# SLIM, A Baroclinic Discontinuous Galerkin Finite Element Model for Marine Flows

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**Abstract**

Unstructured grids models for marine flow modelling are used for many years now. These models have proved their efficiency for coastal applications. A 3D baroclinic discontinuous Galerkin finite element model with split-explicit time stepping, SLIM 3D, have recently been developed and applied to ideal coastal flows.

This model still suffers problems of stability. The simulation blows up easily on the boundaries and non-physical behaviour can be observed where there is a high horizontal pressure gradient. In order to fix it without changing the physics beyond the model, a stabilized version has been developed and applied to large-scale ocean circulation test-case, where the problems of stability are crucial. This model has been compared to other models to assess the quality of the results.

This talk presents the SLIM model explaining its spatial and temporal discretization characteristics. Then a large-scale application in which we assess the robustness of our model is presented. This application, a baroclinic instability in a zonally re-entrant channel, gives a comparison between the SLIM model and other references. Eventually, some results of different coastal academic and real applications on which the model has been assessed are given.

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