

Ice-Tethered Profiler: Background

Sea ice presents a significant impediment to sustained observation of the Arctic Ocean. Manned polar field operations with the associated logistics of ice-capable ships and aircraft are expensive, which limits sampling. Furthermore, perennial sea ice precludes or makes difficult the use of many modern automated observational instruments such as profiling and/or acoustically-tracked expendable floats. As a result, the Arctic Ocean under the ice pack remains very poorly sampled in comparison to the temperate seas.

This observational gap represents a critical shortcoming, both for operational programs at high northern latitude and for the envisioned "global" ocean observing system. Building on the ongoing success of ice drifters that support multiple discrete subsurface sensors on tethers and the WHOI-developed Moored Profiler instrument capable of moving along a tether to sample at better than 1-m vertical resolution, we designed and field tested an automated, easily-deployed Ice-Tethered Profiler (ITP) for Arctic study. The system consists of a small surface capsule housing a controller interfaced to an Iridium data telemetry unit and inductive modem, a plastic-jacketed wire rope tether extending down 500 to 800 m into the ocean terminated by a ballast weight, and a new variation of the WHOI Moored Profiler (in shape and size much like an Argo float) that mounts on the tether and cycles vertically along it. Communication between the Profiler and surface controller is supported by an inductive modem (utilizing the wire tether and seawater return), and between the surface unit and shore via a satellite link.

A detailed description of the ITP instrument system is available under the "Technology" link to the left. The WHOI team members involved in the ITP program are showcased under the "Investigators" link.

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