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Forecasting skills of the HIROMB in the Gulf of Finland

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The Baltic Sea models are „tuned" to perform well in the southern Baltic Sea and in the Baltic Proper. Still, the thermohaline stratification becomes weaker than observed in the long-term runs and in the operation use of the models. Opposite to the case in the Baltic Proper, numerical models either operational or scientific usually give stronger thermohaline stratification than observed in the Gulf of Finland. Besides, coastal upwellings are rather frequent phenomenon in the Gulf of Finland. The upwelling zone may cover one third of the Gulf with pronounced upwelling filaments that extend far to the open sea. In that respect, the Gulf of Finland is rather intriguing area for model skill assessment.

The forecasting skills of the one nautical mile resolution HIROMB are assessed in this study. FerryBox measurements of surface layer water temperature and salinity are compared with HIROMB forecasts along the ship route between Tallinn and Helsinki across the Gulf of Finland in the second half of 2006. The root mean square difference between HIROMB forecasts and FerryBox measurements for temperature and salinity are calculated. The ability of HIROMB to forecast the thermohaline structures is tested in the case of upwelling event that took place in August 2006 in the southern Gulf of Finland. The modeled fields are compared with temperature and salinity profiles that were measured on transect across the Gulf. The transect was repeated several times during the full upwelling cycle. The comparison is less accurate than in case of model and FerryBox data comparison due to spatial irregularity of coastal upwelling and formation of upwelling filaments, which were seen on satellite images. Increasing of model horizontal resolution and/or using local models may improve forecasting skills of the HIROMB model. The sea level forecast of the current HIROMB is in a range of ± 15 cm compared to the real time sea level measurements at the Estonian coast.