

EXPLOSIVE STORM DEVELOPMENT IN KERCH STRAIT: SIMULATION BY COSMO-RU MODEL AND SYNOPTIC ANALYSIS

Gdaly Rivin, Inna Rozinkina, Boris Peskov,
Anastasia Bundel, Tatyana Dmitrieva

Hydrometcenter of Russia, Moscow,

Ekaterina Kazakova
Moscow State University

Gdaly.Rivin@mecom.ru <http://meteoinfo.ru>

One of the most important cases considered was the storm over the Kerch Strait (between Black Sea and the Sea of Azov).

This report is devoted to the “case study” of a synoptic situation, definition of genesis of the phenomenon of intensive cyclone onset and of questions of adequacy of its reproduction in COSMO-RU model (Rivin, Rozinkina, 2009).

On November, 11th, 2007 in northern part of the Black sea there was a strong storm (speed of a wind reached 35 m/c). As a result in Kerch strait (between Azov and Black seas) 5 ships have sunk passage, were human victims, there was a catastrophic flood of oil.

This storm was created by a cyclone that has previously arisen over the Mediterranean sea and sharply became much more active within the Black sea (this situation looks like as “explosion”).

On figs 1 -8 some results of this case study are given.

The typical trajectories of Mediterranean cyclones entering to the Russian territory

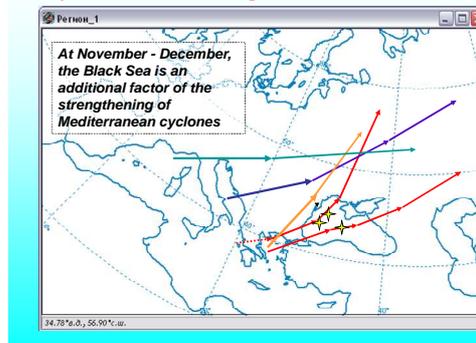


Fig. 1.

24-h forecast and reanalysis

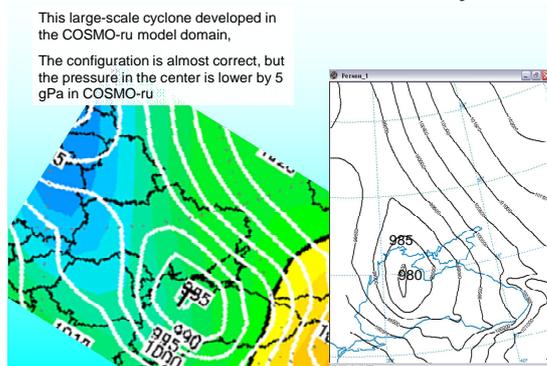


Fig. 3.

The storm in the Kerch Strait may be created only by very strong wind with strict direction as in the figure below

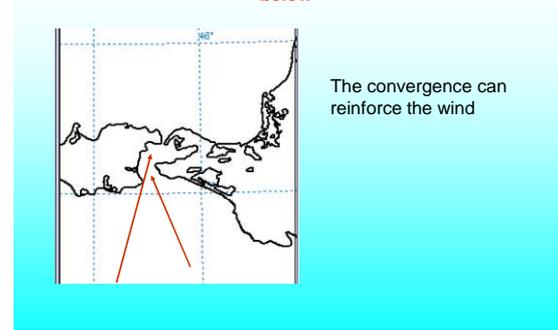


Fig. 4.

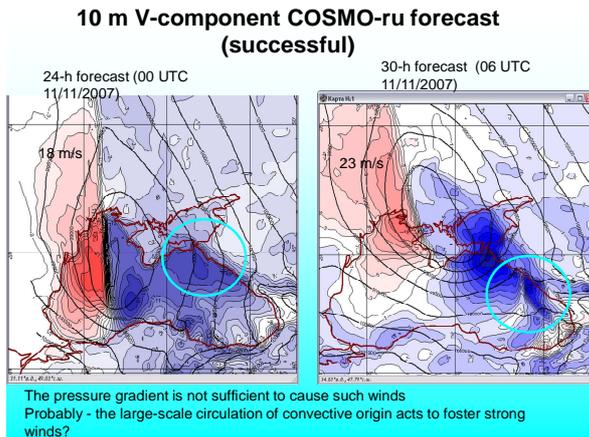


Fig. 5.

