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Local wind conditions in Poland.

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Wind energy is one of the fastest growing sectors of renewable energy resources in Poland. Every year new wind farms are installed, and on March 2011 the installed capacity of wind power in Poland was 1360 MW (from overall 453 wind power stations, according to Energy Regulatory Office). Wind power is highly dependent on meteorological parameters.

In our work we present results from wind speed post-processing and verification of results of numerical forecasting model. The mesoscale COSMO model runs operationally in Institute of Meteorology and Water Management in Warsaw in the domain of 2700 x 2200 km, on regular grids with a resolution of 14 km, 7 km, and 2.8 km. Forecast range is 78 hours (14 and 7 km) and 30 hours (2.8 km). The model is calculated twice per day (for all resolutions). Example results of model for every resolution in a form of vertical wind profiles and of horizontal wind fields are shown.

The fields obtained from model had been verified against Polish SYNOP and TEMP stations. The mean error (ME) and the root square mean error (RMSE) were calculated for the wind speed. Spatial and temporal variations of wind speed over the entire territory of Poland as well as over miscellaneous types of complex terrain (mountains, coastal) are also presented, together with results of conditional verification (under different synoptic conditions) of wind speed.

The study refers to various periods (seasonal, monthly and days with specifics synoptic situations) of 2010 and 2011.