

High-resolution waves and weather forecasts using adapted WAVEWATCH III and WRF models

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High-resolution waves forecast is in demand for nearshore areas and for inland water bodies. Nowadays wave models (e.g. WAVEWATCH III) are forced mostly with wind field from reanalysis with low resolution. To increase the wind input field resolution, the WRF atmospheric model can be used.

The WRF model was implemented in the area containing a middle-sized water body. The area with Gorky Reservoir was chosen as a control area. WRF simulation was performed for 4 nested domains with min cell size of 1 km. Initial reanalysis was CFSv2 winds. Different surface layer parameterizations and planetary boundary layer parameterizations were tested within WRF: MM5 similarity, Eta similarity, MYNN for Nakanishi & Niino PBL parameterization, and Large Eddy Simulation case. The results were compared with the results of the in-situ measurements held by our group.

The WRF model wind calculation results were used as wind forcing of the WAVEWATCH III wave model. A comparison of the mean wave parameters with the measured in the experiment at the Gorky Reservoir was made.

This investigation will be continued with the attempt of coupled modeling based on the automatic exchange of the calculated ocean and atmosphere parameters.