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A general approach to implementation of complex physical processes in open boundary conditions

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The implementation of open boundary conditions (OBC) has long been considered as a crucial key in regional ocean modelling. The past experience (E. Blayo, L. Debreu, 2005) indicates that OBC obtained through rigorous analysis can only be used in cases that are idealized to some extent. Difficulties arise when non-trivial physical processes such as turbulence, wind forcing have to be treated. Comparison (Evaluation of open boundary conditions in ROMS, METreport, 2016) of various OBC in a regional ocean model demonstrates a high degree of sensitivity of the model to the chosen OBC. In this report a general approach has been considered that would allow to combine exterior information (e.g. SSL, wind forcing) with calculated fields in the interior domain in a “seamless” manner. A set of numerical experiments have been conducted to analyze sensitivity of a regional ocean model to the degree of physical complexity introduced in OBC.
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