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Variational data assimilation problem for the thermodynamics model with displaced pole

Eugene Parmuzin (1), Valery Agosgkov (1,2,3), and Natalia Zakharova (1)

(1) Institute of Numerical Mathematics RAS, Moscow, Russian Federation (cheros@mail.ru), (2) Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russian Federation , (3) Lomonosov Moscow State University, Moscow, Russian Federation

The most versatile and promising technology for solving problems of monitoring and analysis of the natural environment is a four-dimensional variational data assimilation of observation data. The development of computational algorithms for the solution of data assimilation problems in geophysical hydrodynamics is important in the contemporary computation and informational science to improve the quality of long-term prediction by using the hydrodynamics sea model. These problems are applied to close and solve in practice the appropriate inverse problems of the geophysical hydrodynamics.
In this work the variational data assimilation problems in the Baltic Sea water area with displaced pole were formulated and studied [1]. We assume, that the unique function which is obtained by observation data processing is the function and we permit that the function is known only on a part of considering area (for example, on a part of the Baltic Sea).
Numerical experiments on restoring the ocean heat flux and obtaining solution of the system (temperature, salinity, velocity, and sea surface height) in the Baltic Sea primitive equation hydrodynamics model [2] with assimilation procedure were carried out. In the calculations we used daily sea surface temperature observation from Danish meteorological Institute, prepared on the basis of measurements of the radiometer (AVHRR, AATSR and AMSRE) and spectroradiometer (SEVIRI and MODIS). The spatial resolution of the model grid with respect to the horizontal variables is uniform on latitude (0.2 degree) and varies on longitude from 0.04 to 0.0004 degree .
The results of the numerical experiments are presented.
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References:

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