

Circulations Driven by Continental Shelf Waves in the Arctic

Robinson Hordoir et al. (IMR)

WP5 - SUDARCO Annual Project Meeting - October 2025

Outline

Wave Driven Currents Explain the Flow Trend at Barents Sea Opening

Residual Circulations in the Arctic

Wave Dispersion Along the Arctic Coast and Shelf Break Regions

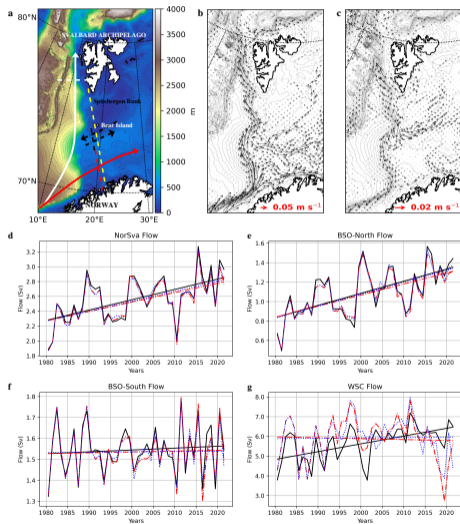
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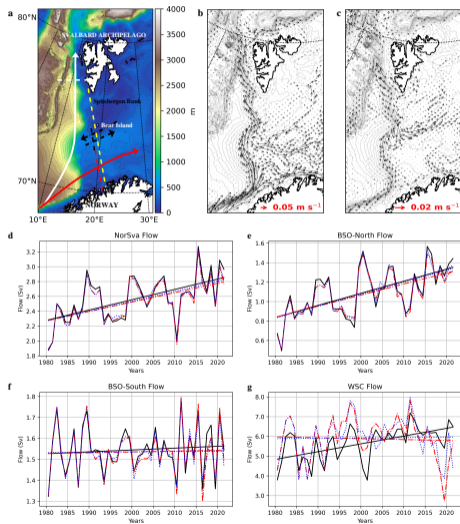
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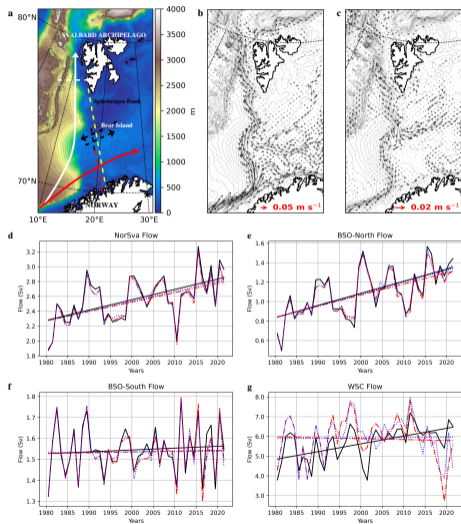
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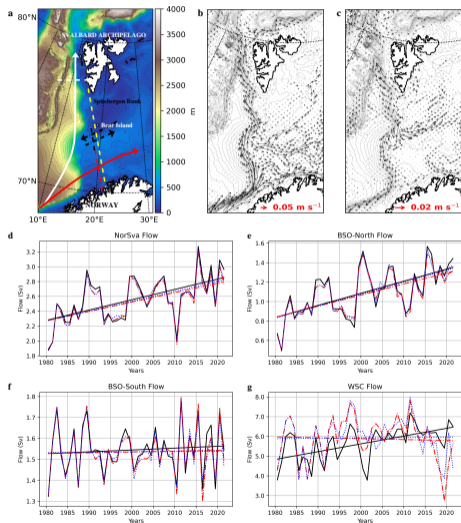
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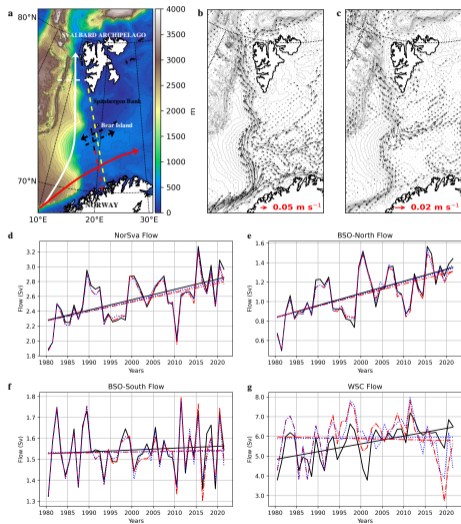
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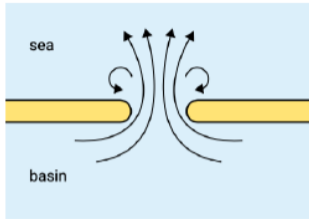
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- Let's explore this theory and its implications for the Arctic

