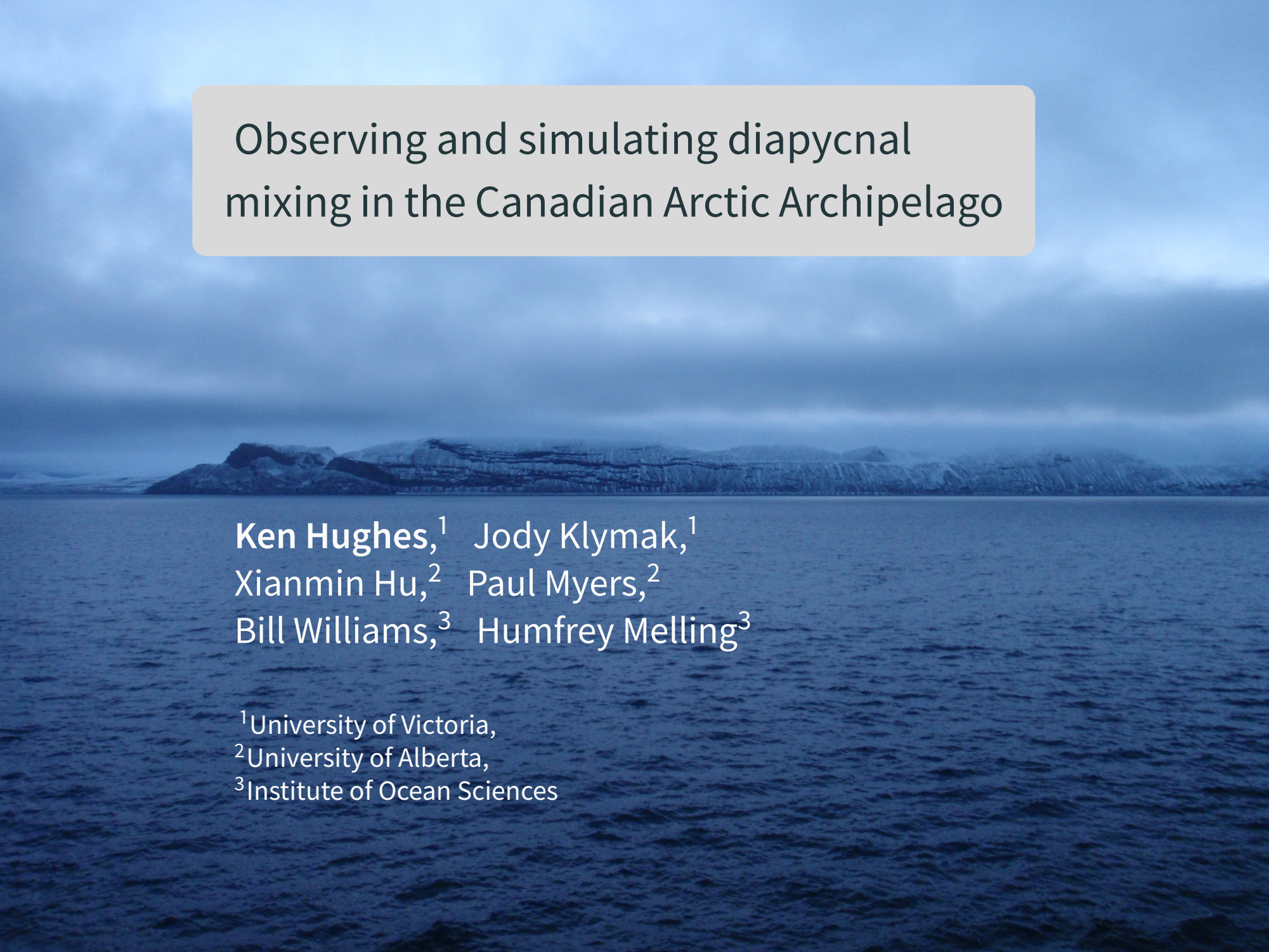
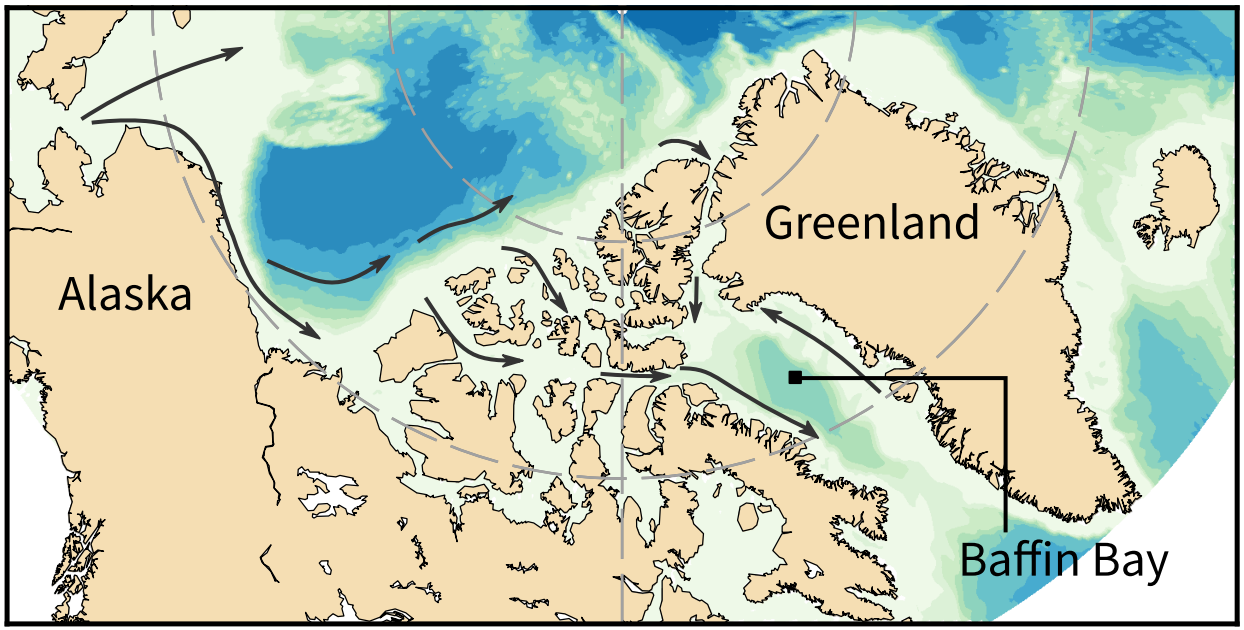


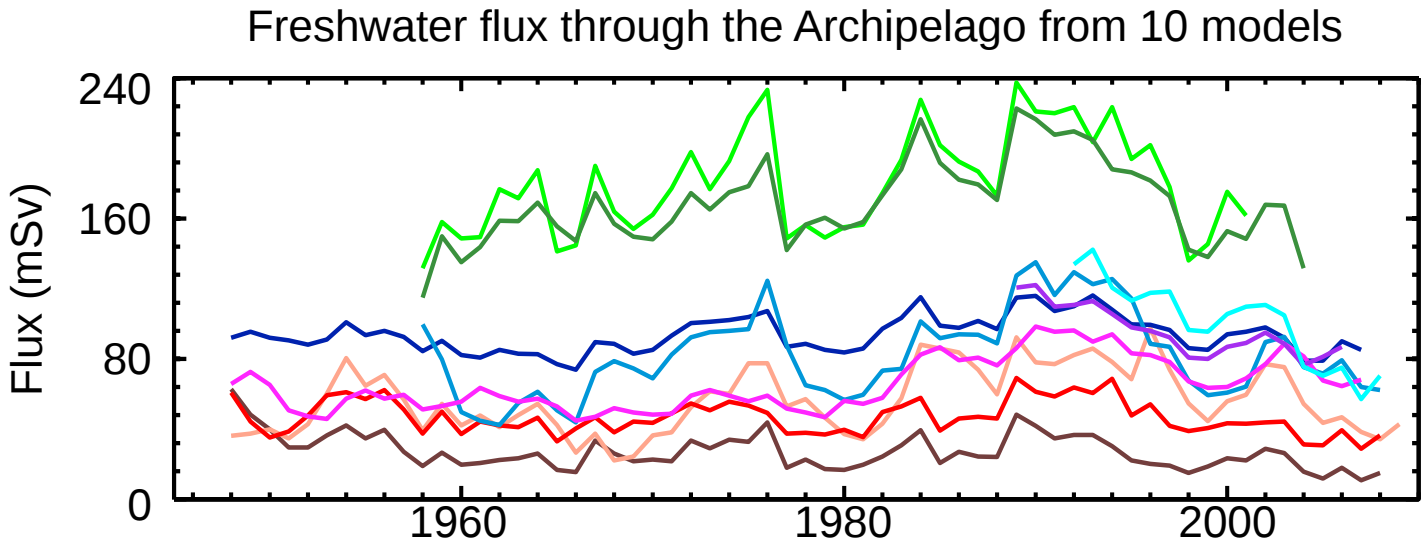
Observing and simulating diapycnal mixing in the Canadian Arctic Archipelago

Ken Hughes,[1] Jody Klymak,[1]
Xianmin Hu,[2] Paul Myers,[2]
Bill Williams,[3] Humfrey Melling[3]

[1]University of Victoria,
[2]University of Alberta,
[3]Institute of Ocean Sciences