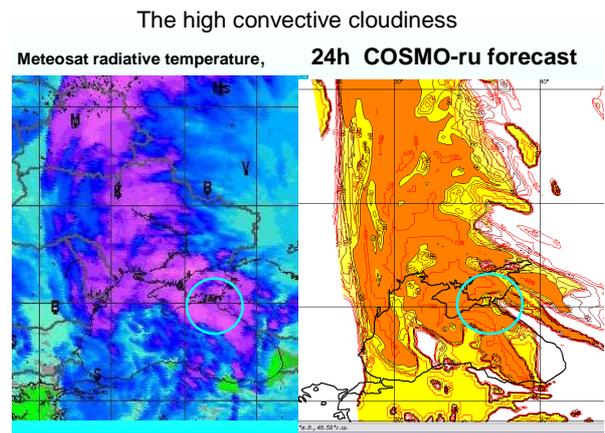


Fig. 6.

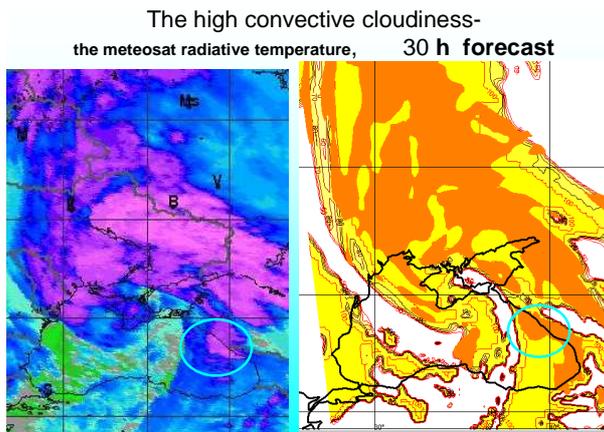


Fig. 7.

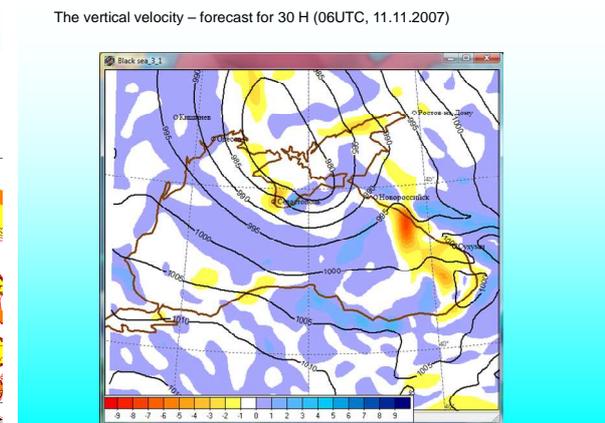


Fig. 8.

Conclusions

- The COSMO-RU forecasts of the 10-m wind velocity fields determined the storm in the Kerch Strait on November 11, 2007.
- The origin of strong wind was:
 - pressure gradients in the cyclone,
 - movements before fast-moving front,
 - vertical convective circulation,
 - convergence of movements of different types in the Kerch Strait gorge.
- COSMO-RU successfully simulated the configuration of high powerful clouds;
- COSMO-RU slightly underestimated velocity of the cyclone front movement and a small error in the cyclone depth.

Acknowledgements

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References

Rivin G., Rozinkina I. (2009). The first steps of operational running of non-hydrostatic mesoscale model atmosphere COSMO-RU. Research Activities in Atmospheric and Oceanic Modelling, CAS/JSC WGNE, WMO (see this issue).