The Trajectory of Sea Ice During the Exceptional 2018 Polynya

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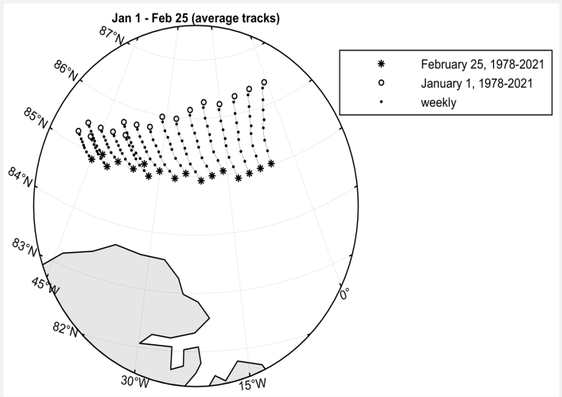
All the sea ice is supposed to melt by mid-century.

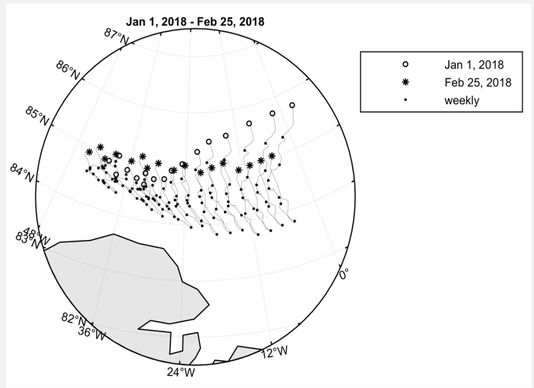
That is, the Arctic will be ice-free in the summer except for a small region about the size of Ontario, descriptively called Last Ice Area (LIA).

This means that the LIA will be the last refuge for the many ice-dependent species and the ice-dependent aspects of the culture of the people who live in the Arctic.

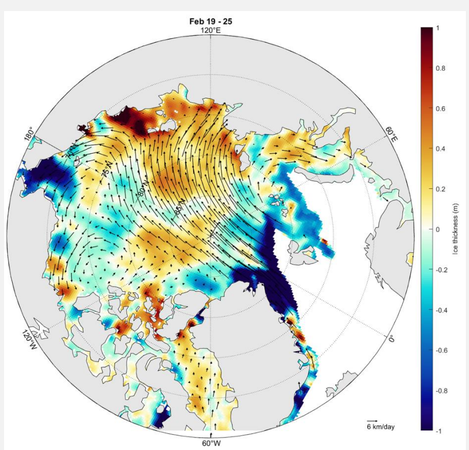
In 2018, their was a remarkable and troubling event where a polynya – a region of uncovered water surrounded by ice – formed during the winter in the Last Ice Area. Here I look at the trajectory of sea ice leading up to this anomalous event.



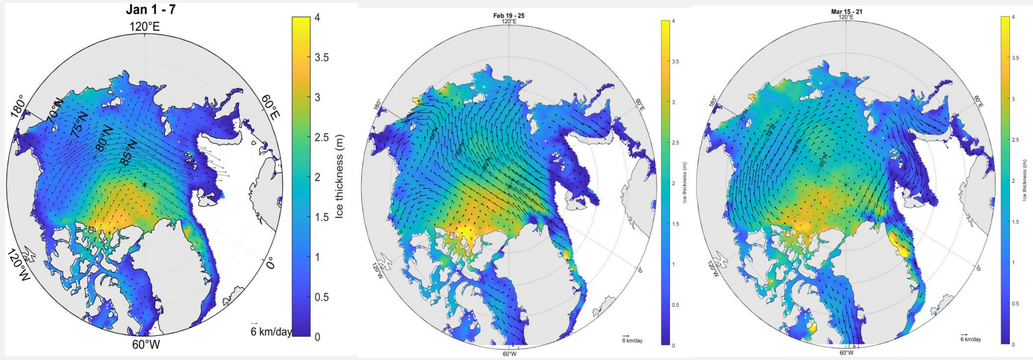
The average trajectory of sea from 1978-2021 from January 1 to February 25.



The trajectory of sea January 1, 2018 to February 25, 2018. The reversal occurs around the second week of February.



This figure displays the anomalies in ice thickness and ice velocity showing during the week of the polynya.



These maps show the polynya forming just off the cost of Greenland above the Nares Strait in the week of February 19-25. They also show the reversal in ice direction.

Discussion

The 'Last Ice Area' is a rather recent name given to the region. Its traditional names are Similijuaq - the place of big ice - and - Tuvaijuittuq: *The ice that never melts*.

An Arctic with year-round sea ice has long been a given - if not a tautology. Over the last fifty years, this has fact has become decidedly less definite as the volume of sea ice the Arctic has decreased by 70-85%. It is in the context of this rapidly changing Arctic cyrosphere, that we see anomalous sea ice events like the February 2018 polynya and the ice reversal. Climate change is an exacerbating factor causing these events to be larger and more prolific.

Currently, there is limited research into the effects of these reversals on the local ecosystem. That said, it seems that such massive and abrupt changes will likely have consequences for the species that live there.

These events tend to happen when the ice is thin; thin ice has well documented negative implications on marine mammals like polar bears and the people who live in Arctic. Mitigating the effects of these events and preventing them from occurring more frequently requires prompt and bold action against climate change. Apathy comes at the cost of the ecosystem, the economy, and the livelihoods of the people who call the Arctic home.

Acknowledgments

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