

A wide-angle photograph of an Arctic landscape. In the foreground, there is a calm, dark blue body of water. In the middle ground, a long, low mountain range stretches across the horizon, its peaks and ridges covered in snow and partially shrouded in mist. The sky above is filled with heavy, grey clouds, creating a somber and atmospheric scene.

Small-scale ocean processes within channels in the Canadian Arctic Archipelago

Ken Hughes

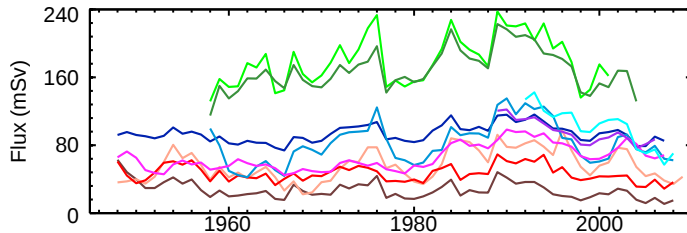
SEOS Student Workshop

November 9, 2016

Large-scale flow estimates disagree



Freshwater flux through the Archipelago from 10 models



Past observations indicate strong mixing

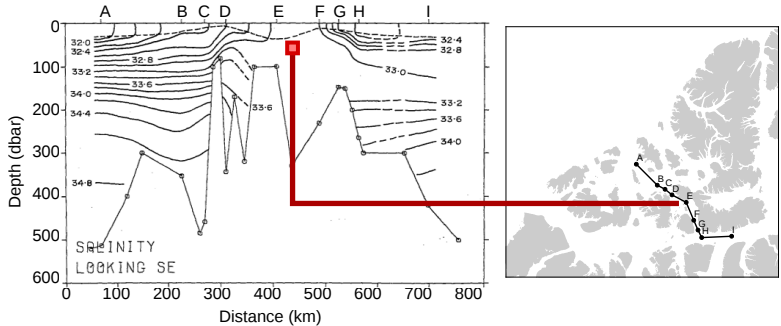
Rationale

Processes

Approaches

Existing model
Observations
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Conclusions



de Lange Boom et al. (1987)

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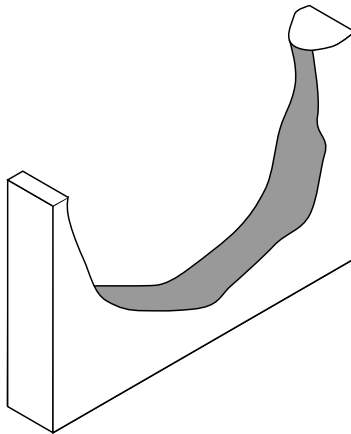
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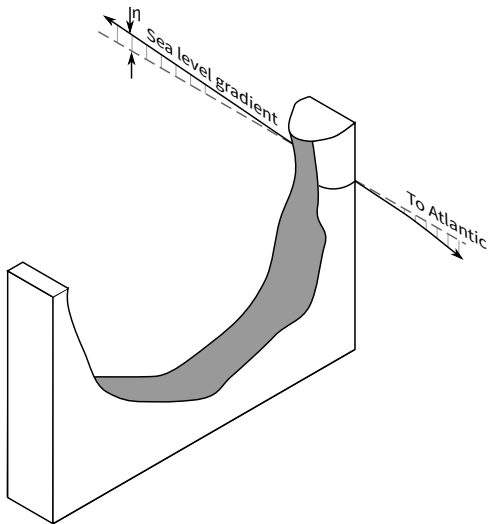
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Several processes control throughflow

