

Polar-ICE Sci-I Project Summer 2016 Educator Workshop

Palmer Antarctica Long Term Ecological Research Site

Website: <https://www.lternet.edu/sites/pal>

Overview: The Palmer Long Term Ecological Research (PAL-LTER), established in the Fall of 1990, is one of the National Science Foundation sponsored LTER Sites which is funded by the Office of Polar Programs. It focuses on the pelagic marine ecosystem along the Western Antarctic Peninsula (WAP), and the ecological processes which link the extent of annual sea ice to the biological dynamics of different trophic levels.

Intro to Research Topics: Our marine ecology of the Southern Ocean focus is in the WAP area and includes: physical forcing with an emphasis on the ecological consequences of sea-ice variability, biological processes with an emphasis on microbial and primary production as well as life-history parameters of secondary producers (krill) and apex predators (penguins, seals), and modeling that links ecosystem processes to environmental variables.

Website Highlights

Sea Ice Change. Changes in sea ice reflect changes in atmospheric and ocean circulation and properties, while the changing seasonality of sea ice plays a predominant role in controlling much of the polar marine ecosystem. Since the late 1970s satellites have allowed us to track sea ice changes from space. More here:

<https://www.lternet.edu/research/keyfindings/changes-ice-and-heat>

Underwater Gliders Provide New Way to Study Marine Ecosystem. PAL-LTER scientists have developed the first sustained underwater polar robotic network to overcome the chronic undersampling of the WAP region. The PAL-LTER autonomous underwater vehicle (AUV) network consists of a fleet of underwater Slocum buoyancy gliders. More here: <https://www.lternet.edu/research/keyfindings/new-view>

Climate Change Impact on Antarctic Food Webs. The WAP is one of the most rapidly warming places on the planet and the ecosystem is responding to the rapid climate warming. PAL-LTER observations of the Antarctic marine food web started in 1990, but some changes are just now becoming apparent. Antarctic food chains are traditionally believed to be short and simple, efficiently funneling energy to large predators like seals and whales. We believe we're witnessing the development of a much more complicated food web with new types of grazers and increased microbial activity. More here:

<https://www.lternet.edu/research/keyfindings/delicate-conditions>

Penguins and Climate Change. Long-term ecological research in the WAP has revealed a situation in which PAL-LTER researchers now consider Adélie penguins (*Pygoscelis adeliae*) to represent the canaries in the coal mine. Changes in the penguin populations over time in the PAL-LTER study area are providing some of the earliest evidence that regional climate warming is negatively impacting the marine ecosystem on which this and other species depend. More here: <https://www.lternet.edu/node/157>