Freshwater Processes in the Central Arctic in Regional Ocean Model Configurations

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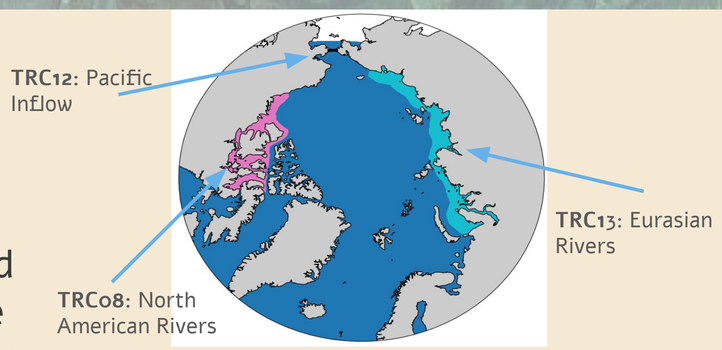
Introduction

Background

Freshwater plays an important role in the Arctic Ocean. Some of the main sources of this freshwater is Pacific inflow and river runoff. These sources are important in freshwater storage and transport out of the Arctic Ocean

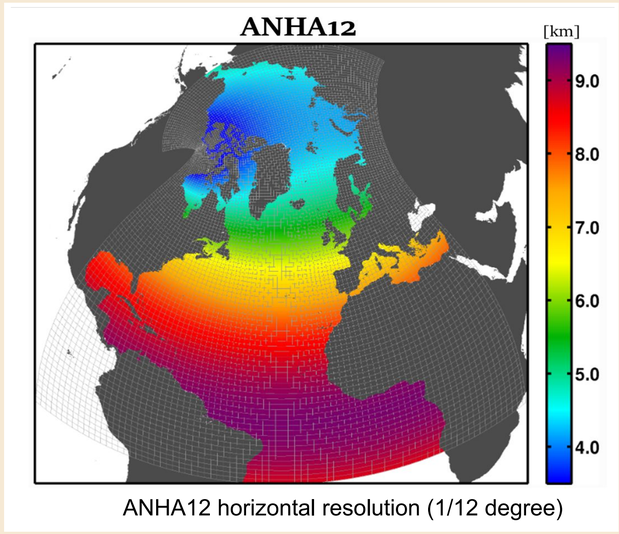


Map showing the Arctic Ocean, showing the release regions for the three online tracers. These tracers represent a large portion of the freshwater sources into the Arctic Ocean

What pathways do river and Bering Strait waters take along and off the shelf in the Central Arctic Ocean, in a high resolution regional model configuration?

Model Setup

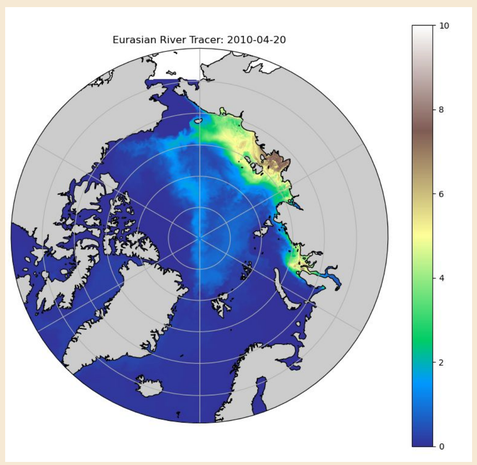
- Initial and Boundary conditions from GLORYS2v4
- LIM2 Sea Ice Module
- ERA5 atmospheric forcing
- Dai and Trenberth runoff product
- Model run from 2002-2022

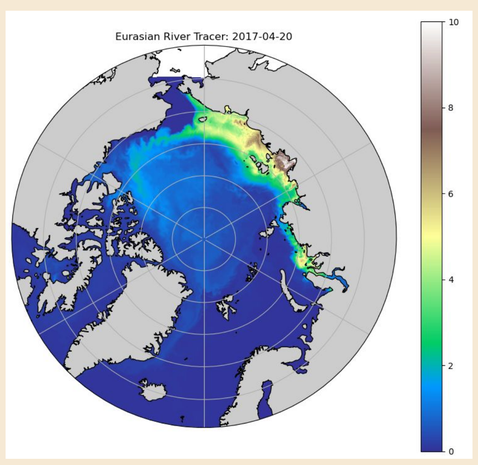


ANHA12 horizontal resolution (1/12 degree)

Research

Tracer Pathways

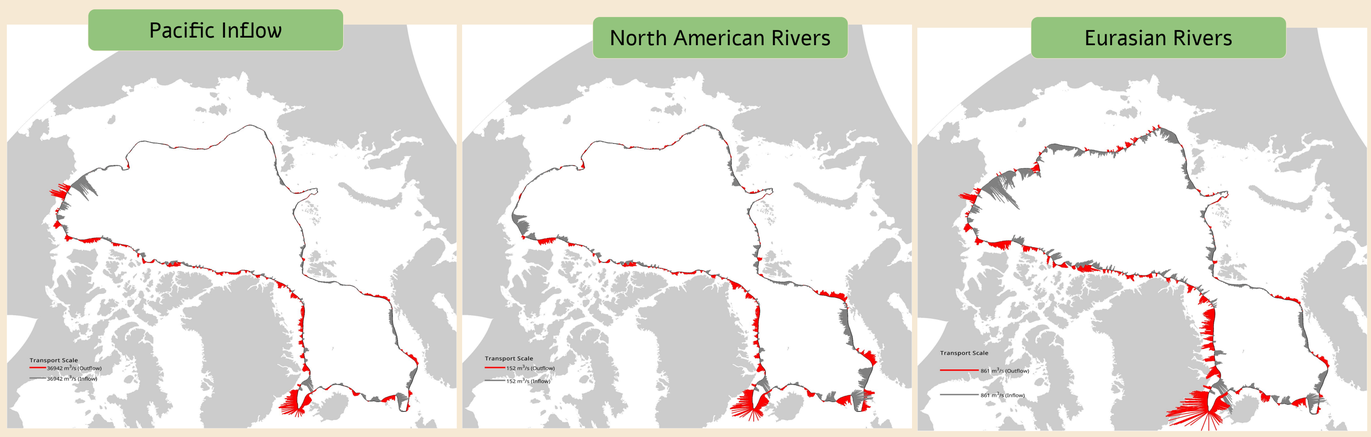




From tracer snapshots, we an see there is large interannual variation in the pathways that there are larger variations that Eurasian river waters take off the shelf and into the Central Arctic Ocean

Transport into the interior

In long term means, we can see these two pathways off the shelves seen in snapshots for the Eurasian river waters. We can also see the main pathways of Pacific Inflow and North American river tracers take into the Central Arctic Ocean.



The longterm mean of the tracer transport across the 500m isobath

Conclusion

Online passive tracers were used to understand the pathways taken by freshwater sources in the Arctic Ocean. A major transport pathway off schelf and into the Canadian Basin is seen in the Chucki Sea. We also see a strong variation the pathway taken by the Eurasian rivers.

Next Steps

- Correlating interannual variations in shelf-basin tracer pathways with different atmospheric conditions
- Understanding volume contributions of different freshwater sources in the Central Arctic Ocean

Contact Info

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