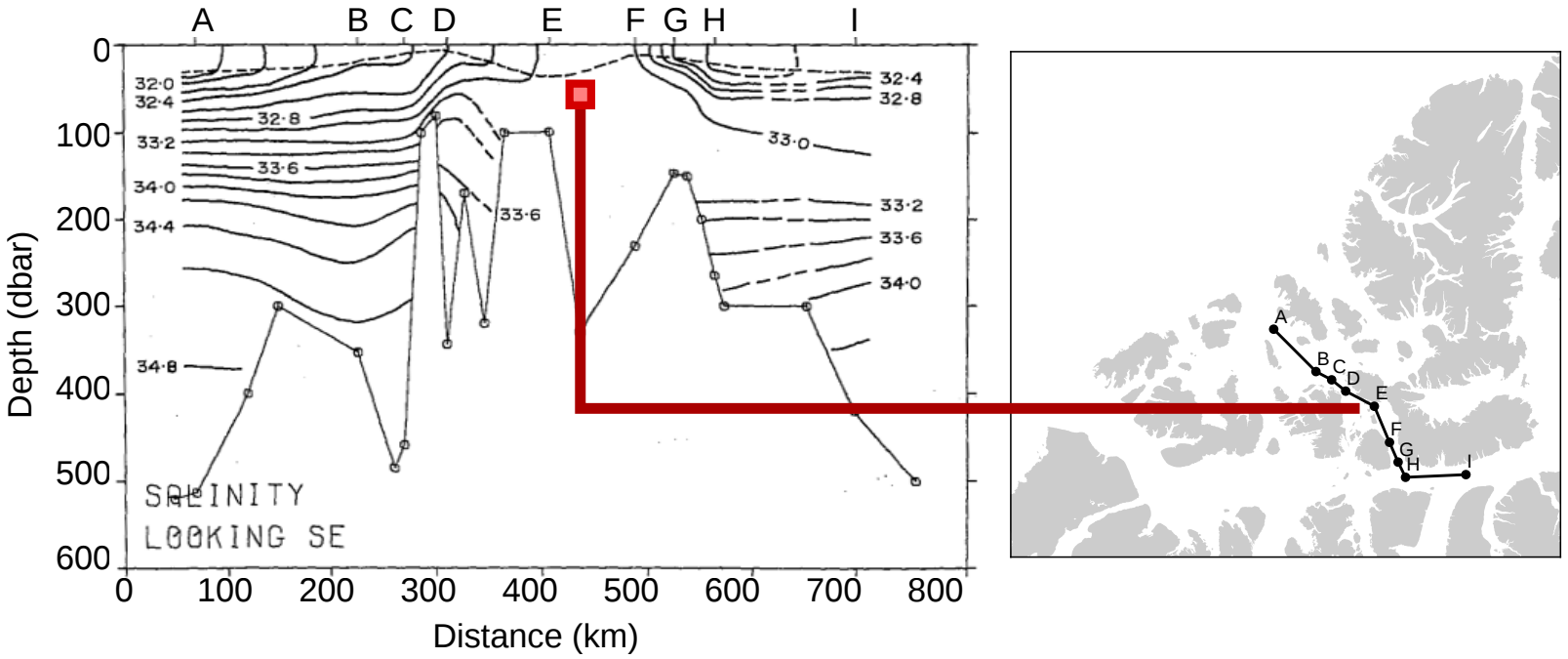
Large-scale flow estimates disagree





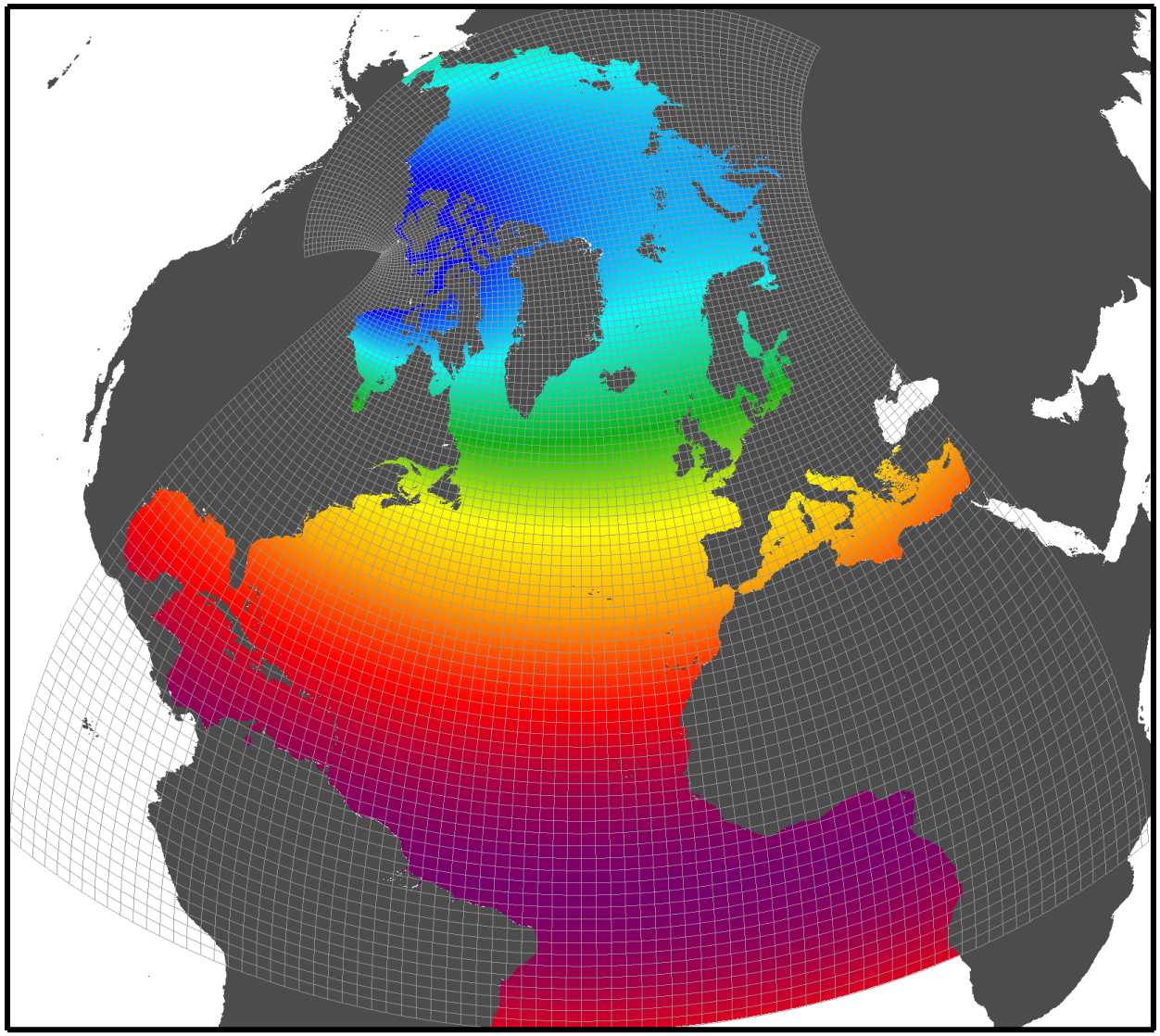
Jahn et al. (2012)

Past observations indicate strong mixing



de Lange Boom et al. (1987)

Estimating mixing from a model



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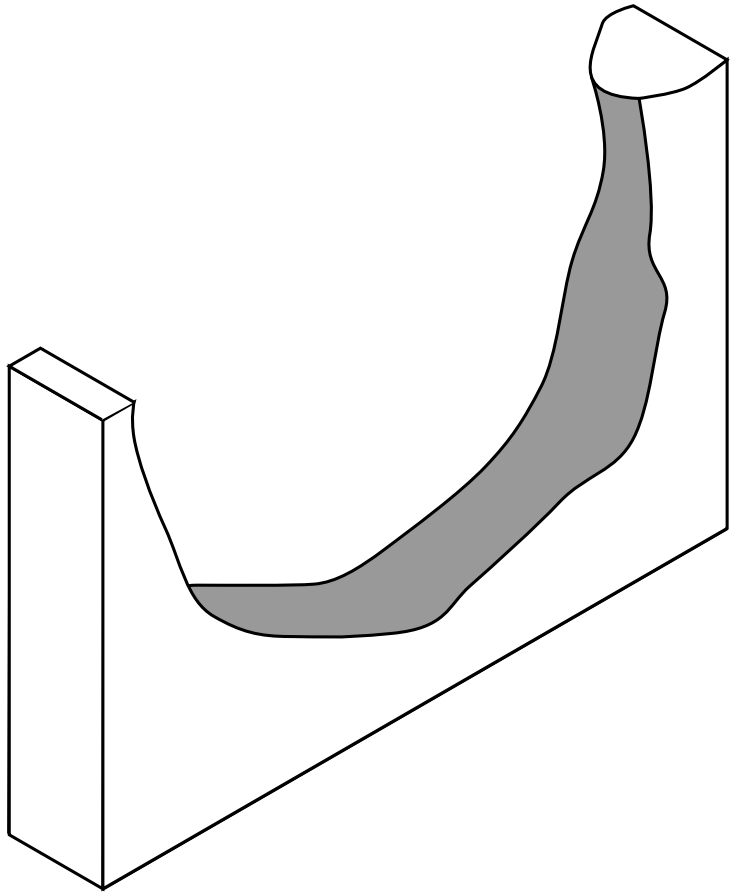
Several processes control throughflow



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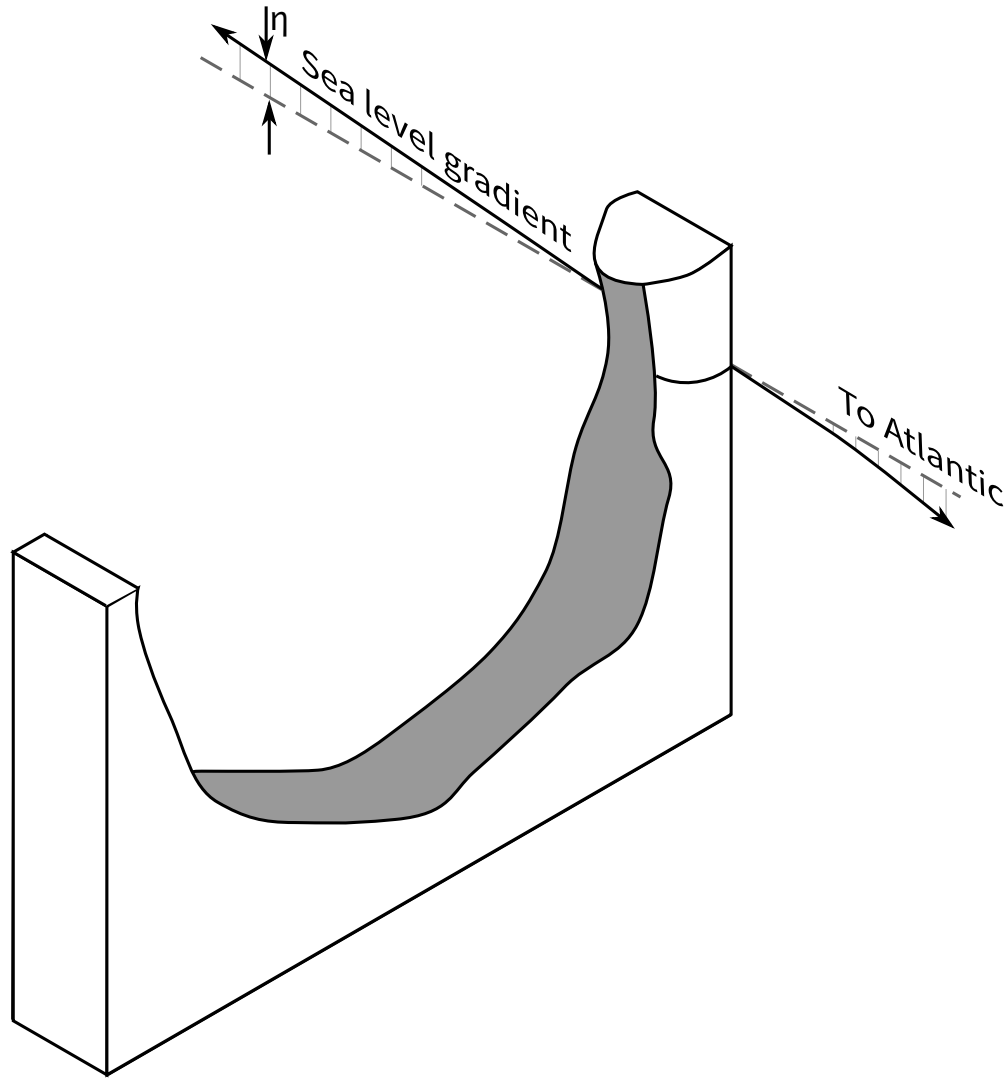

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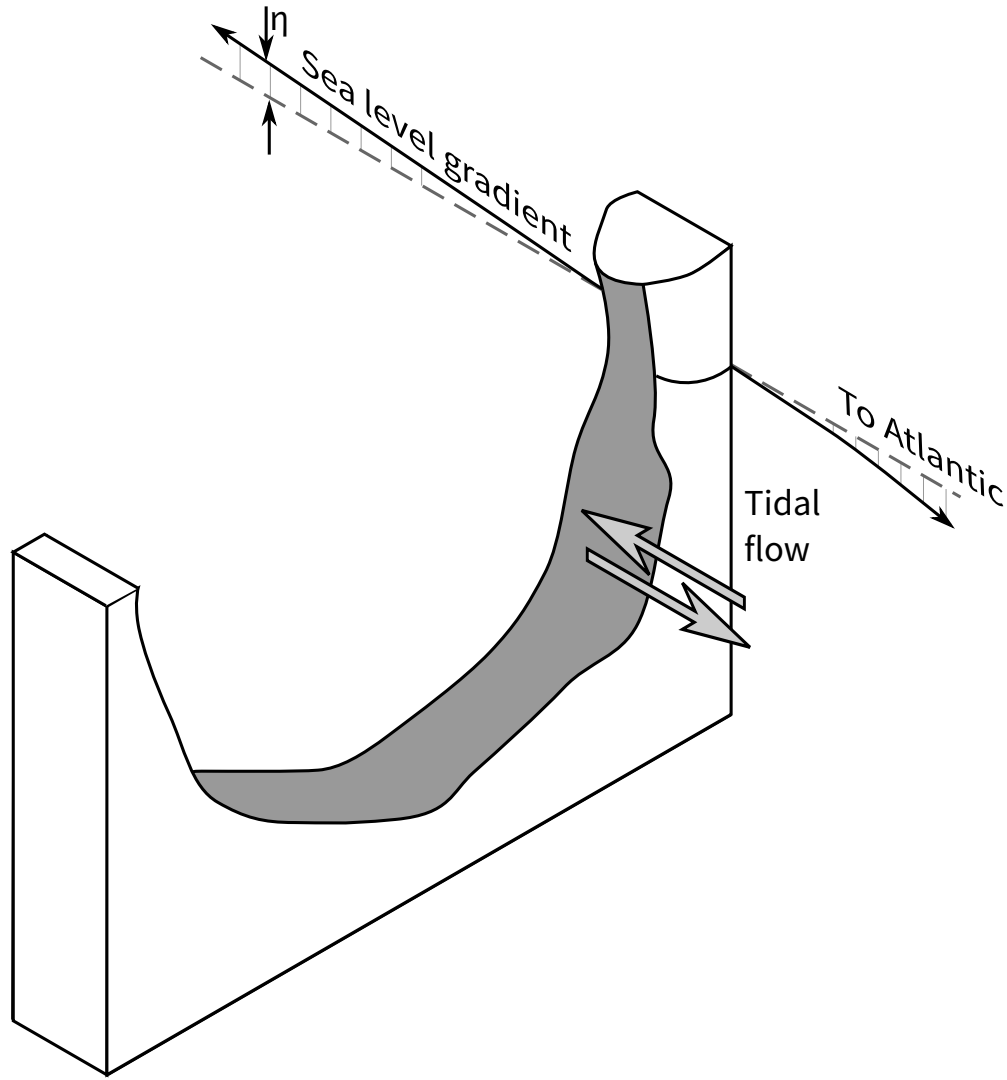