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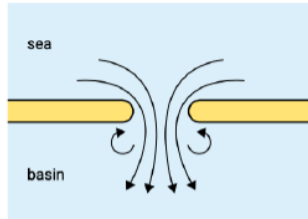
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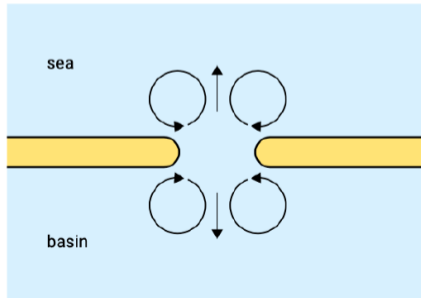
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(a)



(b)



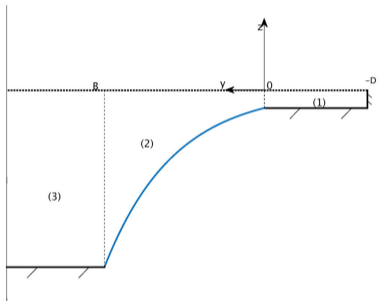
- What is a residual circulation

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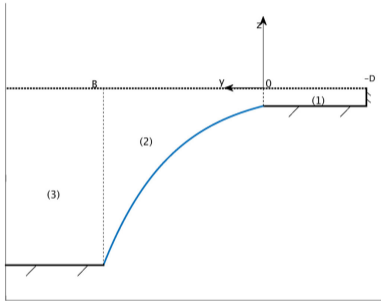
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$$\begin{aligned}u_t - fv &= -g\eta_x \\v_t + fu &= -g\eta_y \\ \eta_t + (uH)_x + (vH)_y &= 0\end{aligned}$$



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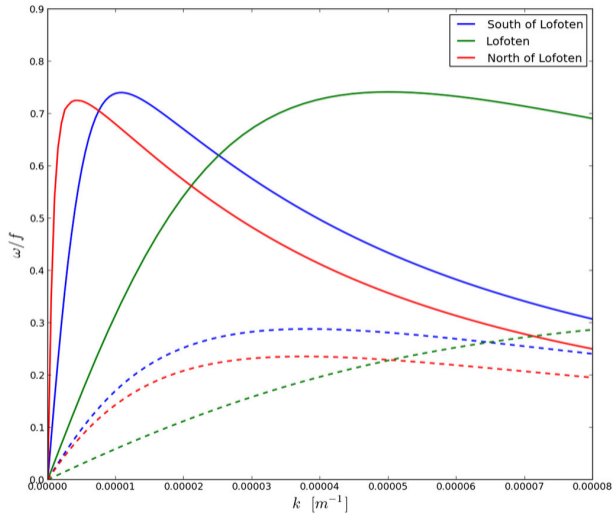
$$\frac{\omega}{f} = \frac{2kb}{k^2 + l^2 + b^2 + \delta_m}$$

