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Simulation and Reconstruction of the Inshore Labrador Current off East Canada

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Fisheries and Oceans Canada

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Canada

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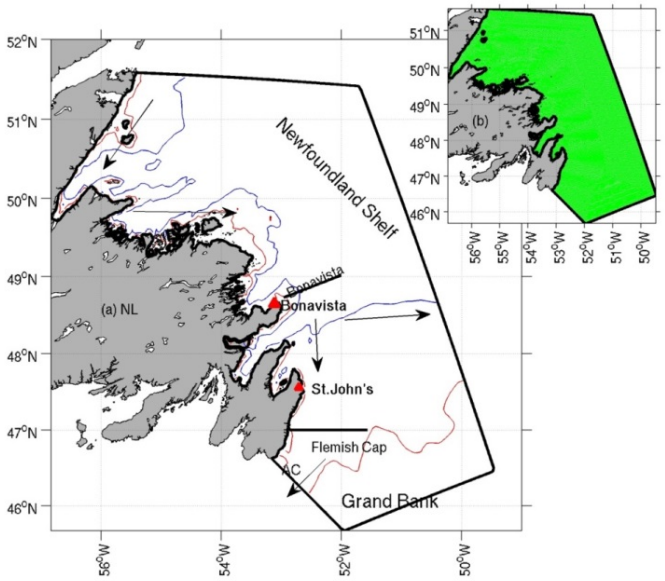
Hudson Strait
GREENLAND
Labrador Sea
Irminger Sea
LABRADOR
Northeast Newfoundland Shelf
Grand Banks of Newfoundland
Flemish Cap

Objective

- To reconstruct the inshore Labrador Current from simulated SWOT-like data.

Coastal Ocean Model

- Coastal waters of Newfoundland, Canada
- A Finite-Volume Community Ocean Model (FVCOM, Chen et al., 2003; 2011)
- Horizontal grid size of 2 km
- Model running period: May 1 to October 31, 2010.



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SWOT Simulator

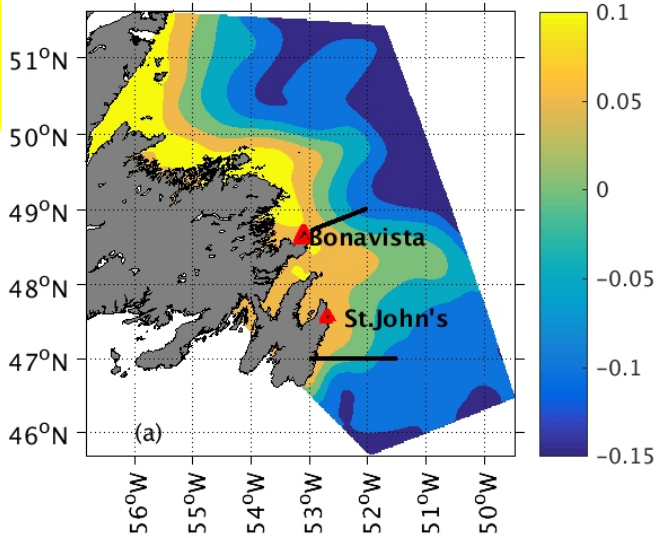
- SWOT ocean simulator (Gautier et al., 2016)
- Six main errors considered: KaRin noise, roll error, phase error, baseline dilation error, timing error and wet tropospheric correction error
- Simulation period: June 1 to October 31, 2010.

