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Alek Petty P-7 Seasonal Trends in Sea Ice Circulation and Wind Forcing Over the Beaufort Sea

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Both the ocean circulation and overlying sea ice cover of the Beaufort and Chukchi seas have experienced significant change in recent decades. We use sea ice drift estimates from satellite feature tracking (NSIDC/CERSAT) and wind forcing from atmospheric reanalysis products (NCEP-R2/ERA-I/JRA-55) to investigate the role of wind forcing and ice dynamics in driving these changes.

An assessment of ice drift shows reasonable agreement across the different products, revealing interannual variability in the ice flux around the Beaufort Sea. However, clear uncertainties remain in determining the magnitude of these fluxes, especially in regions of low ice concentration. We find an increase in anti-cyclonic ice drift within the Beaufort Sea and an increase in ice export out of the southern Beaufort Sea (into the Chukchi Sea) across all seasons, despite the wind curl showing a similar trend in summer only. The strongest trend in ice drift curl appears to be in autumn, however recent years have seen a strong reduction in this anti-cyclonic drift, likely due to a combination of changes in the wind forcing and sea ice state. The implication of this finding is an enhanced response of the ocean circulation to shifts in atmospheric circulation compared to that experienced prior to 2000.