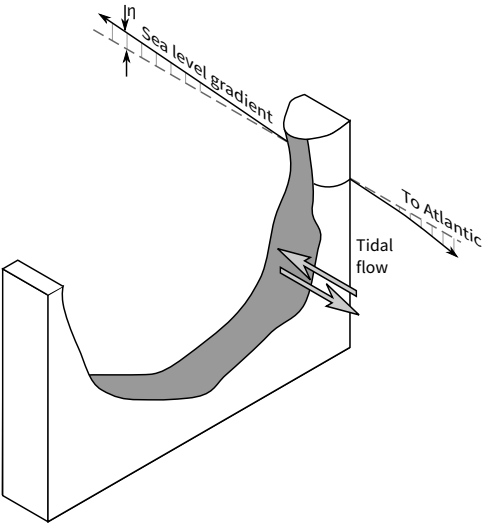
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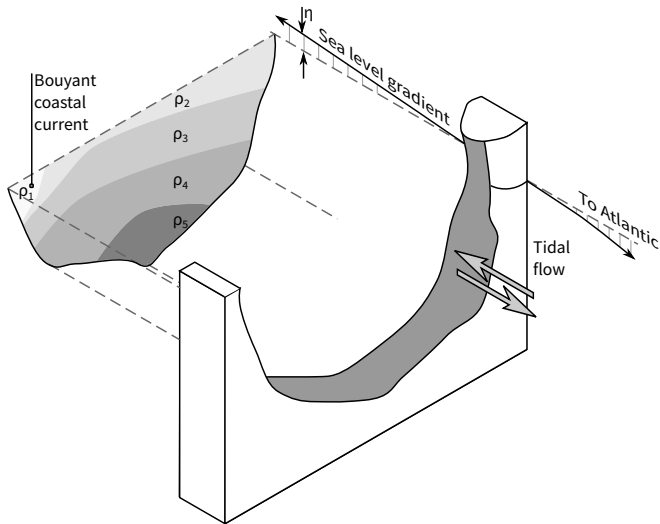
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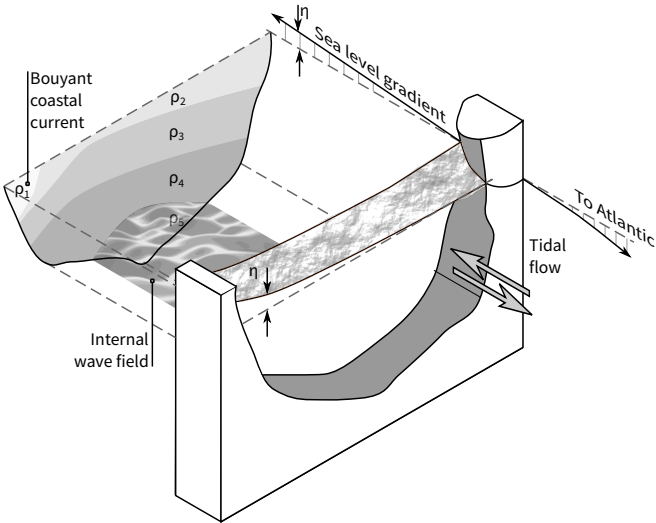
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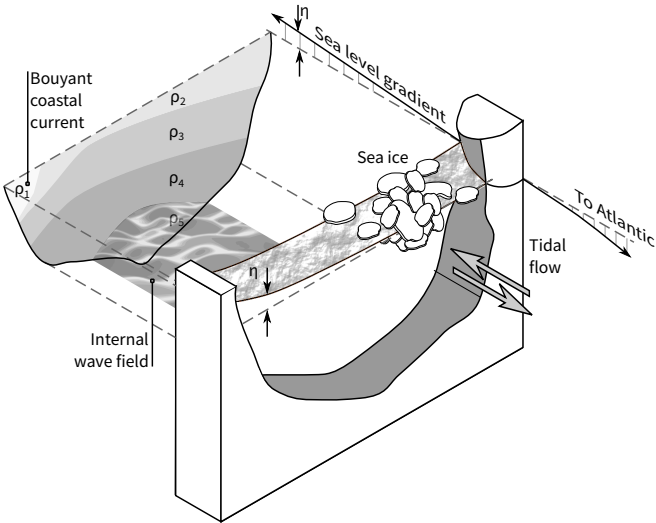
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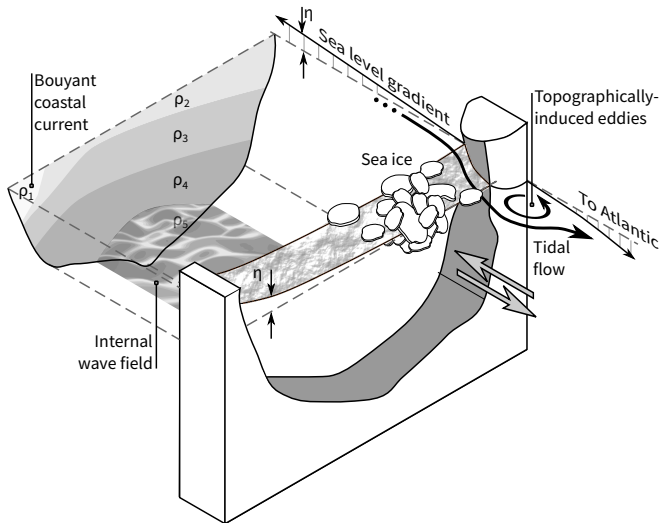
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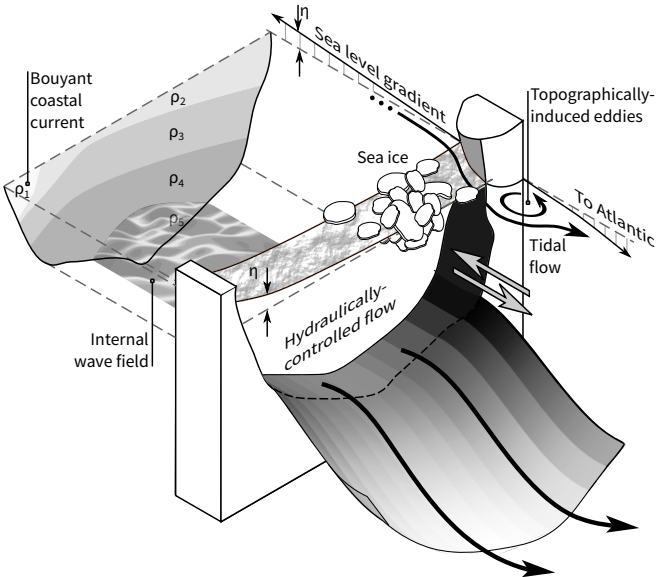
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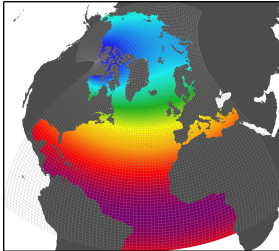
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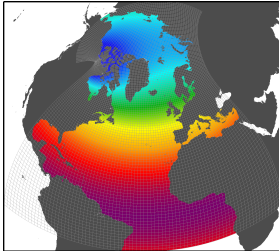
Examine an existing model