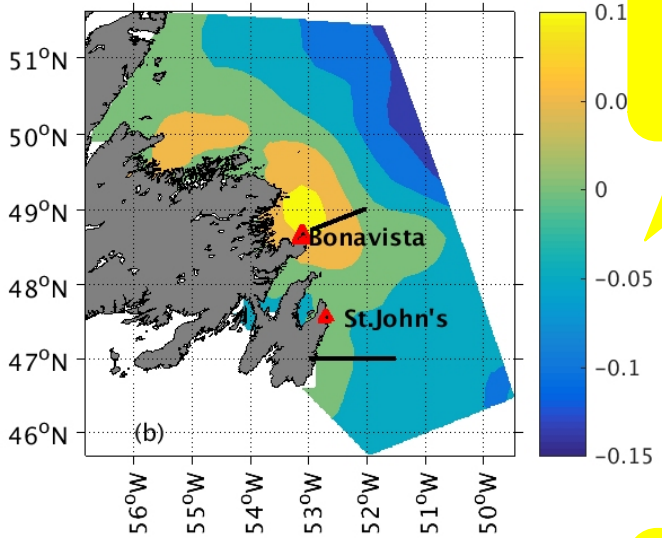
Optimal Interpolation

- Temporal de-correlation scale: 2 d
- Spatial de-correlation scale: 50 km

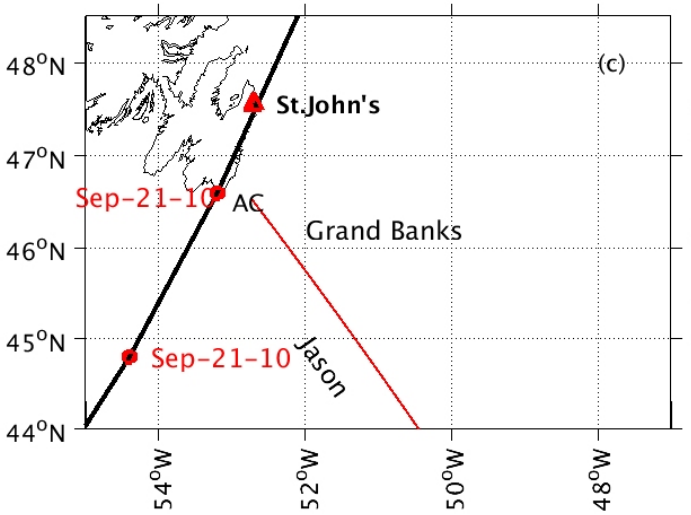
Model Results vs Nadir Altimetry

