

Thunderstorm forecasting and nowcasting at the Institute of Meteorology and Water Management



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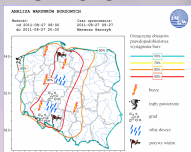
Last year extreme weather events in Poland showed that there is a great need to develop new forecasting methods and nowcasting tools. To meet the needs of emergency services, IMWM decided to create a workstation devoted to forecasting occurrence and movement of thunderstorms and other phenomena such as hail, wind gusts etc.

This project started on 1st July. Since then a group of forecasters is watching weather every day from 7 a.m. to 7 p.m. focusing on conditions which can lead to Cumulonimbus clouds and thunderstorms forming. In the morning they prepare forecasts for next 48 hours basing on actual weather maps and NWP models from 00 UTC. Forecasts contain information about the area covered by thunderstorms, their probability and severity expected. During a day they are updated and issued as nowcasting reports. and reports are distributed to the regional forecast offices and published on the website: www.pogodynka.pl.

The idea of storm nowcasting was to support forecasters in decision making and to improve warnings accuracy.

This year activity was experimental and showed us what to change to meet forecasts' users expectations. In winter we plan to study further the nature of thunderstorms to be better prepared for next summer.

FORECAST



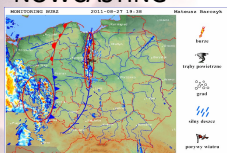
An edge of the high pressure system over east of Poland. In the west a deep trough with cold front preceded by convergence line, during the day moving eastwards. Tropical air mass coming from south.

Thunderstorms are possible over almost entire Poland. There are strong dynamical forcings expected in the west part of country, connected with an active front and convergence line. Air mass is very unstable, CAPE exceeds 2200 J/kg. In addition upward motions will be enhanced by positive vorticity advection in the middle and upper troposphere. Sharp temperature gradient at the frontal zone is favorable for severe storms occurrence. The main threat in this area are heavy rainfall (PW around 38 mm) and hail.

In the early afternoon Cb clouds will form along the convergence line in central part of Poland (its location is consistently forecasted by all NWP models). Here severe storms are also expected with main threat of strong wind gusts (up to 100 km/h) and large hail. Rain sums can be quite big due to cumulation (up to 40 mm). Storm cells will move northwards according to the steering flow at 500 hPa and very slow to the east with the whole system (500 hPa trough).

In the east part of Poland there is very hot and unstable tropical air mass present. Although high CAPE values (1500-2000 J/kg) indicate that enough energy exists to thunderstorms forming, model soundings mark CIN layer that will prevent convective initiation. However due to strong thermal forcings isolated outbreaks could not be ruled out. Storms in this area should not be severe.

NOWCASTING



There are two areas with thunderstorms over Poland. First one is connected with the convergence line – here severe storms are expected. Storms are moving northwards along the line therefore large rain sums can occur due to cumulation. Strong radar echo indicates heavy rainfall, however it is not confirmed by the ground measurements, since storms are located between stations. Since high dBz values exceed 11 km there is high probability of hail with diameter more than 5 cm. Convergence line is moving very slowly to the east and storms will persist during the first half of the night over west frontier of Warmia and Mazowsze, gradually weakening.

Scattered storms are also over the south-west part of Poland moving northwards to Wielkopolskie and Lubuskie Districts. They appeared behind the cold front, in cold air mass. Forcings are much weaker in this area therefore no severe phenomena are expected, but weak storms will persist during early night hours.

