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Abstract:

Long-term trends in the extent of the polar sea-ice pack are an important indicator of global climate change. In the Arctic, nearly half of the late-winter maximum of sea ice cover survives the summer melt season and is classified as Multi-year ice. The net export of Multi-year sea ice through the Fram Strait has historically been balanced by production of Multi- year ice in the Arctic basin. The heat budget of the polar regions is strongly impacted by the presence of sea ice and by its annual cycle of growth and decay. Sea ice significantly inhibits the vertical flux of latent and sensible heat from the ocean to the atmosphere and reflects a large fraction of the incident solar radiation. The vertical heat flux is an important energy source for Arctic cyclogenesis over open water in summer. Observations suggest that young, thin ice is susceptible to breakup and melting by wind and waves produced by summer Arctic storms.

The ability to accurately predict Arctic storms and sea-ice extent are of growing strategic importance in a warming climate, but progress is hampered because the region is too remote for comprehensive in situ monitoring. Recent observations of sea ice extent and Arctic cyclogenesis have lent support to the thesis that year-to-year variations in Arctic sea ice are driven to a great extent by a relatively small number of intense storms. For a variety of reasons, Arctic cyclones are very poorly predicted over the Arctic even by the most skillful NWP models. The inability to predict this forcing is a predictability barrier that must be overcome if intra- and inter-seasonal predictions of sea ice are to become a reality. To find out more about how these meaningful challenges may be resolved, please come to the seminar.