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Three approaches

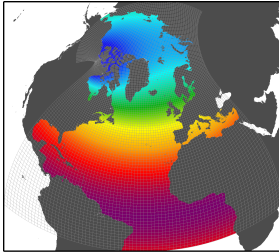
Examine an existing model



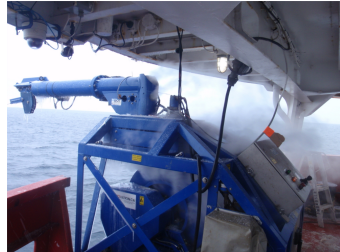
Take new observations



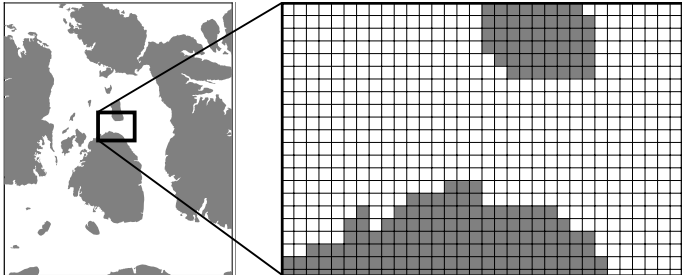
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Take new observations



Process-oriented modelling



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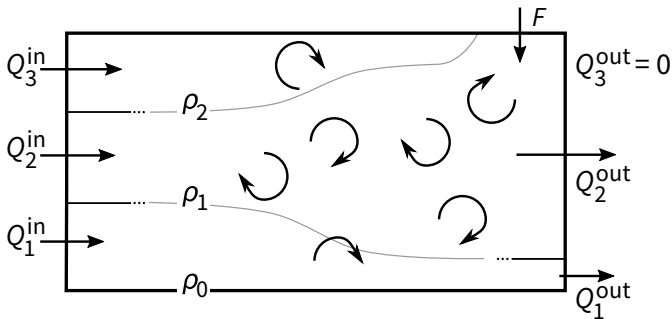
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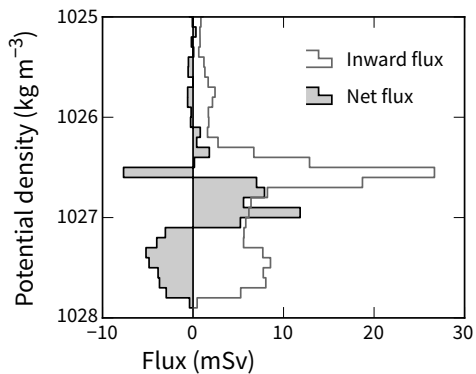
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Transport changes in Queens Channel



