

## **Analysing effects of aquaculture on water column and sediment biogeochemistry with a 2-Dimensional Benthic-Pelagic model**

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Biogeochemical C-N-P-Si-O-S-Mn-Fe transformation model BROM (Yakushev et al., 2017) was coupled with a 2-Dimensional Benthic-Pelagic transport model (2DBP) using Framework for Aquatic Biogeochemical Models (FABM, Bruggeman, Bolding, 2014). 2DBP considers vertical and horizontal transport in the water column with 25 m horizontal resolution and vertical transport in the upper 10 cms of the sediments,

2DBP was forced by hydrophysical data from simulations with ROMS and applied for the Hardangerfjord (Western Norway). Model predicts changes in the bottom biogeochemistry in several tens of meters from the fish farm (i.e. increased organic matter (OM), oxygen depletion, denitrification, metal and sulfur reduction etc.) as well as a detectable decrease of oxygen and increase of ammonia, phosphate and OM in the water column in the vicinity of the fish farm. The model results are compared with the field data received in the Hardangerfjord in August 2016.

The code of the software used is available at <https://github.com/BottomRedoxModel>. This work was supported by Norwegian Research Council project 535640 (JELLYFARM).