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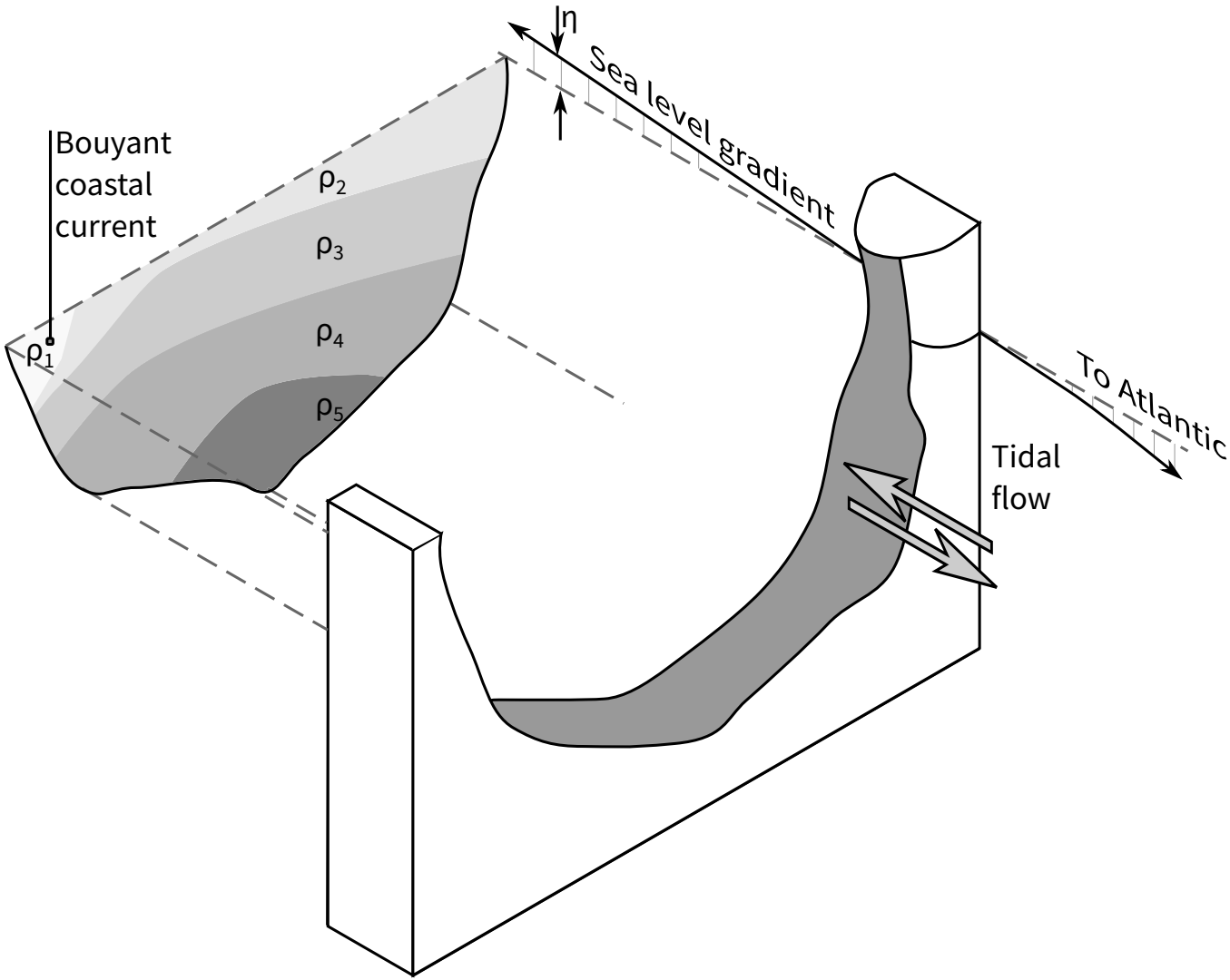

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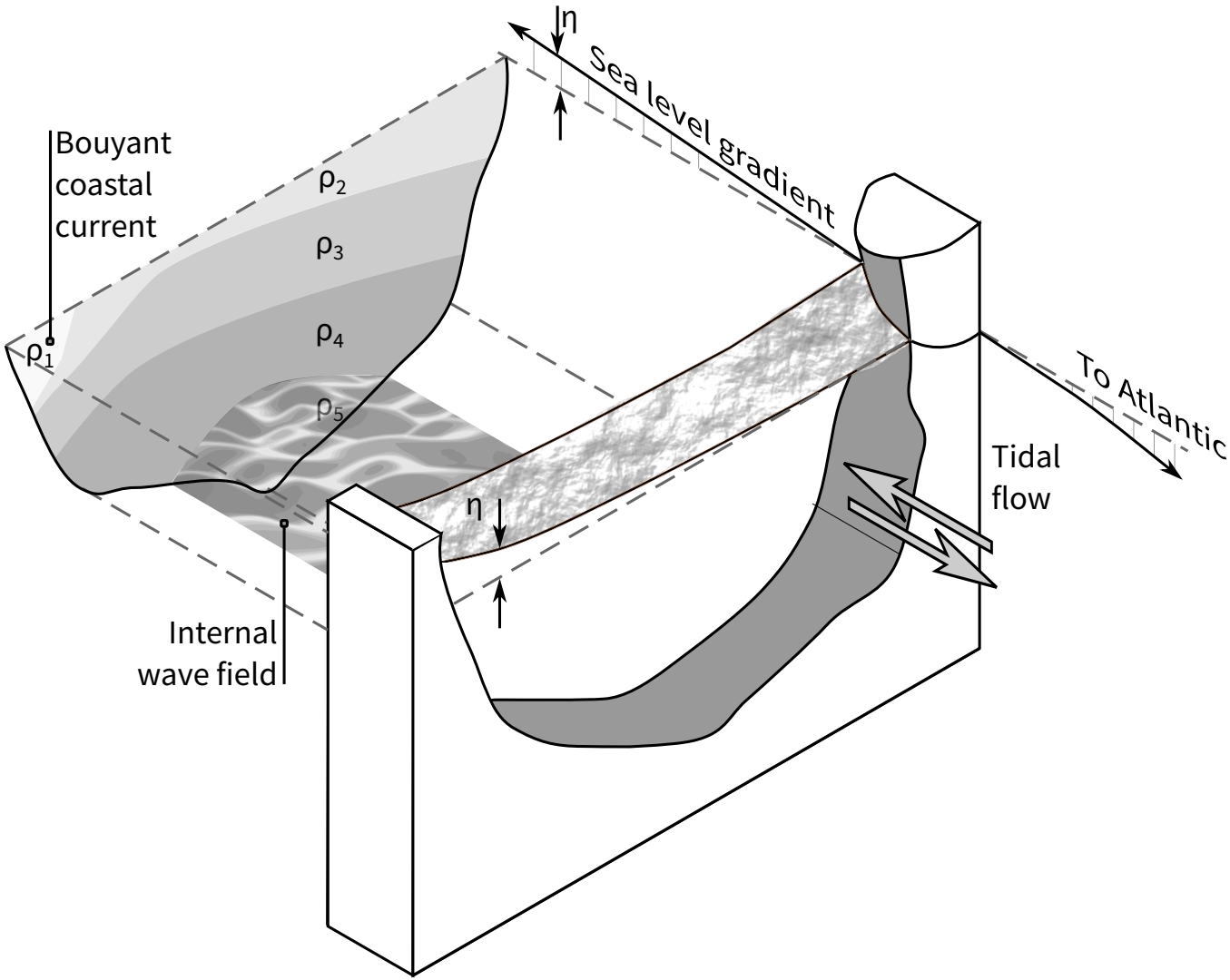

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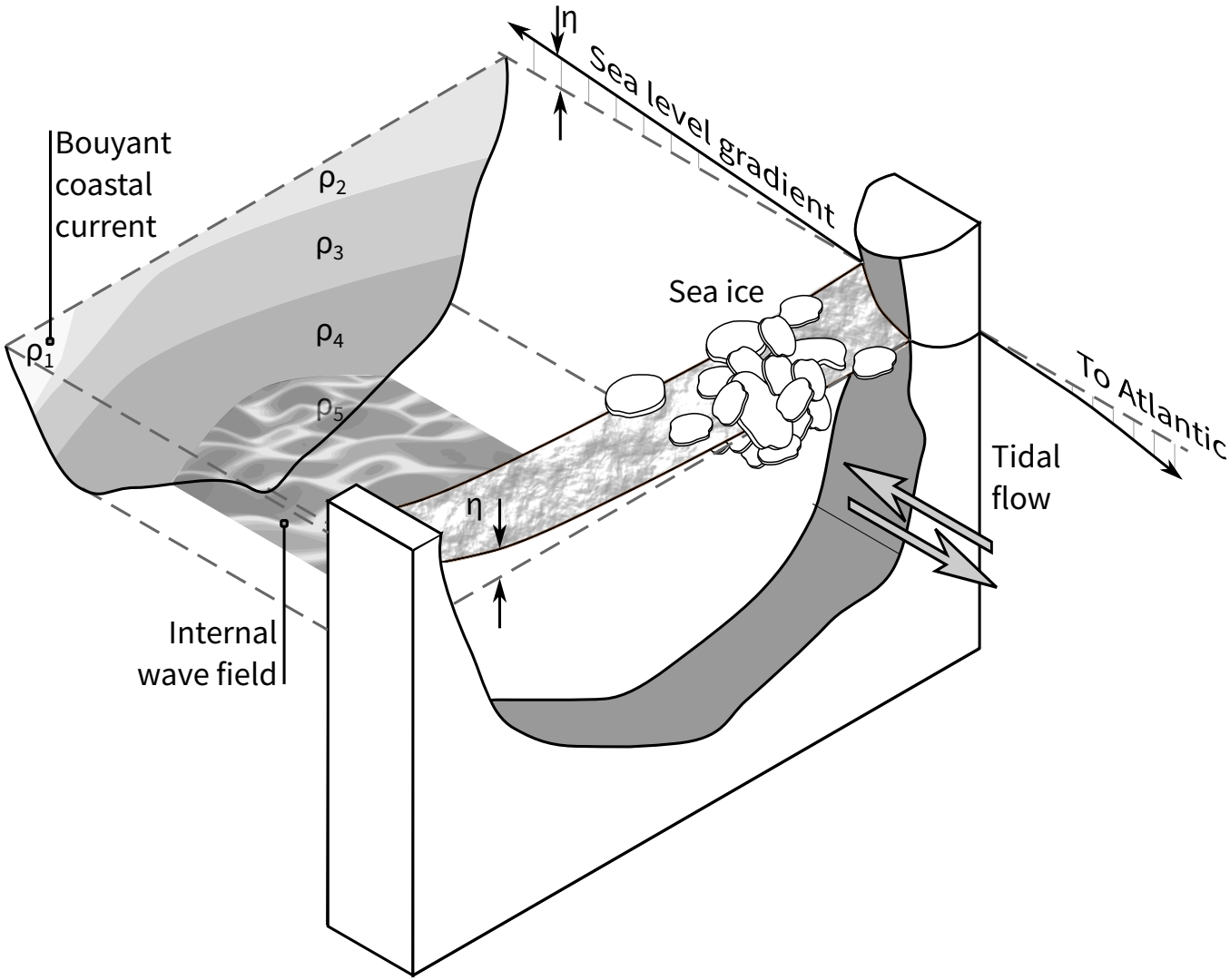

