

About this issue

Sea ice in the polar regions is a very relevant topic today, and the focus of multiple PAGES working groups. Two of these groups - Arctic Cryosphere Change and Coastal Marine

Ecosystems and Cycles of Sea-Ice Dynamics in the Earth system - combined forces to produce the current collection of 12 science highlights in this *Past Global Changes*

Magazine issue. The following section on ice-core science, by early-career researchers, provides another perspective on research at the poles.

Arctic Cryosphere Change and Coastal Marine Ecosystems

The PAGES working group on Arctic Cryosphere Change and Coastal Marine Ecosystems (ACME; pastglobalchanges.org/acme) provides a community platform to critically assess and refine available coastal marine proxies that can be used to reconstruct cryosphere changes and their multifaceted ecosystem impacts. ACME seeks to promote a leap forward in the accuracy of paleo reconstructions that are central for deciphering cryosphere-biosphere interactions in the Arctic region at relevant timescales.

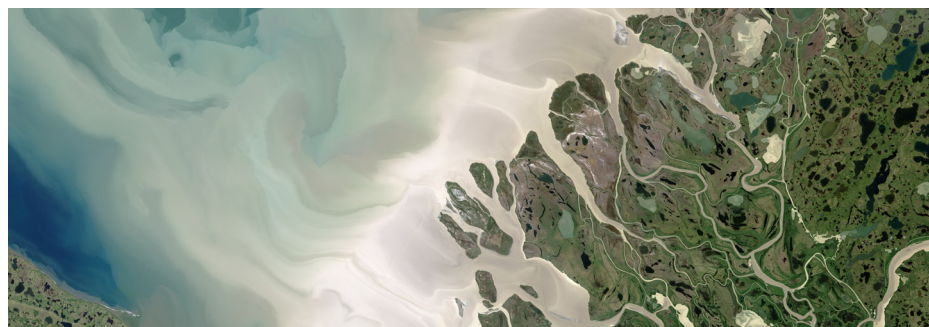


Figure 1: Fresh water and sediment input into the Arctic Ocean are expected to increase with climate change (Photo credit: NASA Earth Observatory/Jesse Allen).



Figure 2: Sea ice in the Southern Ocean (Photo credit: Pearse Buchanan).

Cycles of Sea-Ice Dynamics in the Earth system

Southern Ocean sea ice plays several important roles within the Earth system, affecting nutrient cycling and marine productivity, as well as modulation of air-sea gas exchange and deep water formation in high latitudes. As sea ice changes in the future, it is important for Earth system models to be able to simulate the effects of these changes.

The aim of the Cycles of Sea-Ice Dynamics in the Earth system (C-SIDE; pastglobalchanges.org/c-side) working group is to reconstruct changes in sea-ice extent in the Southern Ocean for the past 130,000 years, reconstruct how sea-ice cover responded to global cooling as the Earth entered a glacial cycle, and to better understand how sea-ice cover may have influenced nutrient cycling, ocean productivity, air-sea gas exchange, and circulation dynamics.

Early-career perspectives on ice-core science

The Ice Core Early Career Researchers Workshop (ICECREW; pastglobalchanges.org/calendar/128625) brought together a diverse group of US-based scientists to discuss past and future ice-core projects, to build community, and to develop 10 articles showcasing the current state and future directions of ice-core science. From million-year-old samples of the atmosphere to microbes living within ice sheets, the ICECREW early-career participants seek to share with you the immense value of ice cores for understanding the Earth system.

For more information and to get involved in ice-core research or to connect with other early-career scientists, go to:

- Ice Core Young Scientists (ICYS; pastglobalchanges.org/icys)
- Polar Science Early Career Community Office (PSECCO; psecco.org)
- Association of Polar Early Career Scientists (APECS; apecs.is)
- Polar Impact (polarimpactnetwork.org)



Figure 3: Ice core (Photo credit: NASA's Goddard Space Flight Center/Ludovic Brucker).