CSQ-24 Summary

Question	Knowledge Advancement Objectives	Geophysical Observables	Measurement Requirements	Tools & Models	Policies / Benefits
What is the impact of the Polar regions on global climate variability?	Determine what impact the polar regions have on global climate variability.	● Glacier area change and volume change ● Ice sheet mass balance ● Ice shelf mass balance ● Sea ice thickness and extent ● Permafrost volume change ● Global temperature ● Ocean temperature and salinity ● Atmospheric winds	Fine temporal (weekly) resolution, with enough sensitivity to measure change Multi-decadal record of change required over last 30-40-years, updating continuously Medium (1 km) spatial resolution for all components.	EO satellite datasets. Auxiliary data including global temperature, ocean temperature and salinity, atmospheric winds	Climate change adaptation and mitigation policy. IPCC monitoring.
	Determine what impact global climate variability has on the polar regions.	As above.	As above.	As above.	

CSQ-24 Narrative

The remote Polar regions are geographically far away from other environments on Earth, however changes in the Poles can have dramatic impacts on the global climate system. The cold high elevation ice masses, reflect a large proportion of the suns incoming radiation, and affect atmospheric circulation and weather patterns in the mid latitudes. When cold freshwater is input to the ocean through ice melt, this can lead to ocean freshening and change in the strength of ocean circulation. Similarly, we now know that major climate cycles, such as La Nina and ENSO, are directly responsible for driving the decadal cycle of ice shelf melt in West Antarctica (Jenkins et al.), demonstrating the long-range tele-connections between the polar regions and the equator. The impact of global climate variability on the Polar regions, and vice versa, should be studied to better understand the complexity of Earths systems.

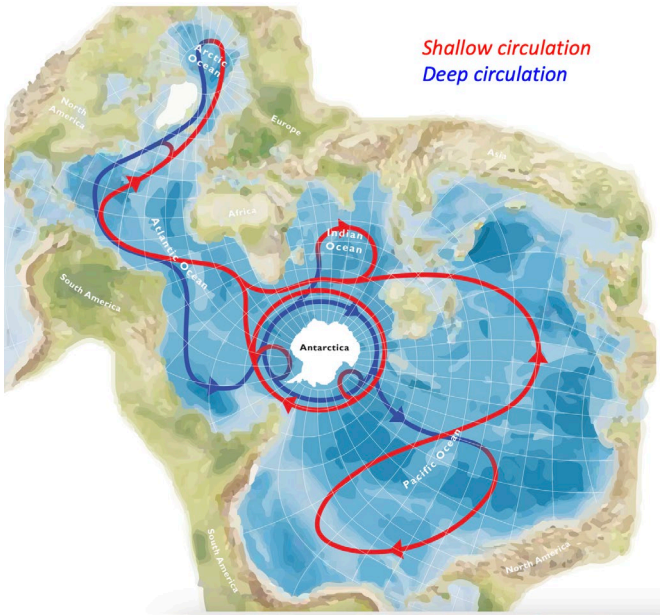

Fig. 5: Shallow and deep ocean circulation pathways between the Arctic and Southern oceans.

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