

SESSION: (B6) Frontiers in earth system prediction

(B6-08)

Skillful seasonal forecasts of Arctic sea ice retreat and advance dates in a dynamical forecast system

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The need for skillful seasonal forecasts of Arctic sea ice is rapidly increasing. Technology to perform such forecasts with coupled atmosphere-ocean-sea ice systems has only recently become available, with previous skill evaluations mainly limited to area-integrated quantities. Here we show, based on a large set of retrospective ensemble model forecasts, that a dynamical forecast system produces skillful seasonal forecasts of local dates at which ice forms (the advance date) and melts (the retreat date) - variables that are of great interest to a wide range of end-users. Advance dates can generally be skillfully predicted at longer lead times (~5 months on average) than retreat dates (~3 months). The skill of retreat date forecasts mainly stems from persistence of initial sea ice anomalies, whereas advance date forecasts benefit from longer timescale and more predictable variability in ocean temperatures. Initial steps taken and challenges encountered in translating these results into operational products will be described. These results suggest that further investments in the development of dynamical seasonal forecast systems may result in significant socio-economic benefits.