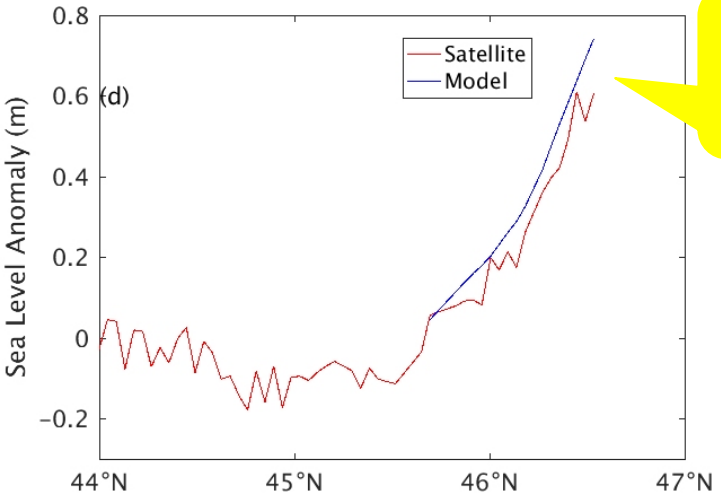
Model Mean





AVISO Gridded





Storm Surge

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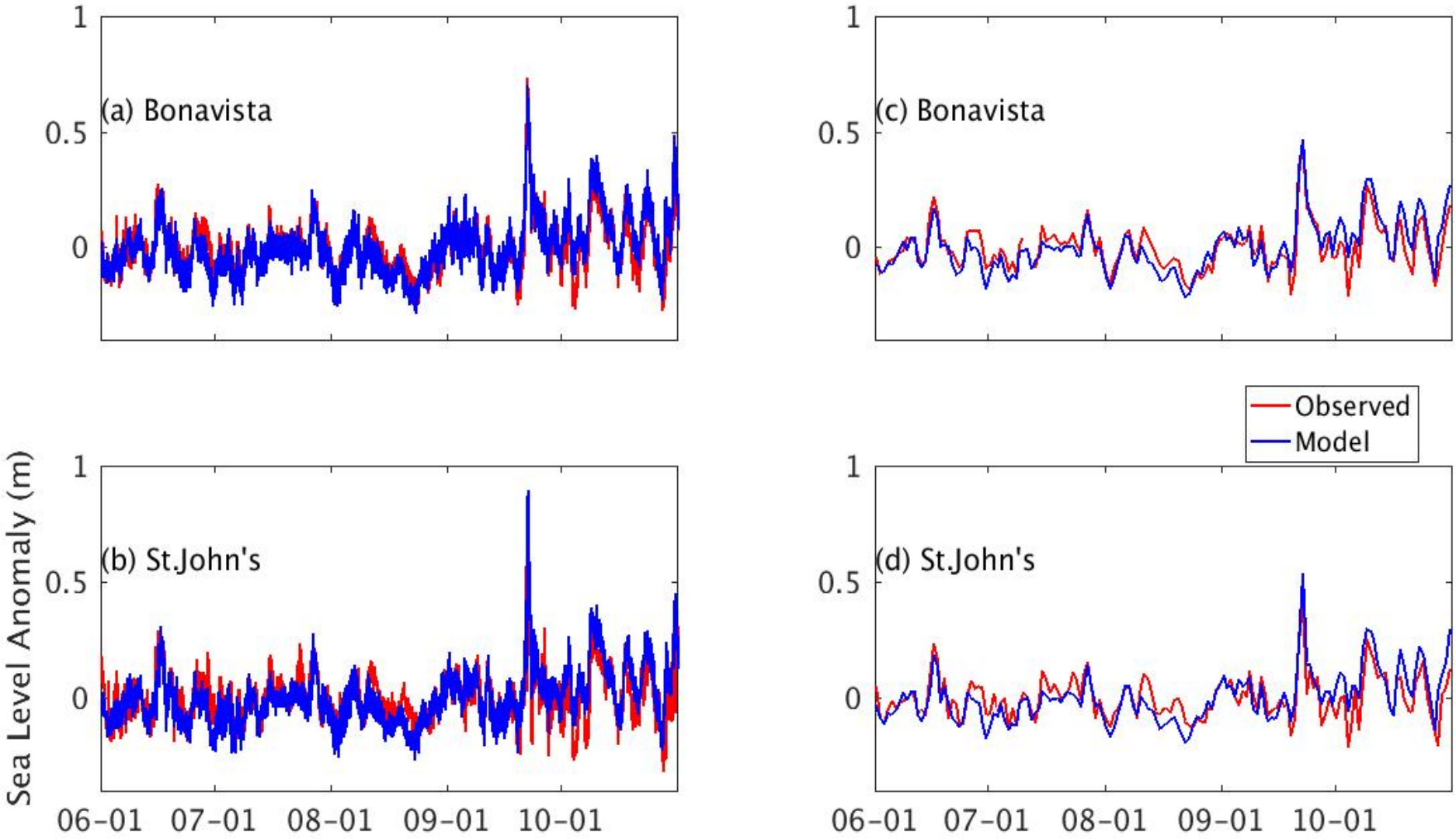
Model Results vs Tide-gauge Data



