Mackenzie Freshwater Layers Uncover River Runoff-Ice Evolution (McFLURRIE)

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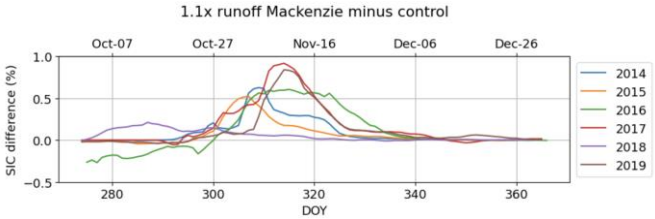
Objectives:

1) To investigate how sea ice responds to increased freshwater input near the mouth of the Mackenzie River.
2) To assess the sensitivity and drivers of surface salinity anomalies near the Mackenzie River.

Approach:

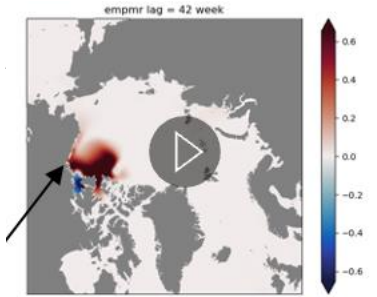
- Run ECCOv4r5 in 4 configurations (daily, 2014-2019):
  1) Control run
  2) Increased runoff globally by 10%
  3) Increase only Mackenzie River runoff by 10%
  4) Time-varying runoff (JRA-55)
- Investigate adjoint sensitivities to salinity at the mouth of the Mackenzie River.
- Use EMU convolution tool to understand controls on salinity near Mackenzie.

Sea ice area time series

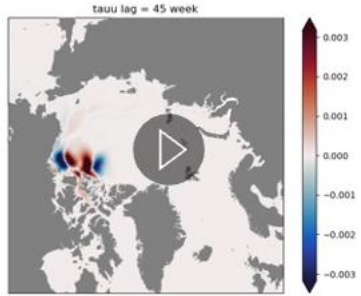


Results:

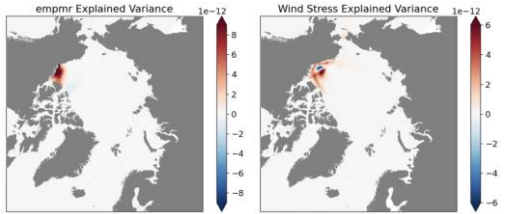
- Runoff modulates seasonal variability in salinity anomalies and wind stress controls interannual variability.
- A 10% increase in runoff leads to slightly increased sea ice area (<1%).

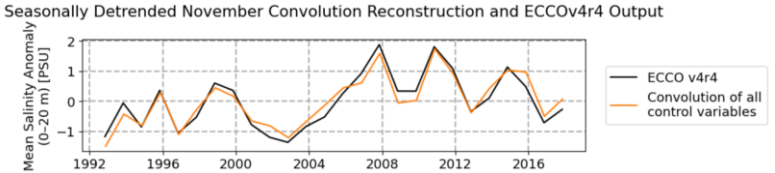


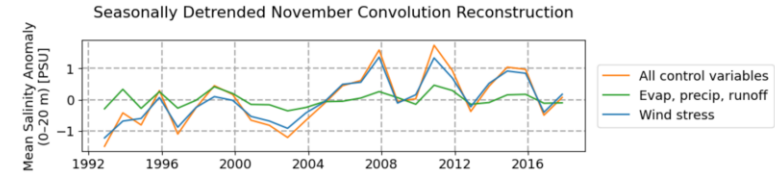
Mackenzie River

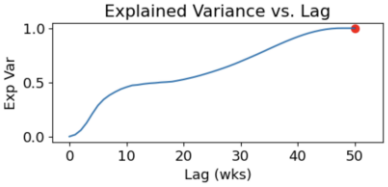


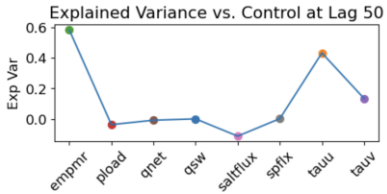
Convolution results



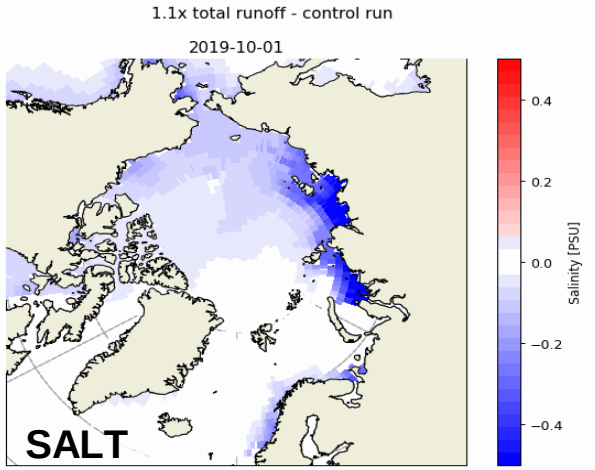


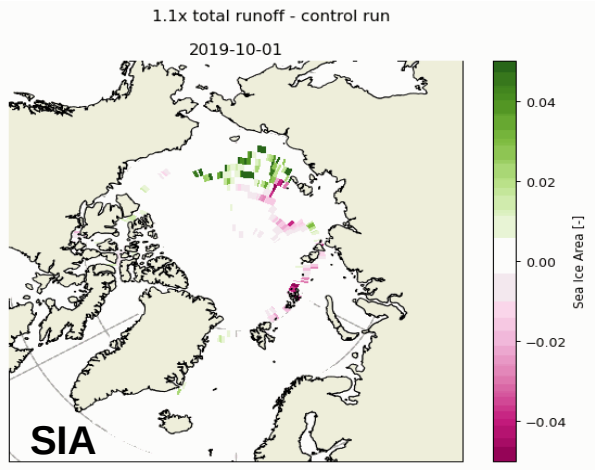






10% increase globally - control





10% increase Mackenzie - control