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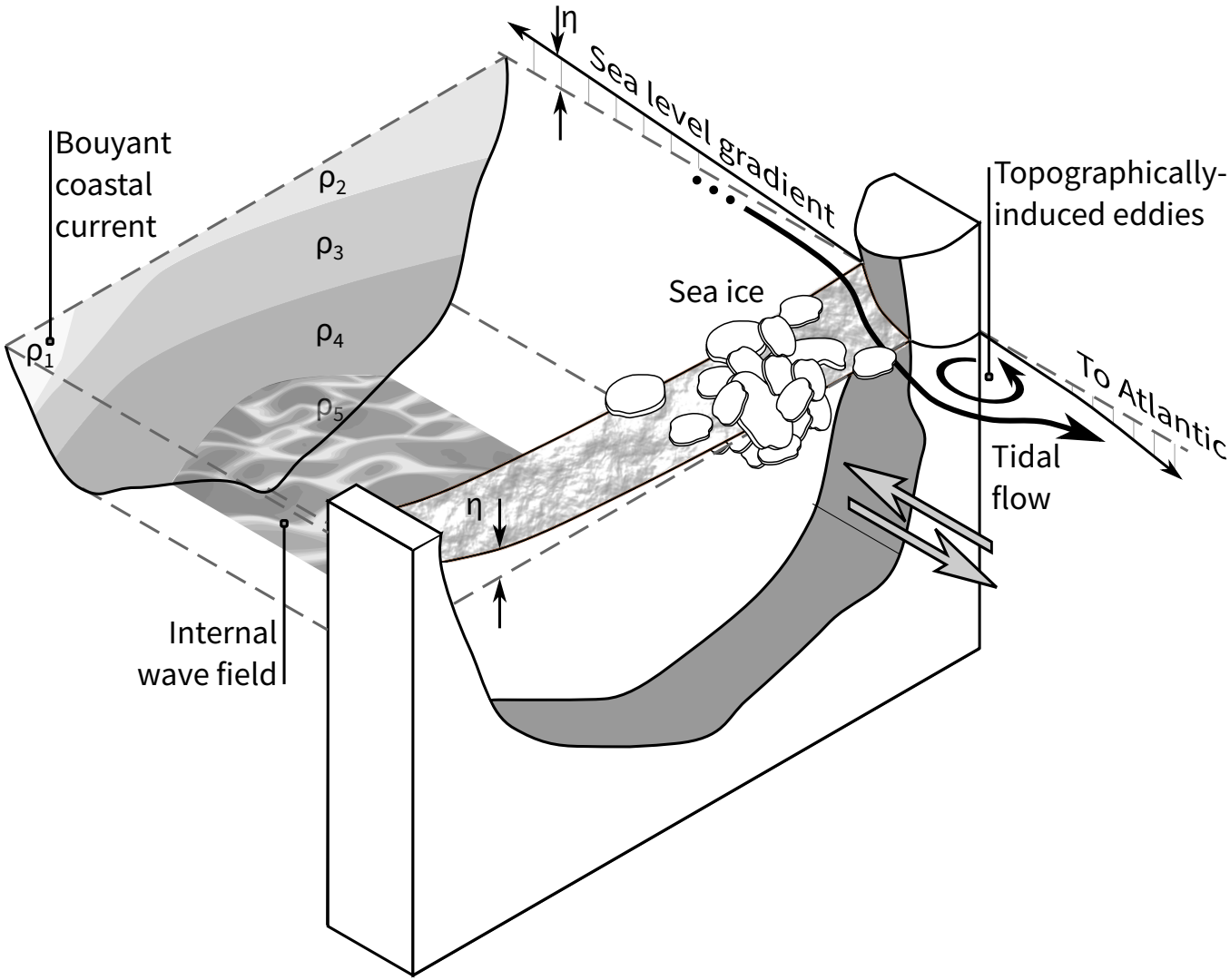

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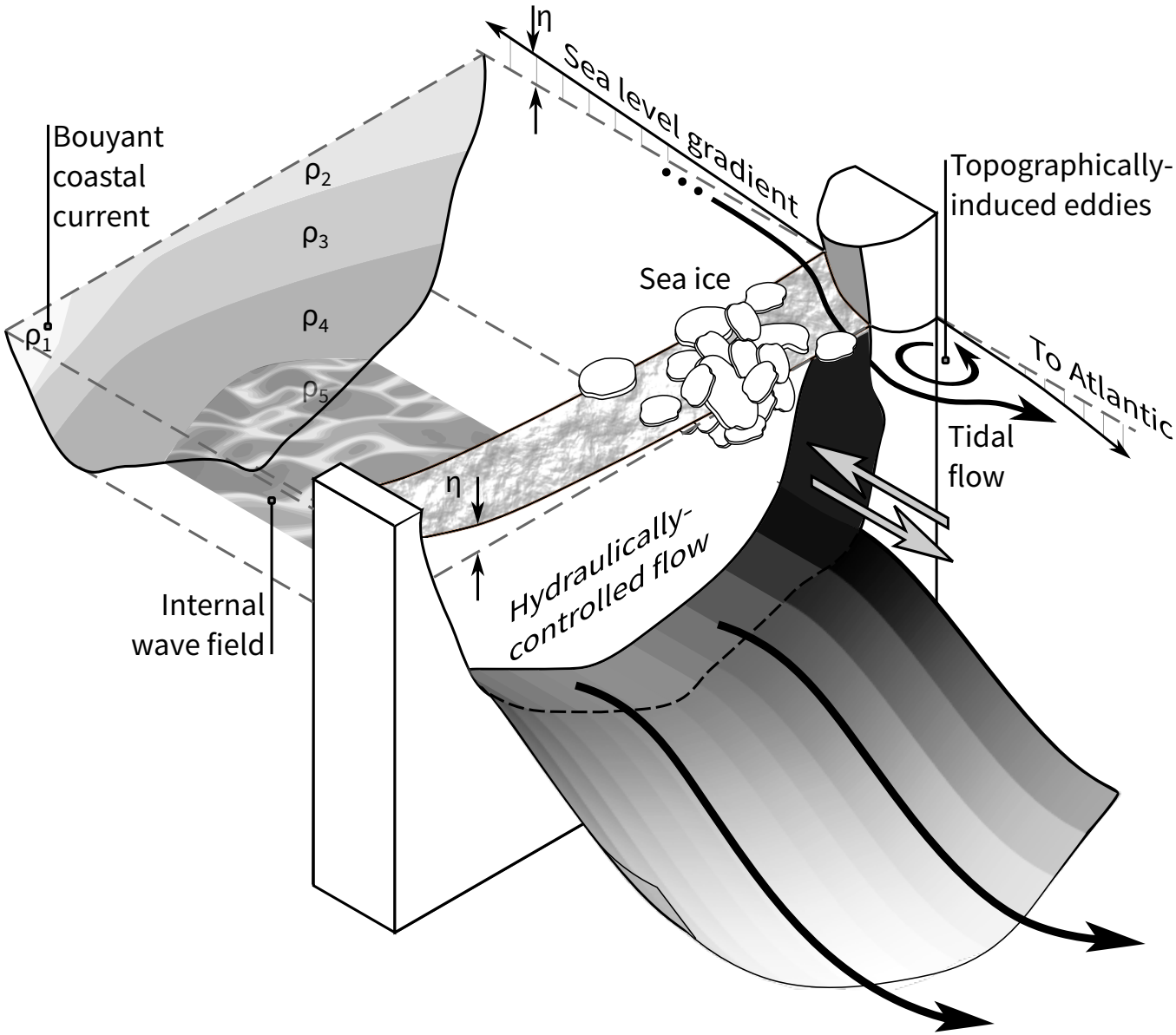
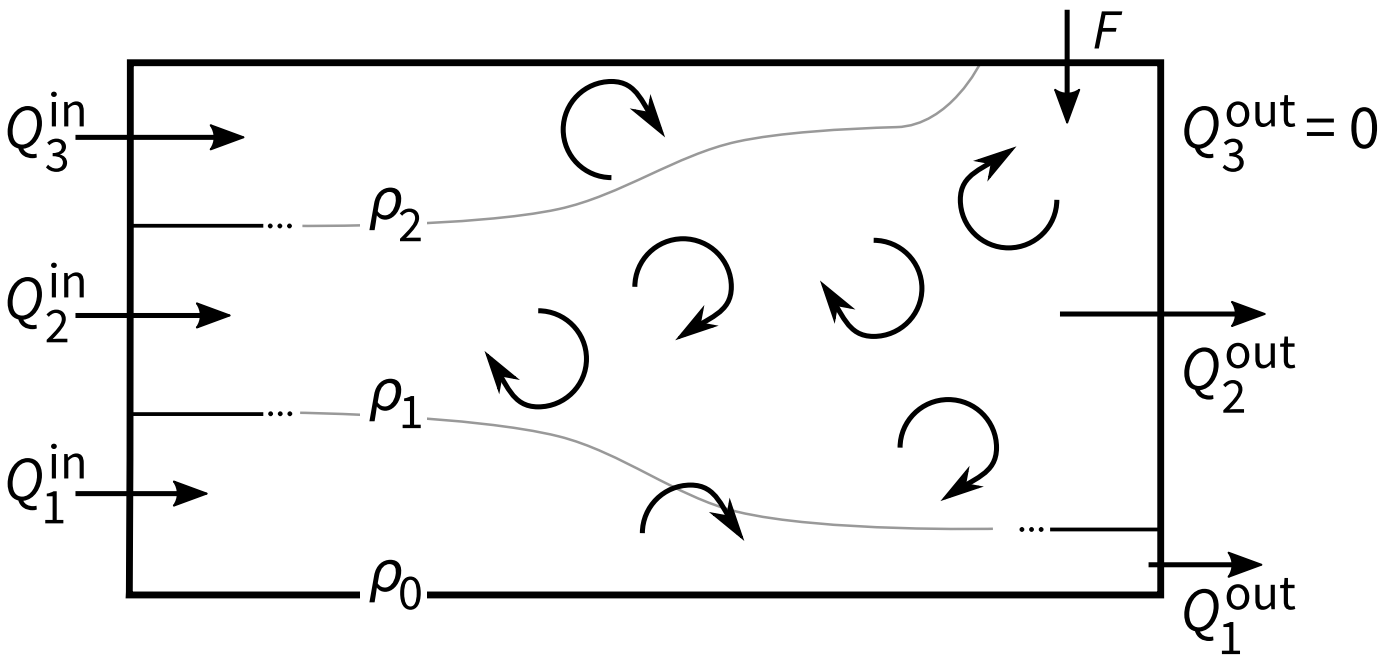


Estimating mixing: An inverse method



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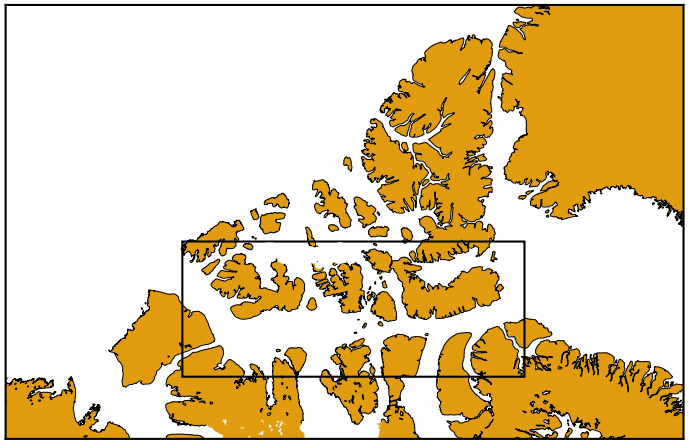