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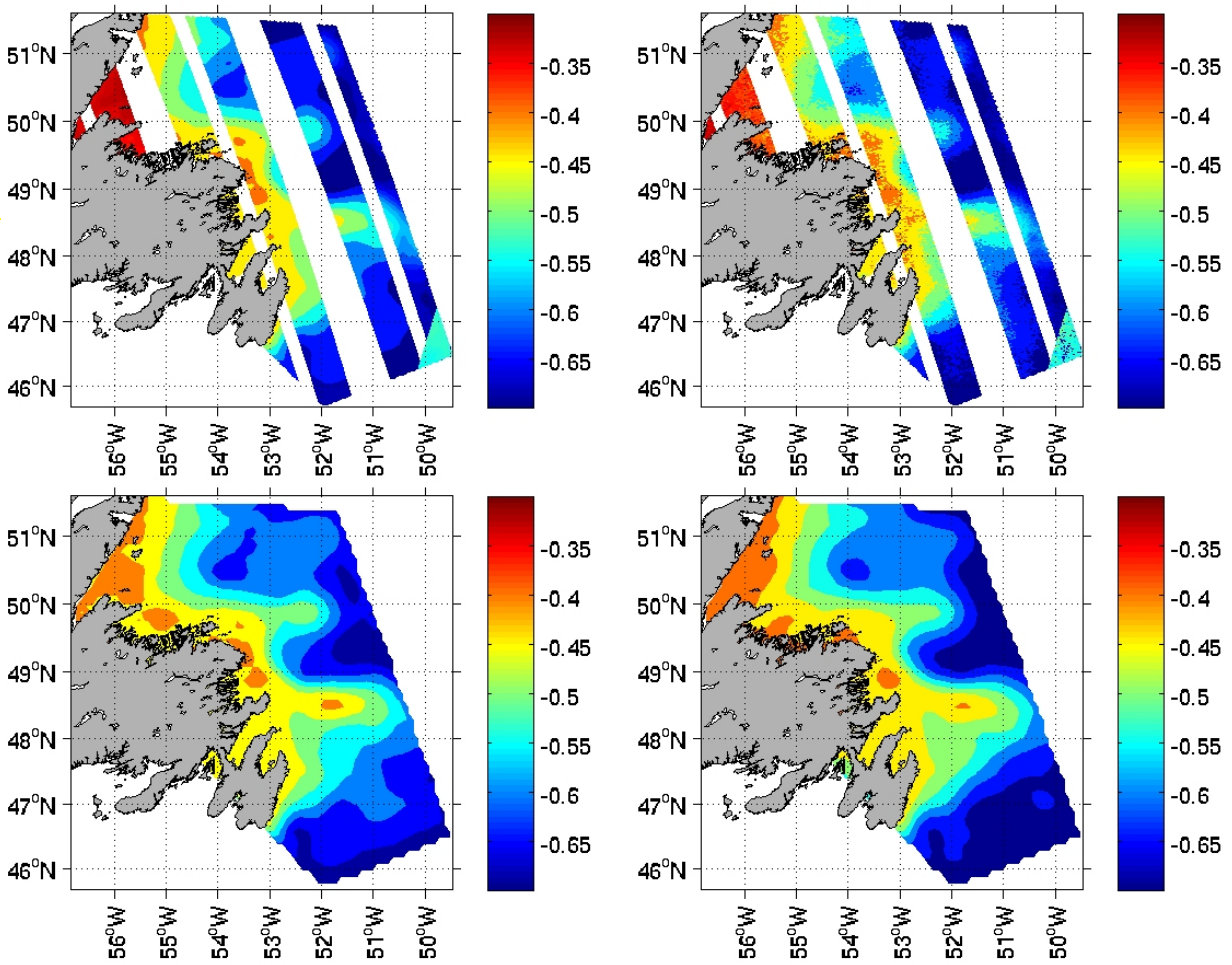
SSH (m) around and on Aug. 4, 2010

