



An Inter-Annual Oscillation in the Western Arctic Associated with a Non Stationary Seasonally Lagged ENSO Signal

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The late summer retreat of Arctic sea ice is one of the most dramatic and well-documented changes that has occurred in the climate system. This retreat is most pronounced in the western Arctic. Sea ice minima in this region are typically followed by years with substantially higher extents. For example, the September 2013 Arctic sea ice extent was $\sim 30\%$ higher than the 2012 minimum. These rebounds have caused confusion amongst the public as well as debate within the scientific and policy communities regarding this aspect of climate change. Here we demonstrate the existence of an inter-annual oscillation in the region that successfully explains the rebound of sea ice following recent minima. The oscillation is associated with local variability in atmospheric flow, including a reversal in the surface wind field, that we propose results in changes in upwelling along the shelf-edge of the Beaufort and Chukchi Seas. From the 1950s to the 1990s, the oscillation was associated with a seasonally lagged El-Nino signal, but this is no longer the case. We argue that this change represents a reduction in the influence that ENSO has on the western Arctic possibly due to the loss of the region's sea ice that has enhanced local inter-annual variability.