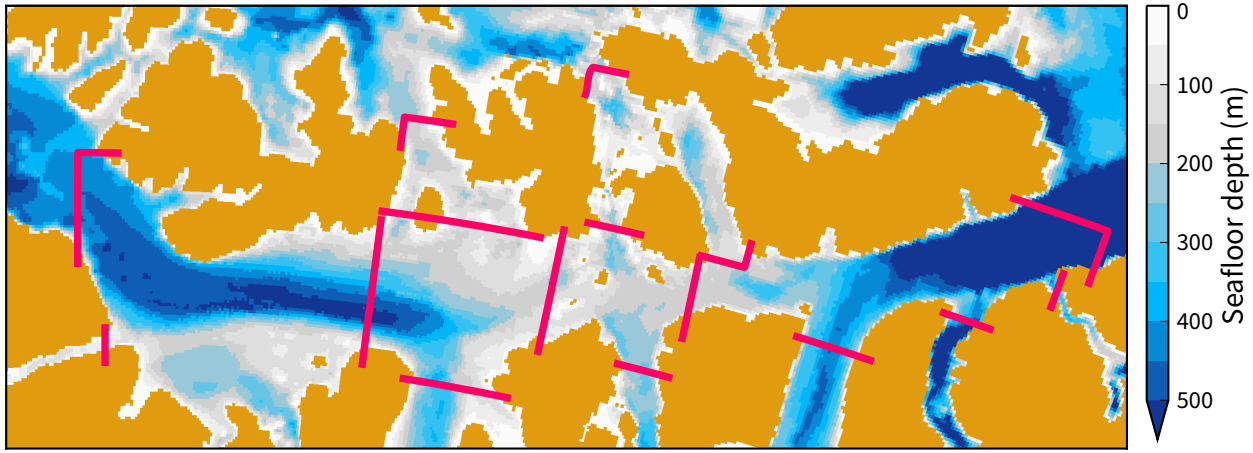

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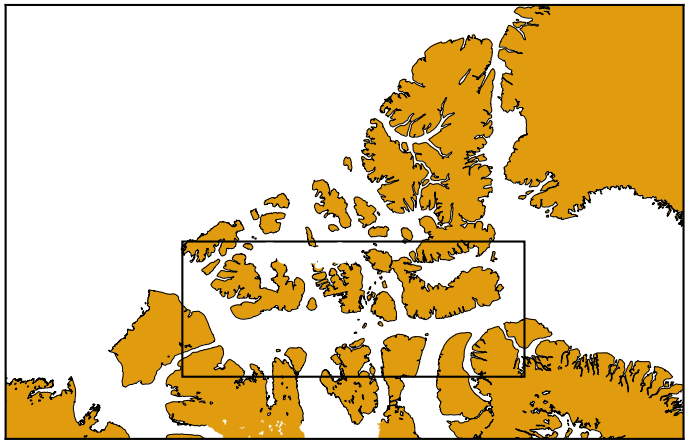
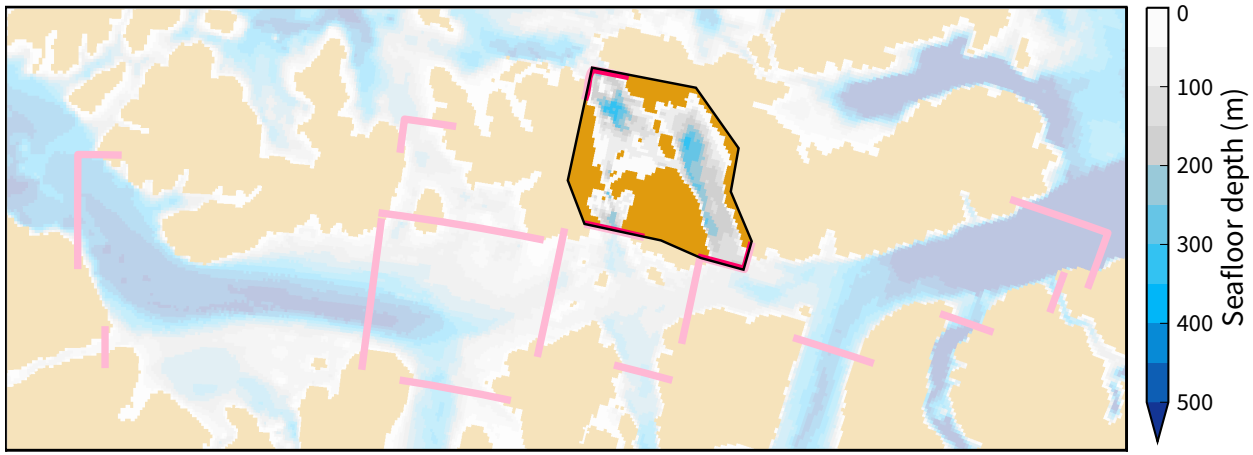
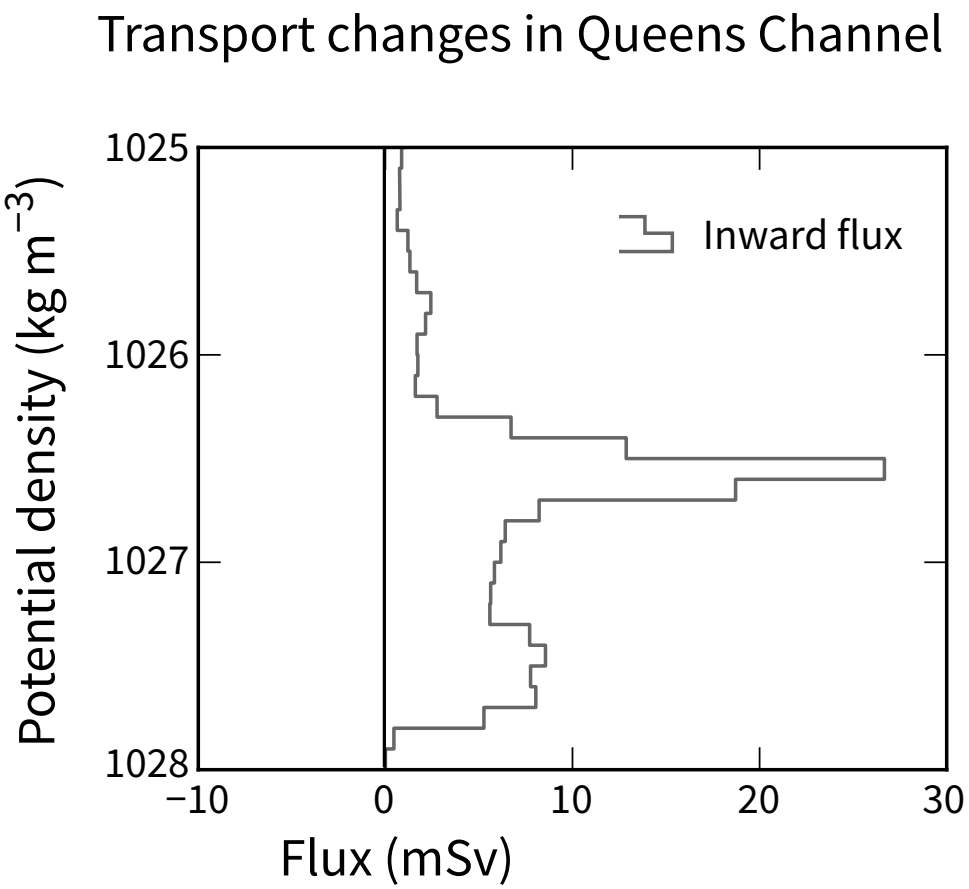




Strong water mass modification



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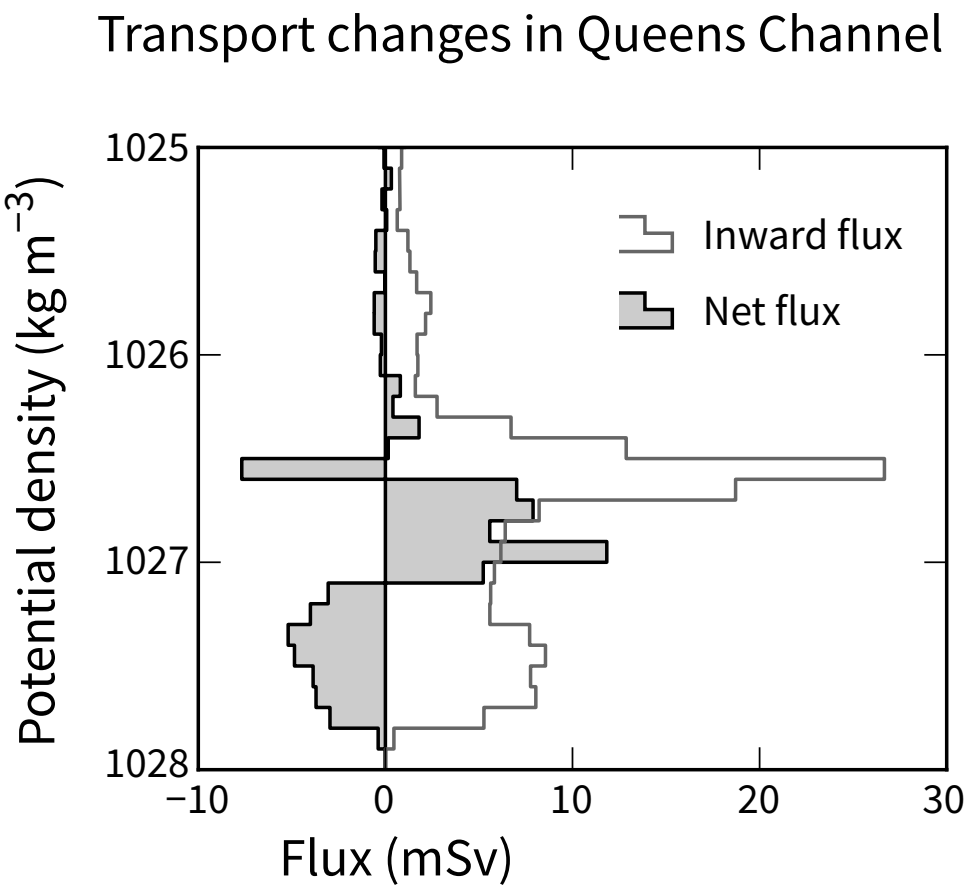
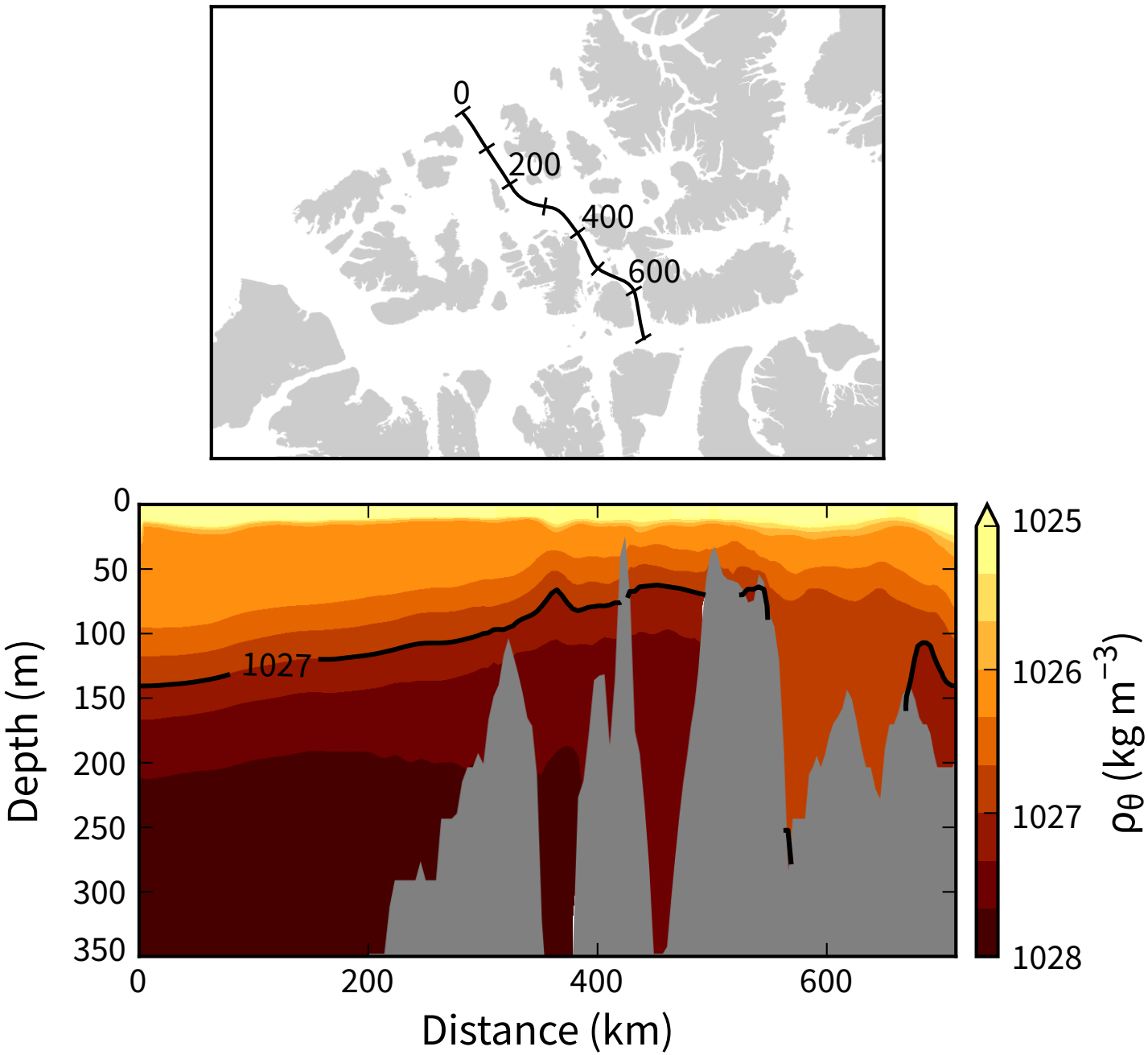
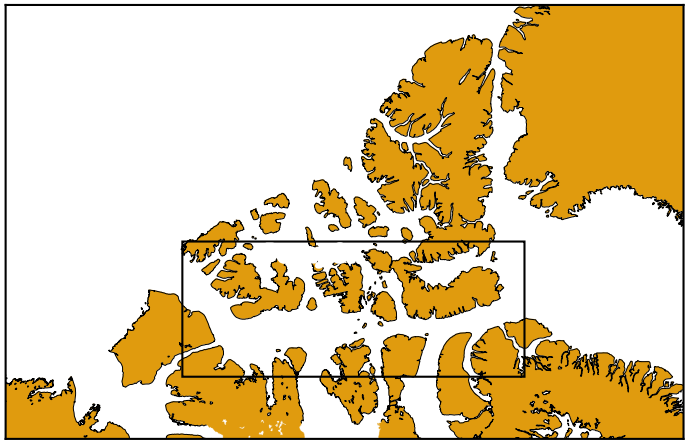
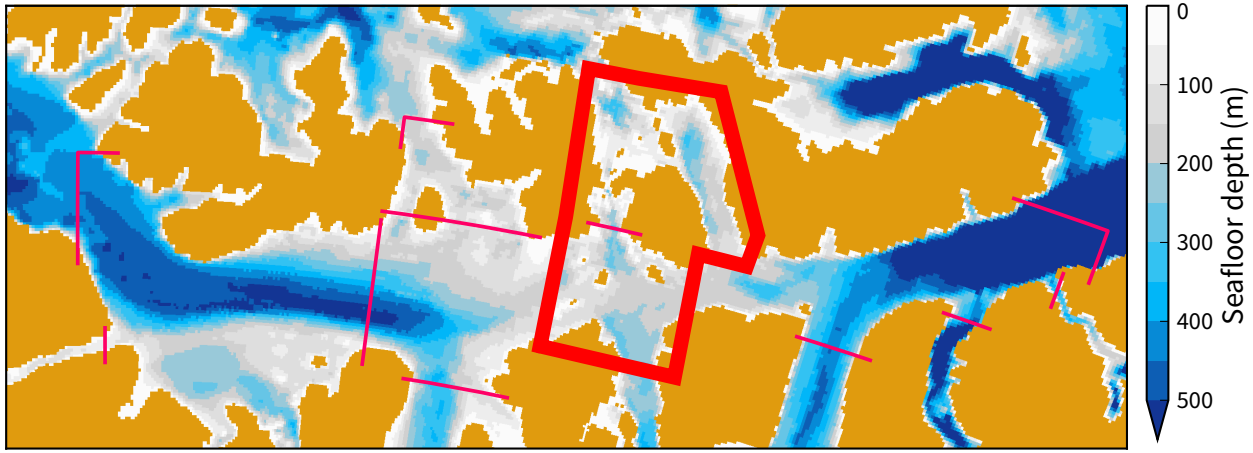


