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# Study and numerical solution of the inverse and variational data assimilation problem on finding the heat flux in the ocean dynamics model

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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 ocean model. These problems are applied to close and solve in practice the appropriate inverse problems of the geophysical hydrodynamics. One of such problems the inverse problem on the heat flux in the ocean is formulated, studied and the algorithm to solve this problem is proposed.
Numerical experiments on reconstructing the heat flux and obtaining solution of the system (temperature, salinity, velocity, and sea surface height) in the World Ocean circulation model are carried out. The observation data used to solve the inverse problems are obtained from ARGO buoy system and from satellite altimetry. The temperature profile is measured by contact methods from the international ARGO buoy system, but the sea surface temperature is obtained from satellites measurements. The numerical experiments confirm the theoretical results and advisability of using the proposed procedure for reconstructing the heat flux in the World Ocean circulation model.

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