



## **DEVELOPMENT AND PRE-OPERATIONAL VALIDATION OF NEMO BASED EDDY RESOLVING REGIONAL CONFIGURATION FOR GULF OF FINLAND**

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At the present day RSHU the Operational Oceanographic System for the Gulf of Finland (GULFOOS) is in a trial operation. For the future development of the operational system, the quality of which also strongly depends on the hydrothermodynamic model spatial resolution. The new model configuration has been implemented, based on the international project NEMO (Nucleus for European Modelling of the Ocean).

Based on NEMO toolbox a new eddy permitting z-coordinated configuration realized with horizontal resolution 30x15" (~500 m) and 1 m vertical step. Chosen horizontal resolution enough to resolve typical submesoscale eddies in this basin where the internal Rossby radius is usually 2-4 km [1]. Verification performed with use all available measurements including vessel, ferry boxes, autonomous profilers, satellite SST. It was shown that submesoscale eddies and filaments generated by baroclinic instability of fronts in upper layers of the Gulf can change vertical stratification and deepening of the mixed layer.

Increase in the model resolution leads to a clear improvement of the representation of the key hydro-physical fields: filaments propagation, local eddies. Obtained results confirm that model adequately reproduce general circulation and seasonal evolution of vertical water structure. It is shown that NEMO model initially designed for a global ocean can be used in regional operational application in case of highly stratified shallow basin with complex bathymetry. Computation efficiency of the system including 3DVar assimilation was enough for 24x7 operational task on 12 nodes of Intel based cluster. Proposed regional modeling system has potential to give information on non-observed physical quantities and to provide links between observations by identifying small-scale patterns and processes.

### References

1. Alenius P., Nekrasov A., Myrberg, K. The baroclinic Rossby-radius in the Gulf of Finland. *Continental Shelf Research*, 2003, 23, 563–573.