

Paleoceanographic and climatic variability on decadal to millennial timescales across the Drake Passage (PALEODRAKE)

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Principal objective

To recover sediment sequences for portraying at decadal-millennial resolution the physical and chemical evolution of surface to deep water masses, sea ice extent, frontal positions, and interocean transports within the Drake Passage.

Project summary

Paleodrake requests support to recover cores at marine sites in order to portray the decadal-millennial scale climate and ocean variability in the Drake Passage region of Antarctica through the Holocene and the last glacial period. These records will ultimately provide the quantitative reconstructions necessary to first define the magnitude and expression of natural climate variability in the region, and then to clarify the nature of its coupling to changes in Antarctic water mass properties and circumpolar circulation.

The key topographic constraint on circumpolar circulation, the Drake Passage, is hypothesized to influence global water mass distributions and overturning rates. Consequently, any assessment of the ocean's relationship to climate ultimately requires constraints from this region. Furthermore, our proposed marine sites provide the geographic complement to Antarctic ice core records necessary for characterizing the spatial expression of natural climate variability and identifying its origin. The results will provide the necessary perspective for contextualizing the significance of recent trends in polar climate observed in the Southern Annular Mode and upper to deep ocean properties, relative to the magnitude of their low frequency variability in the past.

Paleodrake is designed to capitalize on the window of opportunity presented by the presence of the G.O.Sars in the Southern Ocean as part of IPY.