Deep fluxes require mixing



Mixing linked to bathymetry





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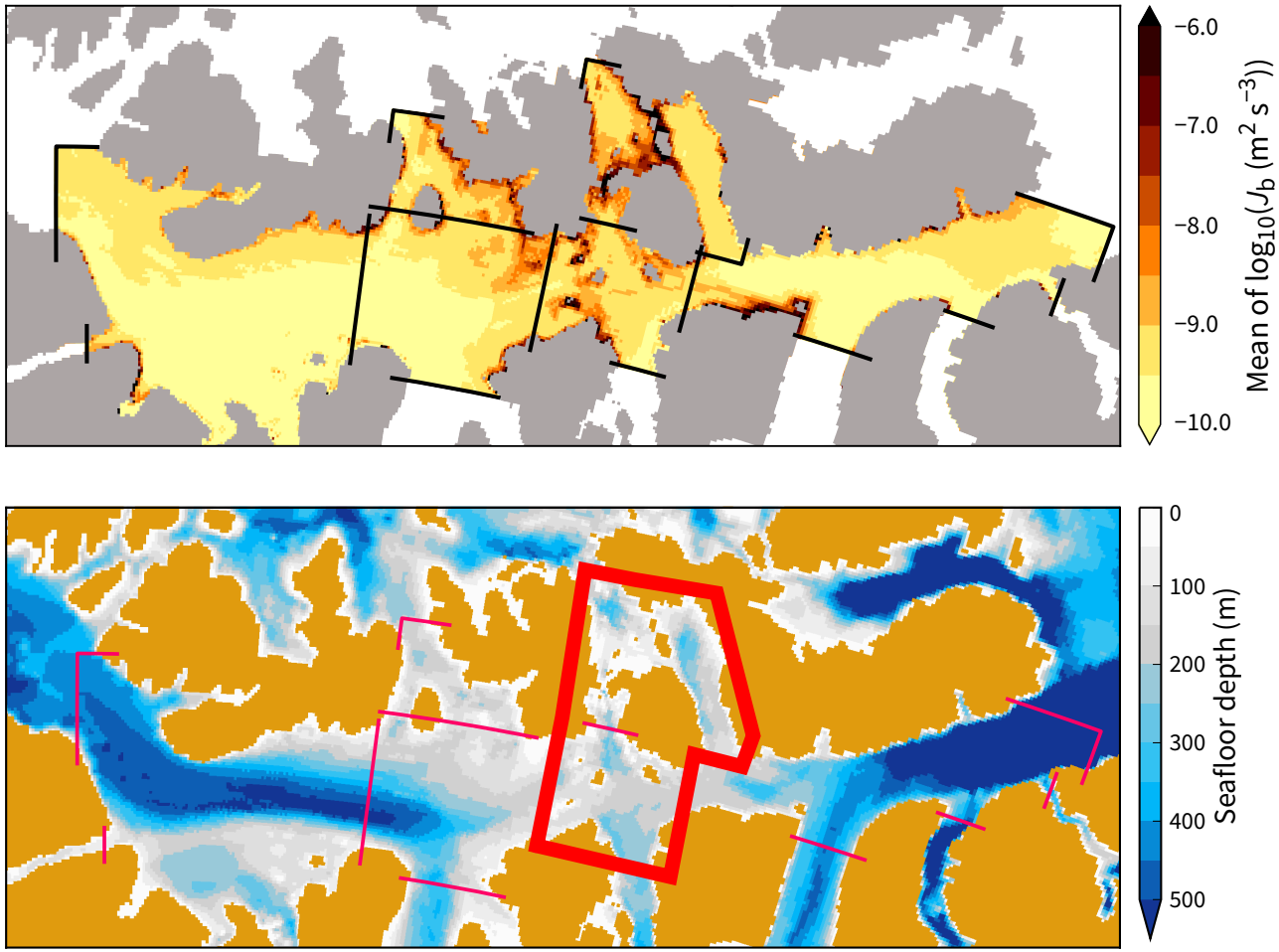

Why use an inverse method?

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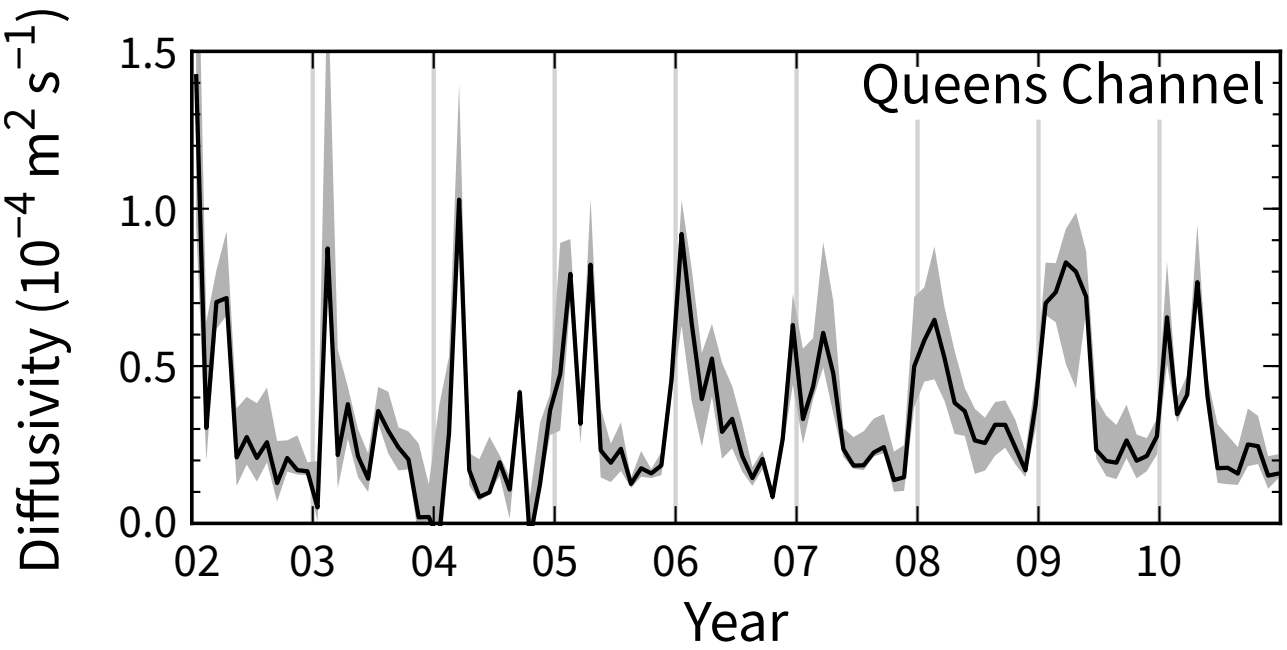

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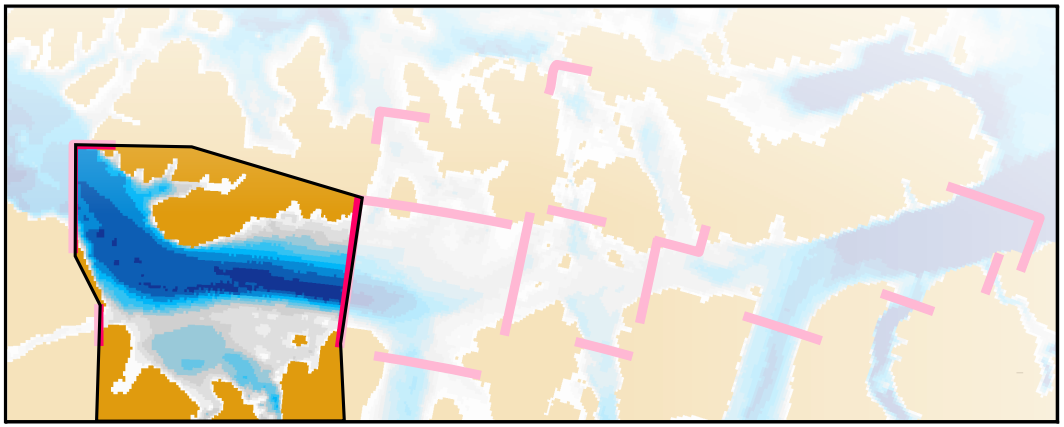