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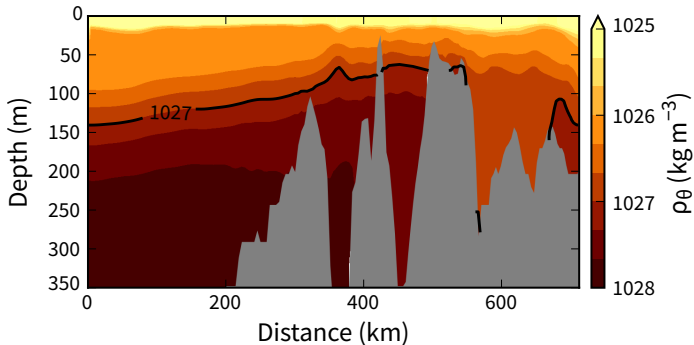
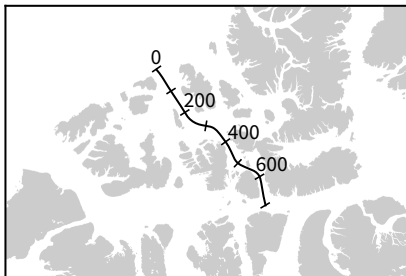
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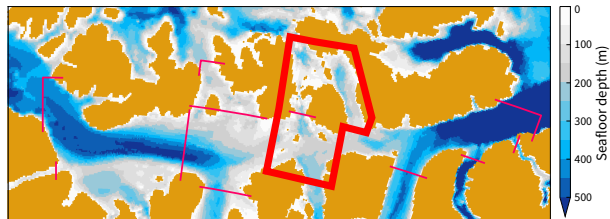
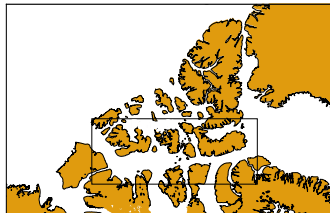
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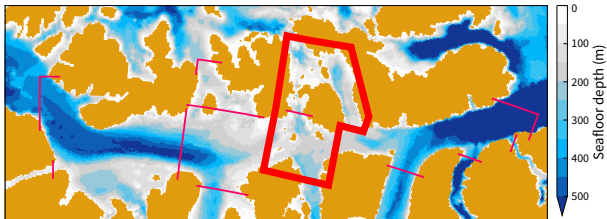
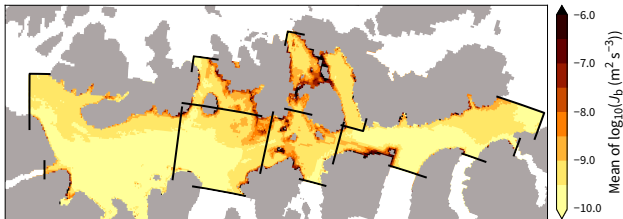
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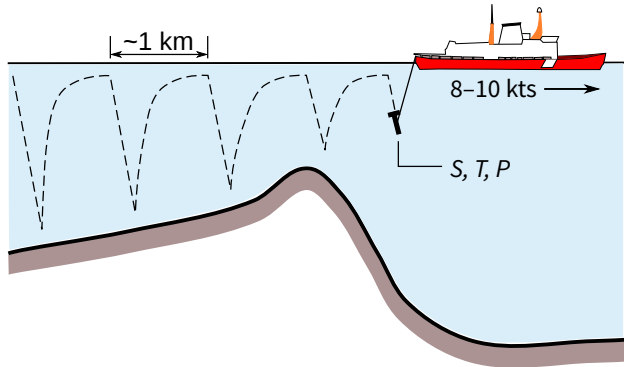
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An abrupt transition in properties