SWOT Sampled

SWOT-like



Truth

Mapped

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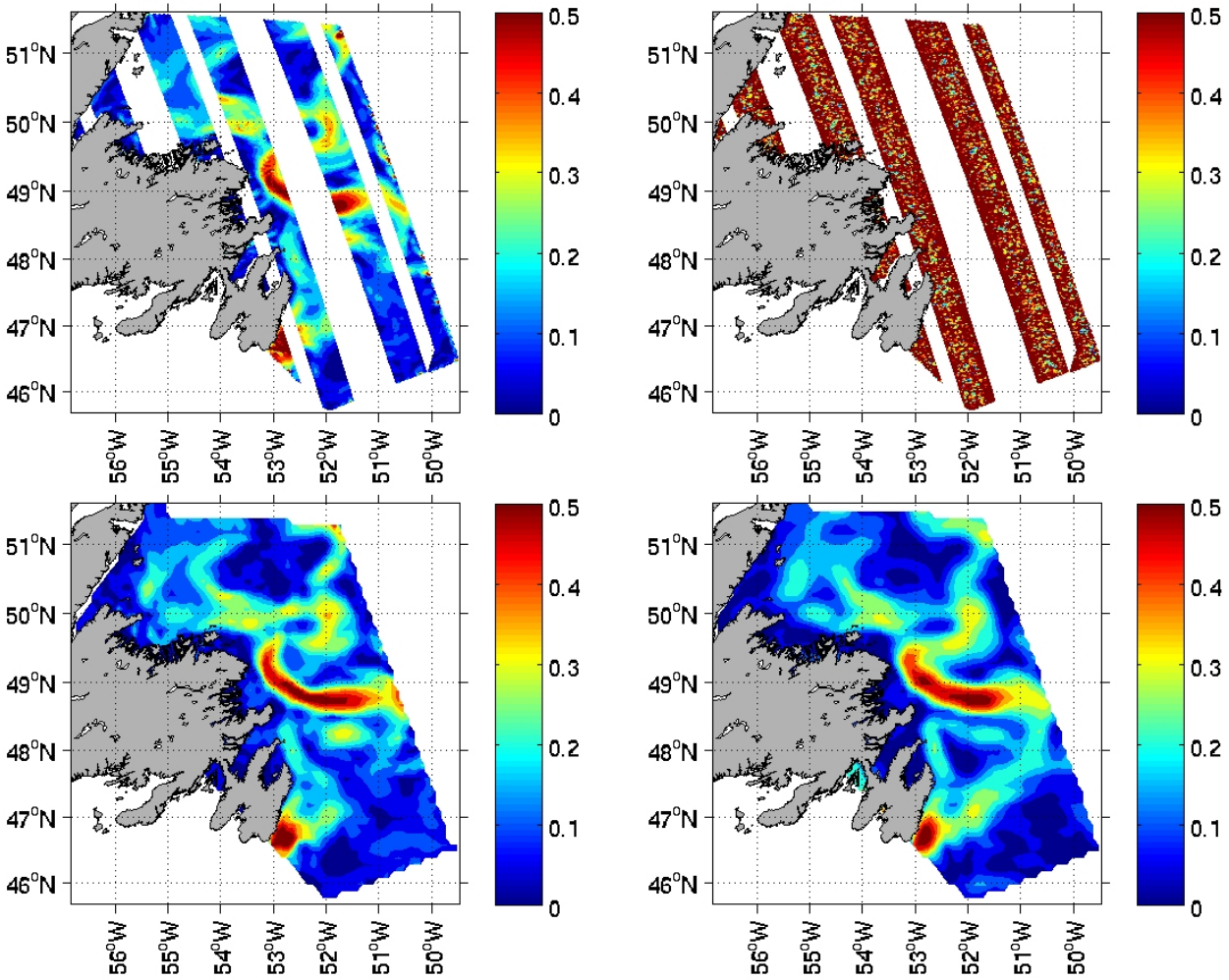