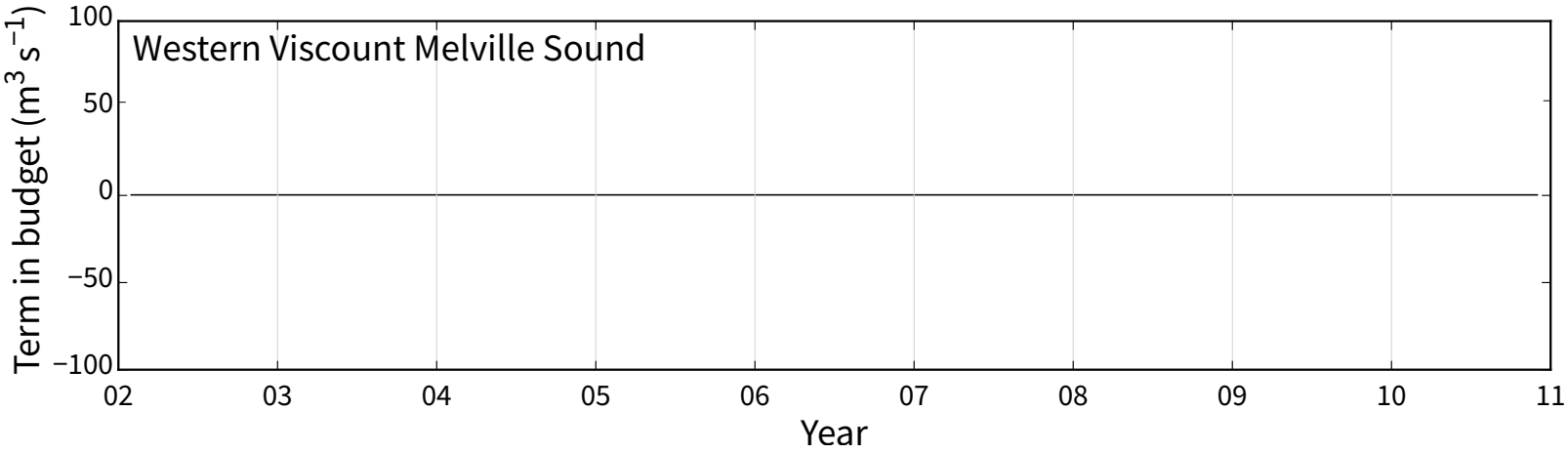

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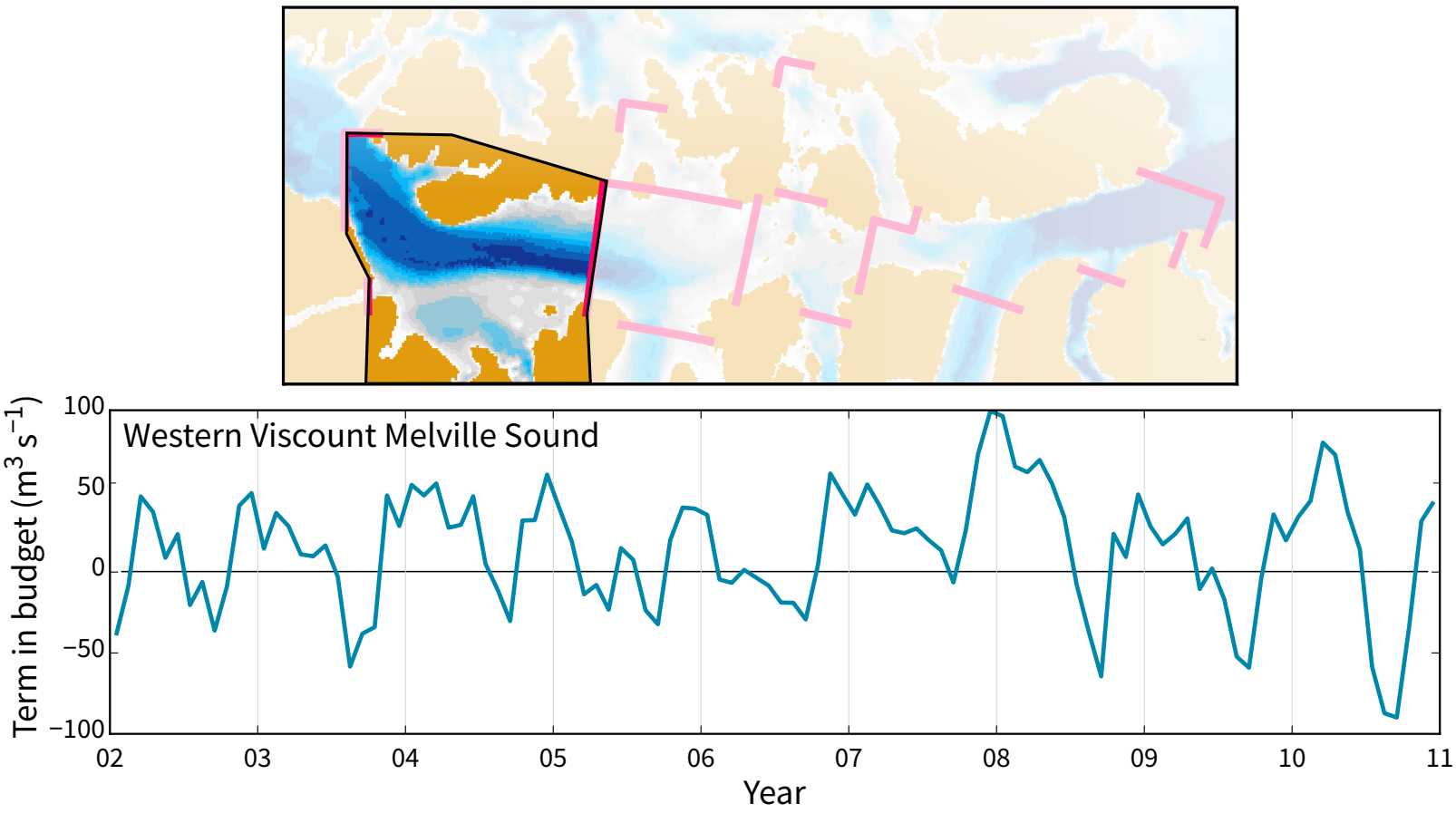

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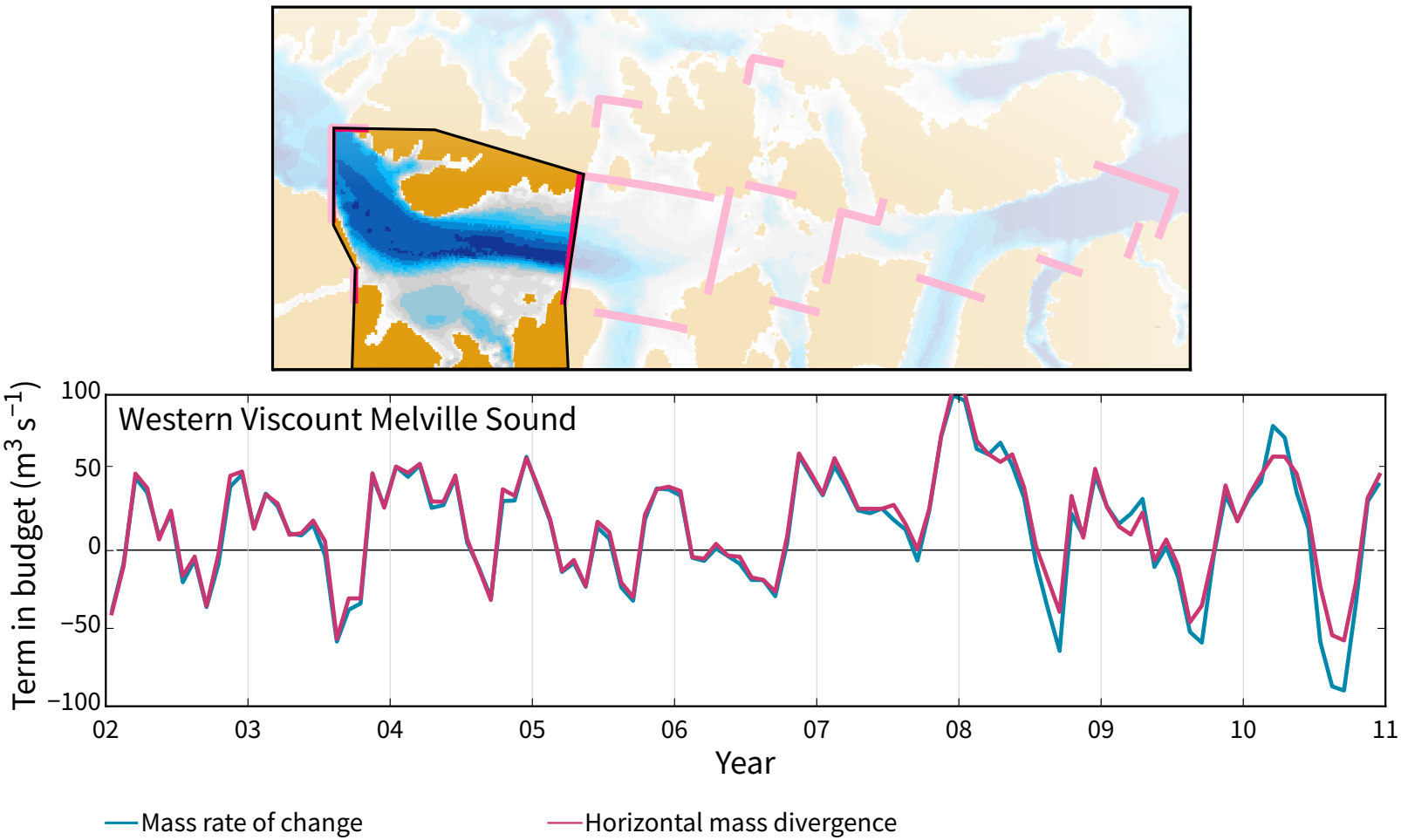

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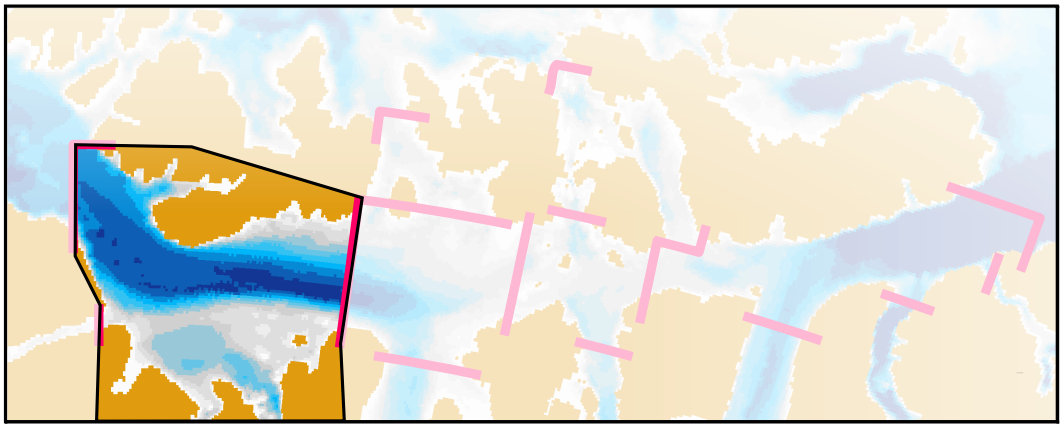

