Development of Coastal Ocean Models for Detiding and Application of SWOT Data along the Canadian Coasts

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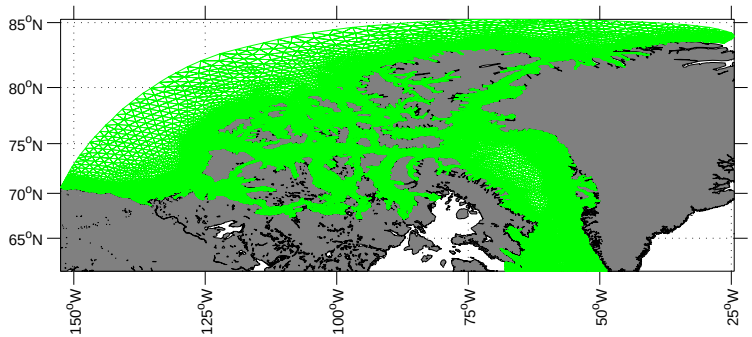
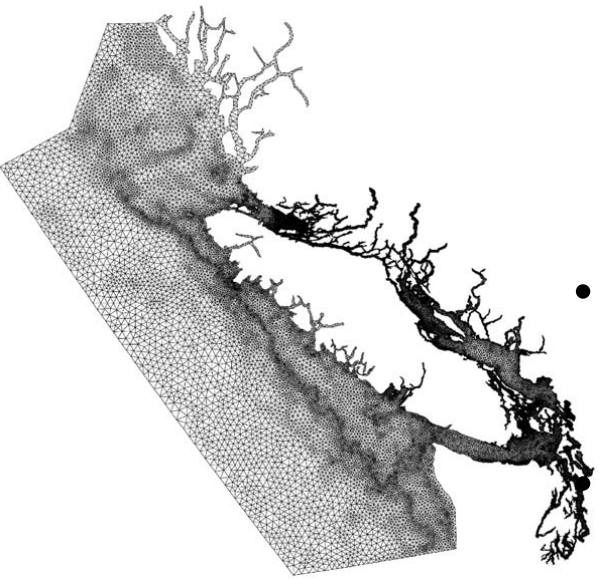
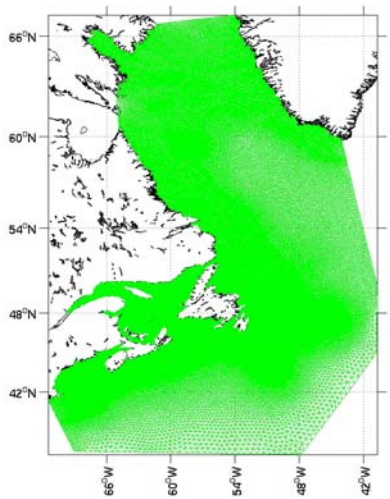
Background





- Canada's vast coastal zone and continental shelves feature harsh environmental conditions, complicated physical processes, diverse ecosystems and rich hydrocarbon resources.
- It is difficult and costly to make in situ observations, and thus long-term measurements are very limited.
- Use SWOT to improve monitoring and forecasting ocean state and understanding processes including storm tides, coastal jets, mesoscale and sub-mesoscale features.



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Objective and Approach

- The objectives of this proposal are to provide an improved tidal model for detiding the SWOT altimetry data and to examine how useful SWOT data can be for the improvement of coastal tide and circulation (mesoscale and sub-mesoscale) modeling.

- We will develop coastal tide and circulation models over the Canadian coastal and shelf seas based on a finite-volume coastal-ocean circulation model. Nadir altimetric data will be assimilated into the models in the forms of sea surface height and/or along-track slopes. Simulated SWOT data will be assimilated into the models.

Relevance to the Key Phase-A Issues

- *Coastal tides...”* Our project will improve tidal models that can be used to better detide SWOT data. We will assimilate multi-mission altimetric tides and in situ data. The improved tidal models along the Canadian Atlantic, Arctic and Pacific will be alternatives for the SWOT community.
- *Model and data assimilation ...”* Synthetic SWOT data will be assimilated into FVCOM to show the utility of SWOT data in improving coastal tides and shelf circulation. With high resolution modeling and altimeter data assimilation, we will have the capability to conduct systematic twin experiments of SWOT observation schemes and expected observational error budgets. These simulation experiments can contrast the relative merits of different schemes, and required measurement accuracy, to enhance the SWOT capabilities for coastal tides and circulation.