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High-latitude processes in sub-seasonal to seasonal predictions

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At high latitudes, the dominant physical processes are radically different from the mid-latitudes and the tropics. At the surface, the large-scale presence of snow and sea ice provides a potential source of predictability on sub-seasonal to seasonal time scales, but poses a difficult challenge for reliable observation, model representation and initialization. Likewise, the atmosphere over snow and sea ice often exhibits unique boundary layer and cloud regimes that are not well represented in global models. Combined with an extreme sparsity of conventional observations, this raises the question whether sub-seasonal to seasonal predictions could benefit from increased investments in observation networks and modelling capacities, especially in the Northern Hemisphere, where teleconnections between Arctic and mid-latitude phenomena are actively being discussed in the research community. Furthermore, the Arctic environment has changed dramatically in the last decades, with important socio-economic, environmental and security implications. To reflect on these issues, this talk is formed of two parts. The first part gives an overview of current state of the art and prospects in observing, modelling and initializing sea ice and other high-latitude processes to improve subseasonal to seasonal predictions. In the second part, recent progress in understanding Arctic-midlatitude linkages will be reviewed and implications for subseasonal to seasonal predictions will be discussed.

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