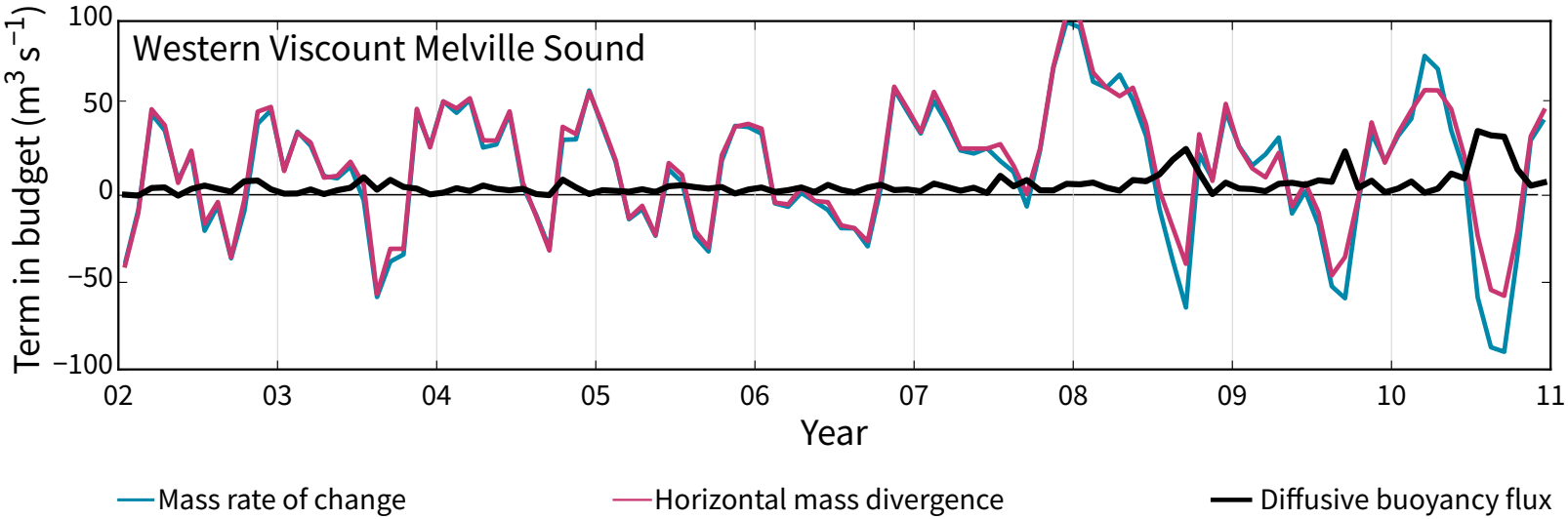

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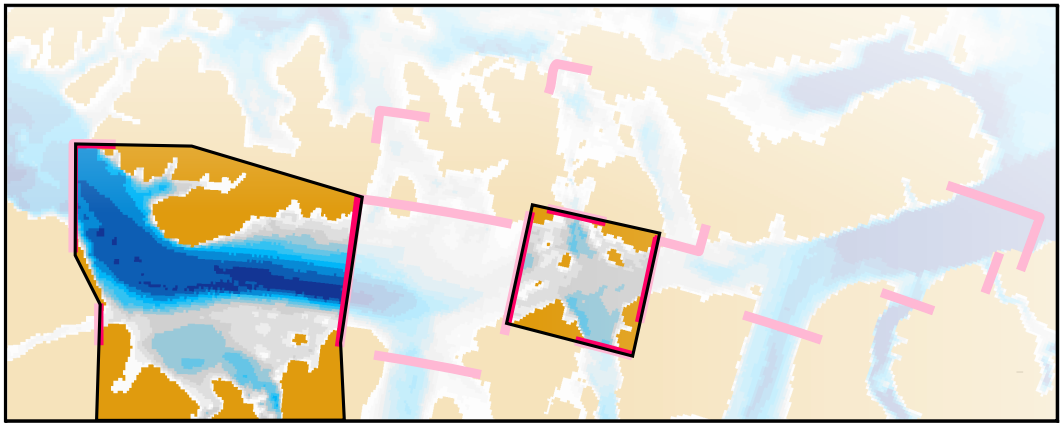
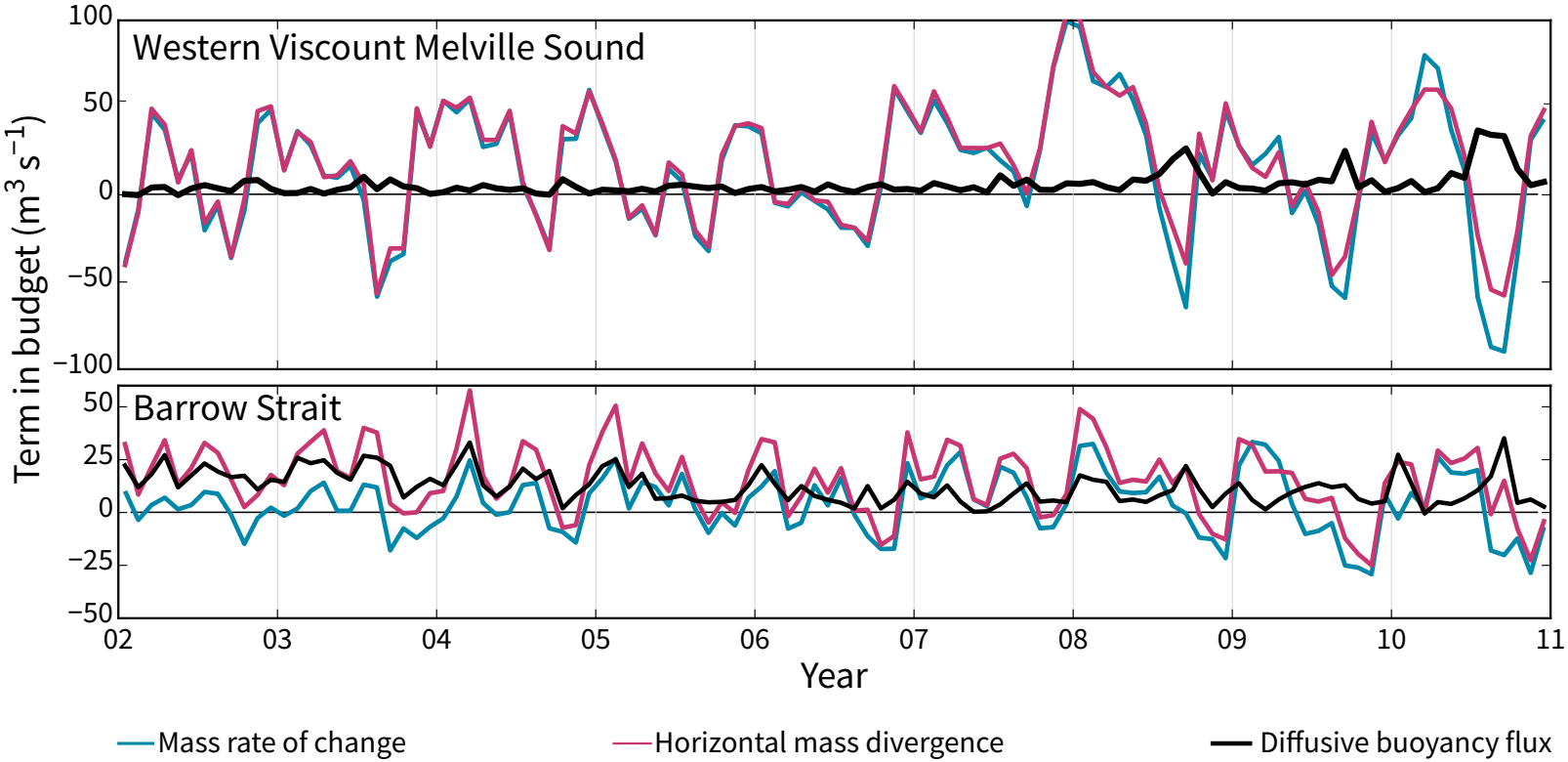
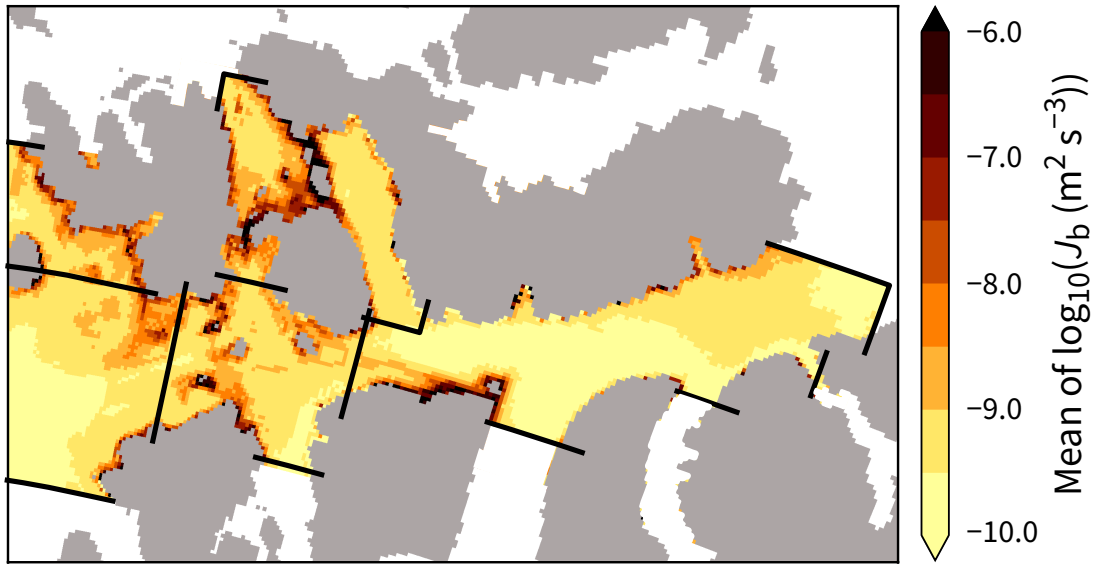




What about tides?



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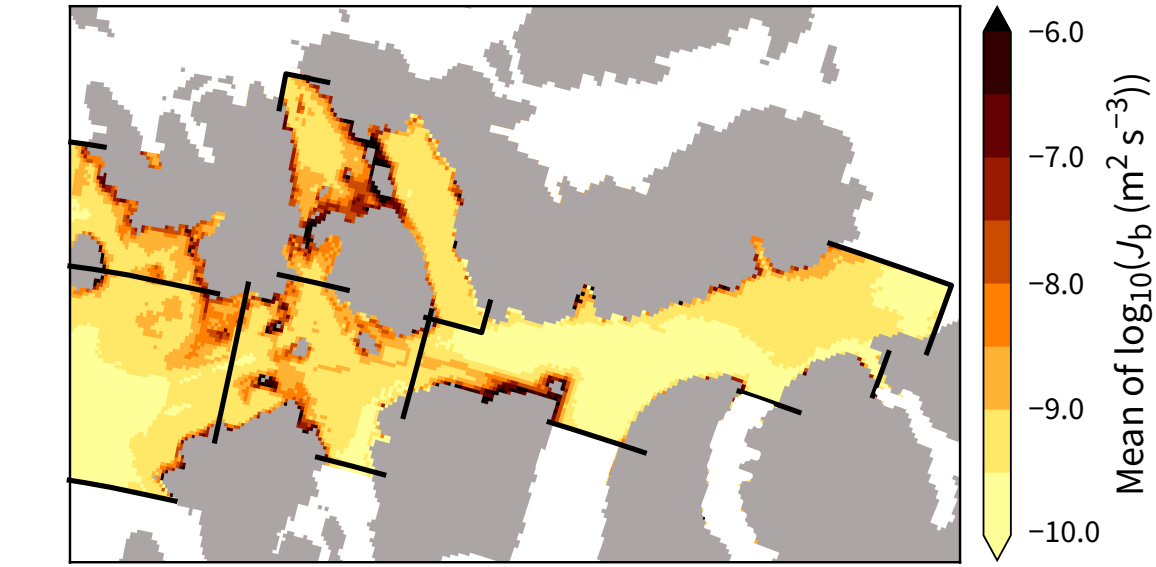

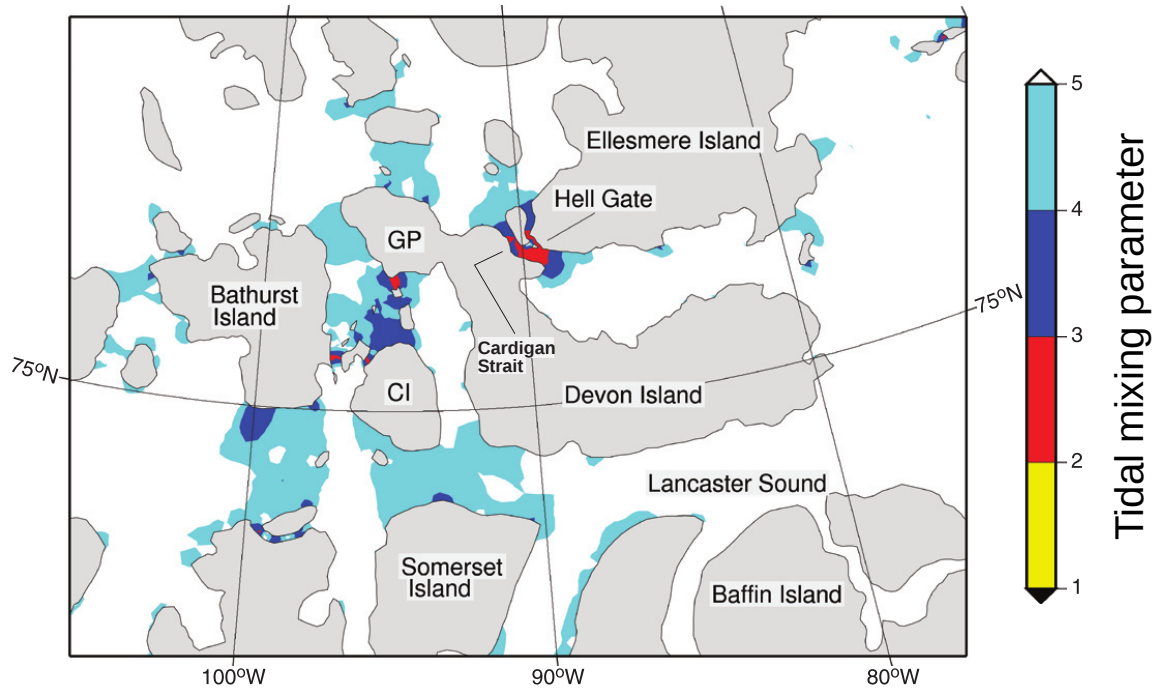

Hannah et al. (2009)

Conclusions

- Use a large-scale simulation to quantify
  - Mixing metrics
  - Terms in the mass budget
- Mixing is localised
- Central sills have dual role

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Water Mass Modification and Mixing Rates in a 1/12° Simulation of the Canadian Arctic Archipelago

Kenneth G. Hughes[1], Jody M. Klymak[1], Xianmin Hu[2], Paul G. Myers[2]

[1]School of Earth and Ocean Science, University of Victoria, Victoria, BC, Canada [2]Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, AB, Canada