$$u_t - fv = -g\eta_x$$

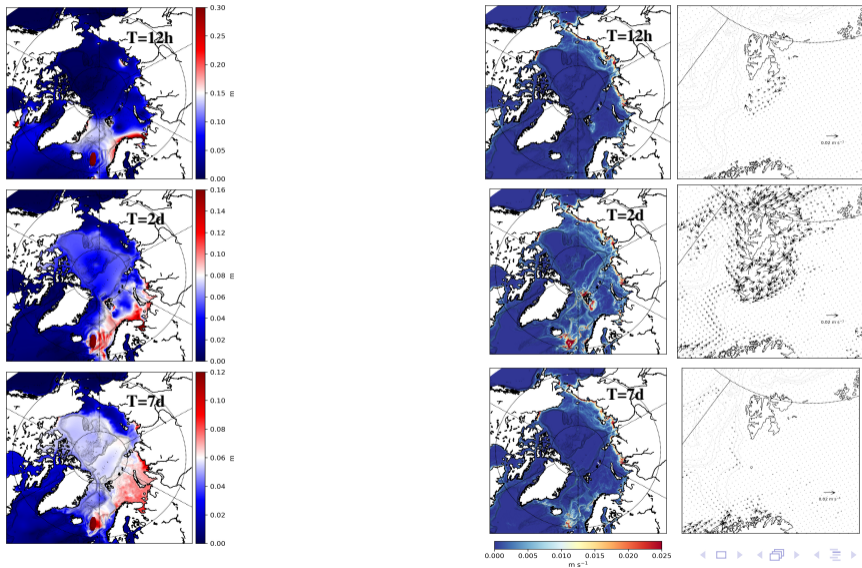
$$v_t + fu = -g\eta_y$$

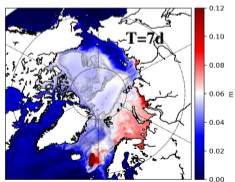
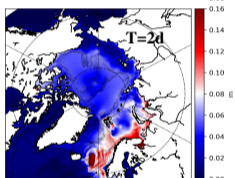
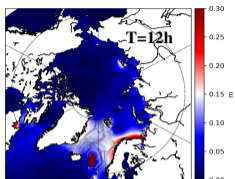
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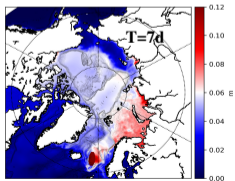
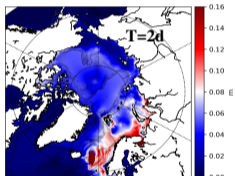
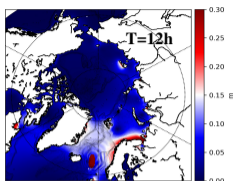


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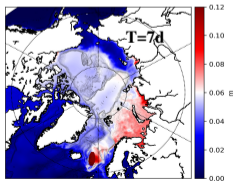
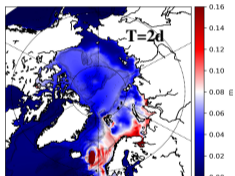
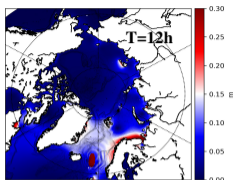




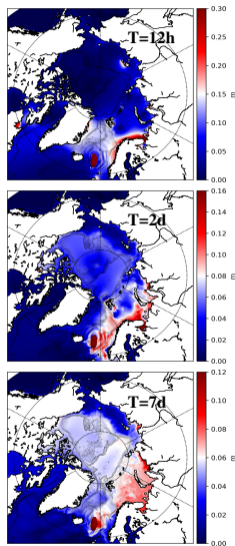
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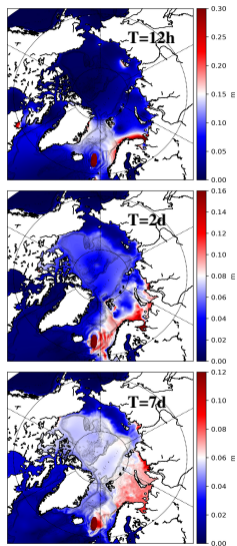
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- We found one example for Barents Sea Opening, but it happens for sure in many places, changing heat, salt and nutrient transports.
- We will continue investigating this aspect.