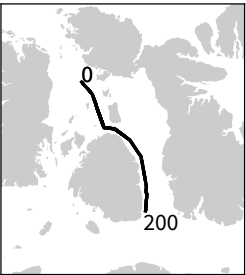
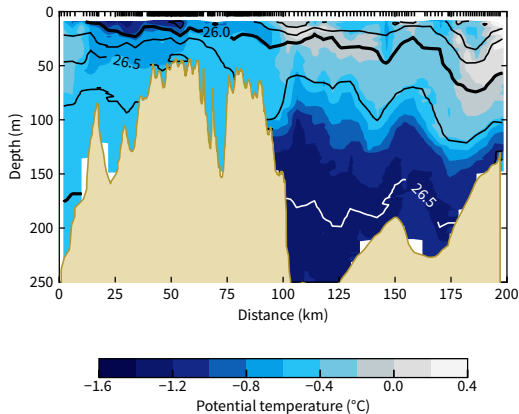
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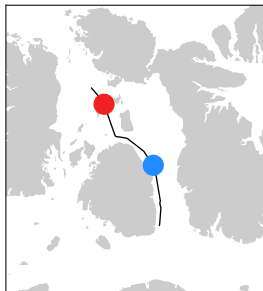
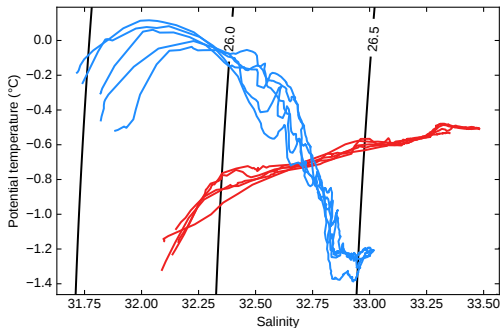
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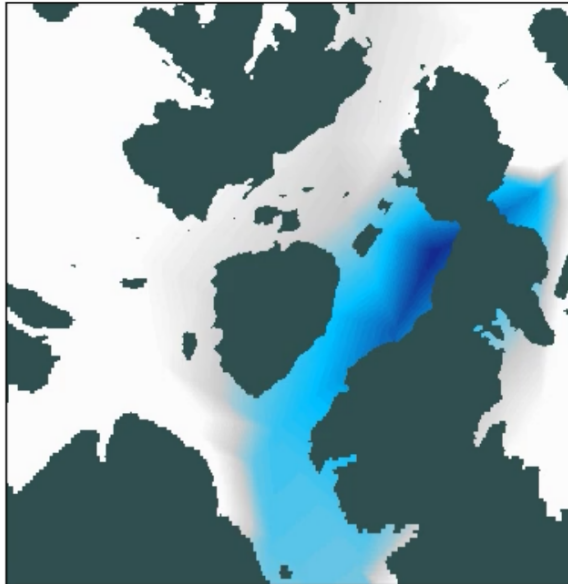
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Time = 0.0 days



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- Identify and quantify mixing with a large-scale model
- Observe Pacific–Atlantic Water transition
- Create a working model to complement observations

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**Ocean
processes in
channels**

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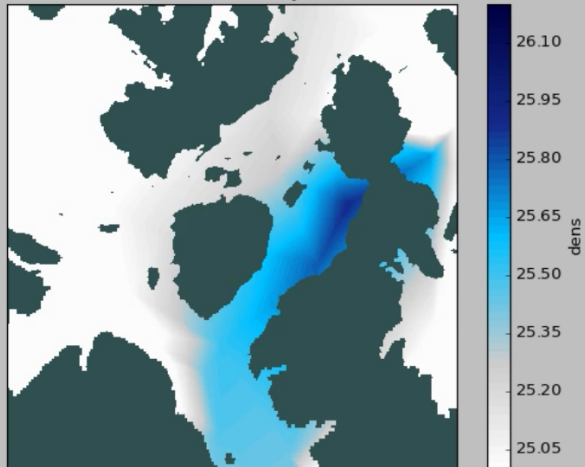
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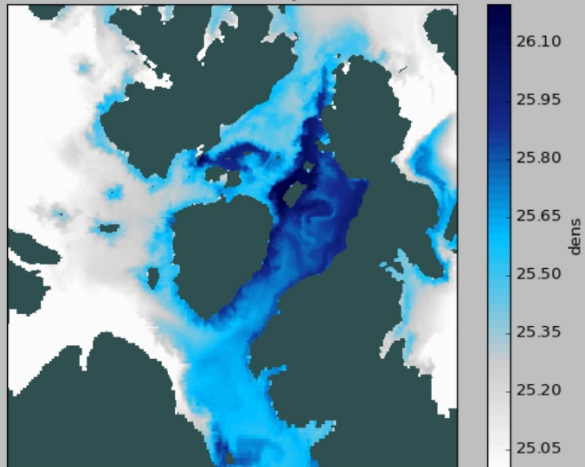
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Time = 5.0 days



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Time = 20.0 days

