his decisions.

At 12 UTC the CAPE-Index shows values about 1084 J/kg which indicates the possibility of heavy showers and hail. Above all an outstanding wind shear can be detected which is one of the most important ingredients to severe thunderstorms. Wind shear in low troposphere and CAPE are shown.

Conclusions

- Severe convection often are highly localized in time and space, and poorly represented in synoptic-scale data.
- Specific conditions: warm wet air upward motion, convergence on sea-coast border, divergence in high levels, equivalent potential temperature maximum.
- It was possibility the squall in the afternoon hours , but the forecasting of the precise trajectory and location of squall line is very complicated.

Monitoring of process development is the most important thing at synoptical situation like that and it helps to make a good forecast and issue warning in time .