

Sea Ice in the Cryosphere: Trends, Observations, and Challenges

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I will summarize the trends in Arctic and Antarctic sea ice cover reported in the Fifth Assessment Report (AR5) of the IPCC. Along with the persistent negative trends in Arctic ice extent since AR4, the current assessment also highlights for the first time our confidence in the decline in Arctic ice thickness over the last few decades based on observations from a variety of sources: moorings, submarine, EM probes, and satellite altimetry. For Antarctic sea ice, although attention is typically directed at the trends in total ice extent, it is the large regional trends that are remarkable although long-term/large-scale observations of crucial parameters for understanding these trends are still quite limited. For both sea ice covers, I list observations that are currently available and what we might expect in the future; emphasis will be on snow depth, ice thickness, and ice kinematics. There are recent advances in the large-scale observations of these parameters but challenges remain especially in the derivation/validation of large-scale fields of snow thickness that are important not only for understanding surface heat exchanges but also for the calculation of snow loading in the retrieval of sea ice thickness.