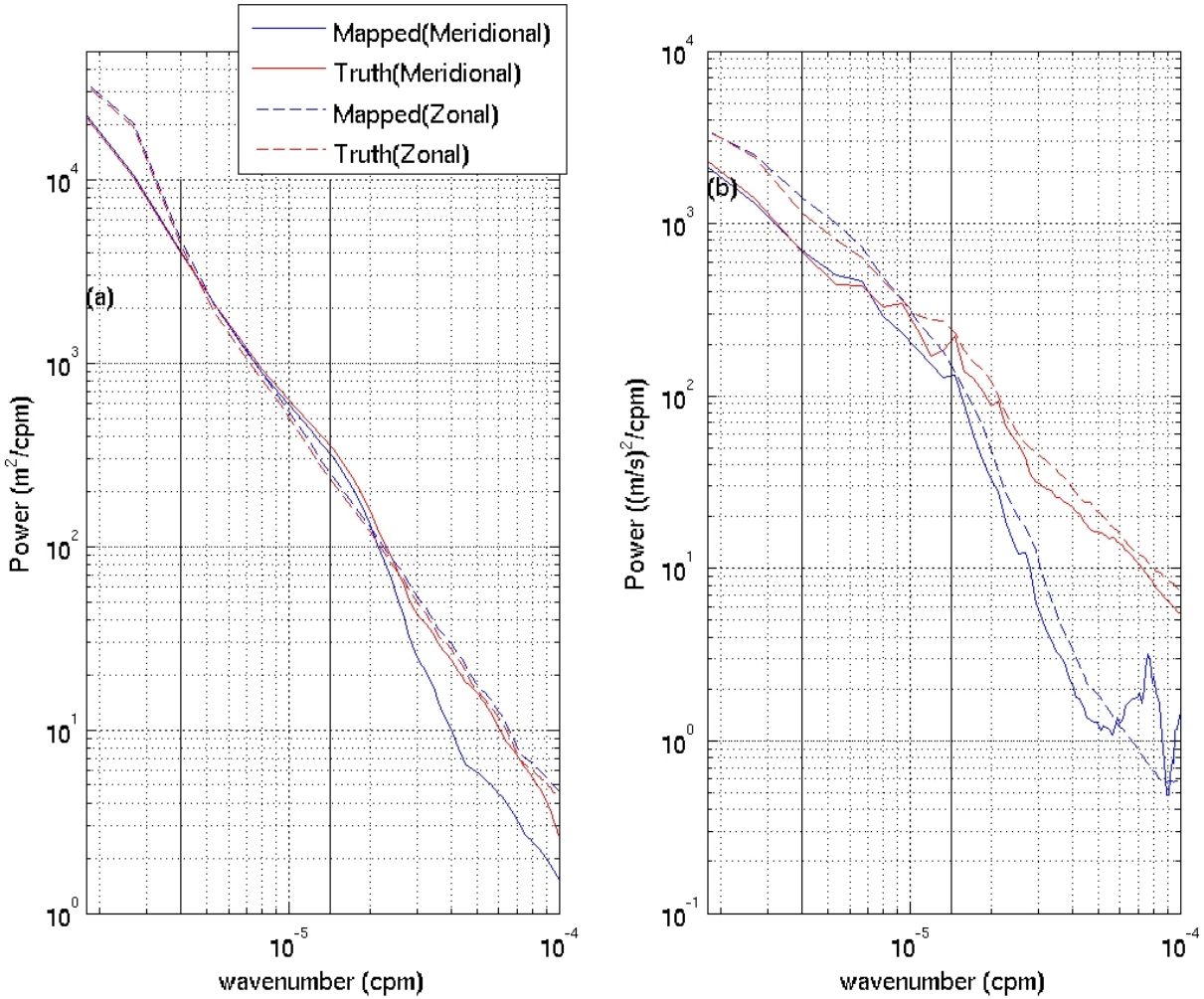
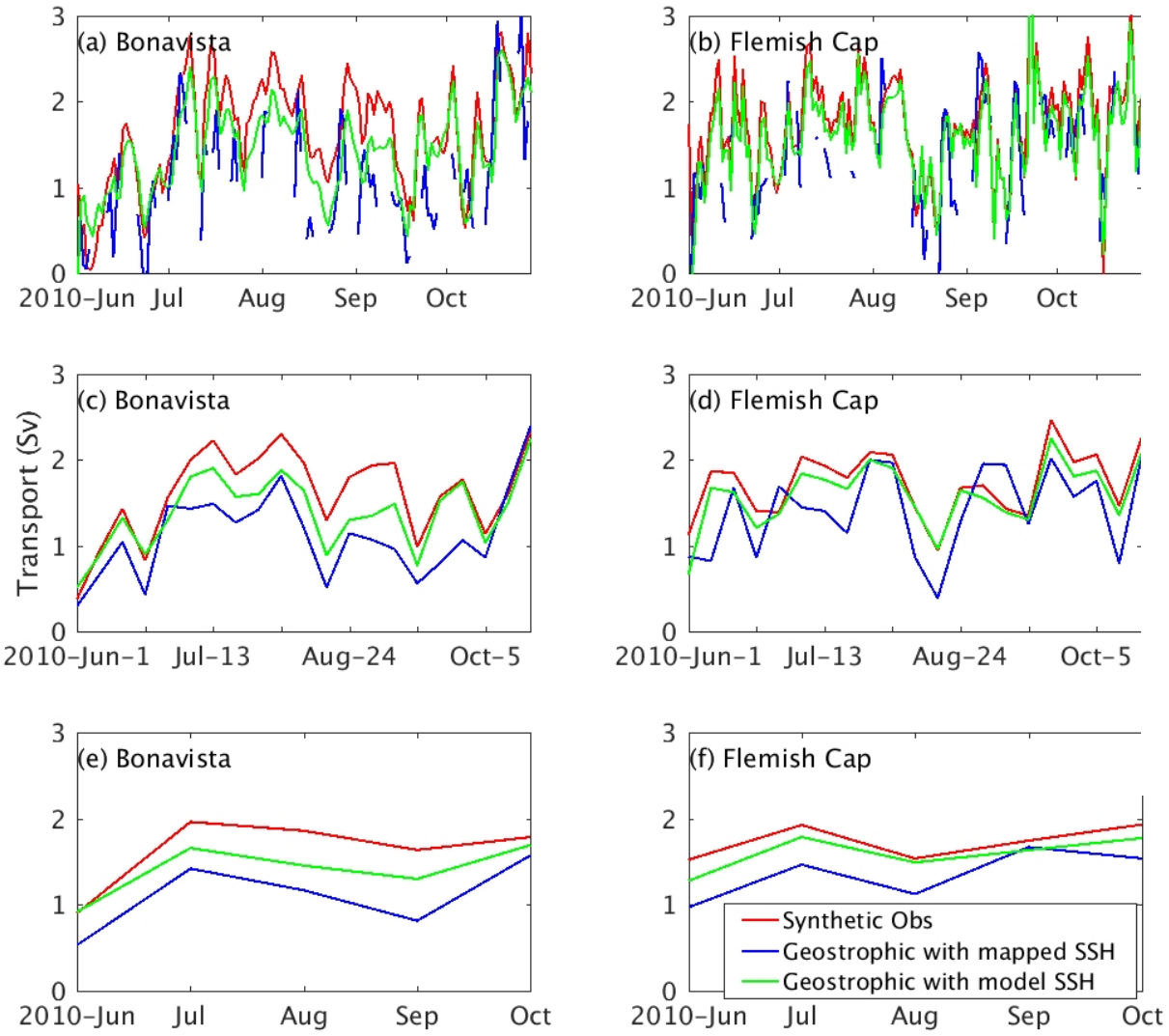
Surface Geostrophic Currents (m/s)

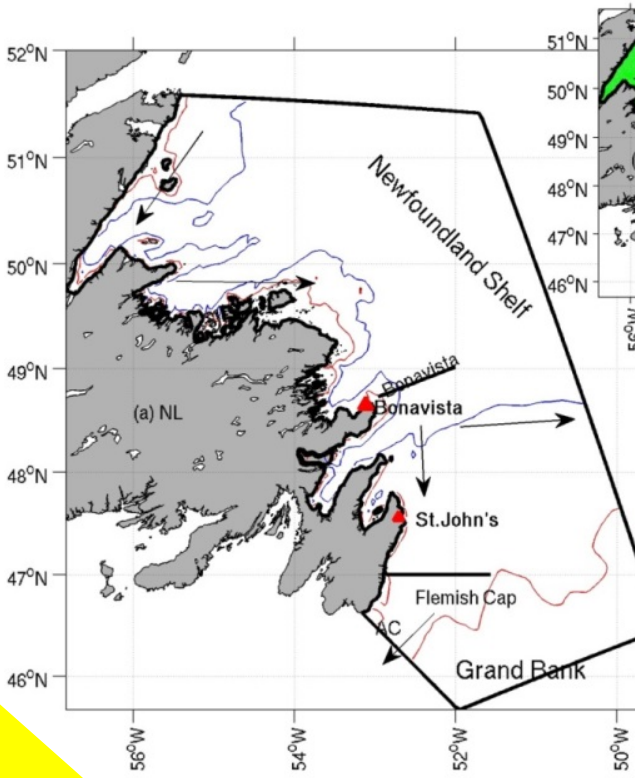


Power Spectrum: SSH and Current



Inshore Labrador Current





r > 0.7
RMS Ratio ~ 0.7

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Summary

- The inshore Labrador Current can approximately be captured through the temporal and spatial mapping of SWOT-like data on weekly and monthly scales.