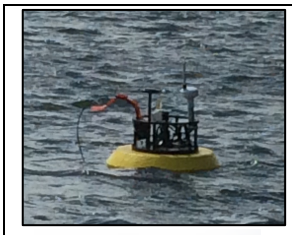
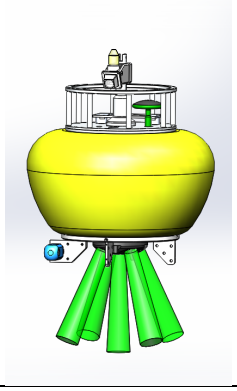
SWIFT: Surface Wave Instrument Float with Tracking, v4





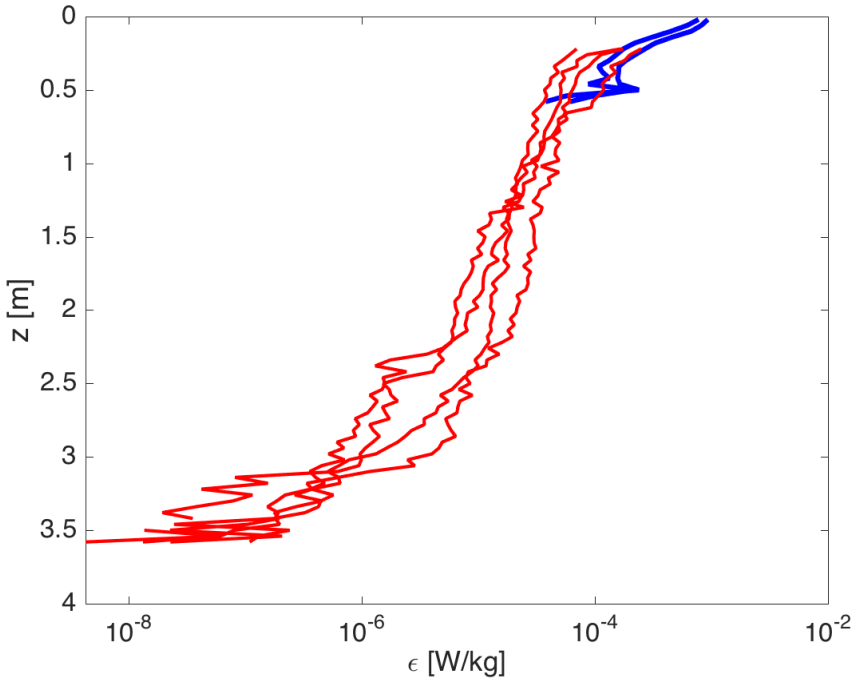
Hull	Anodized aluminum
Power	14 VDC, Alkaline or Lithium (custom)
Weight	20 kg in air
Dimensions	0.52 m tall, 0.45 m diameter
Shipping crate	0.58 x 0.56 x 0.76 m
Endurance	4 days (Alkaline), 12 days (Lithium)
Tracking (RF)	AIS ship traffic system (10 km range)
Tracking (Iridium)	Geoforce SmartOne (global)
Telemetry	Iridium SBD
Processor	Sutron Xpert
Profiler	Nortek Signature 1000
IMU	SBG Ellipse
CT	Aanderaa 4319
Camera	123 Camera Y201-TTL
Light	Yellow 1s strobe

SWIFT drifters were developed by Jim Thomson's group in the Applied Physics Lab at the University of Washington. The primary purpose of the drifter is to measure turbulence at the ocean surface in a wave-following reference frame. The turbulence measurements use pulse-coherent Doppler profilers. The first three versions of the SWIFTs used the Nortek Aquadopp profiler. In 2016, a new version (v4) of SWIFTs was developed around the Nortek Signature1000 profiler with an integrated Attitude-Heading-Reference-System (AHRS).

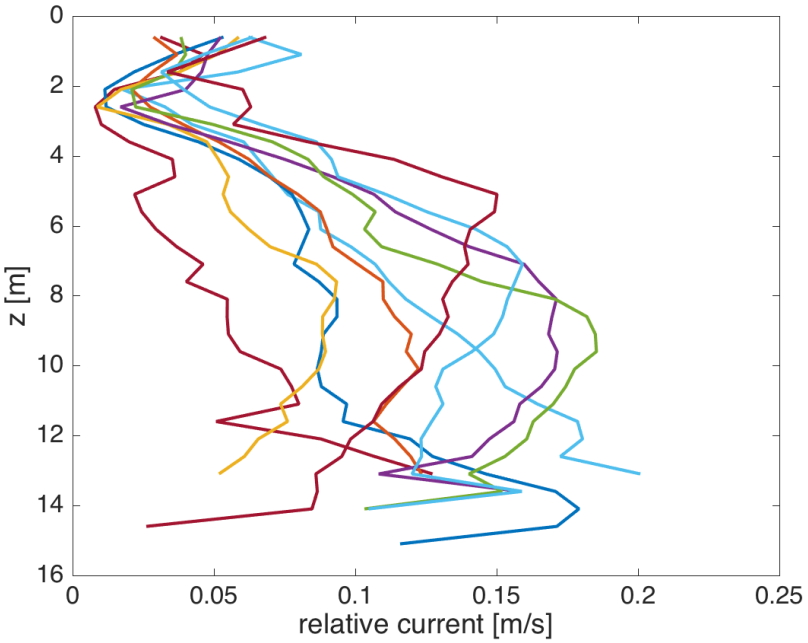
In addition to turbulence, SWIFTs measure directional wave spectra, salinity, water temperature, air temperature, and surface images. Raw data are processed onboard and results are telemetered hourly via Iridium protocol.

Since 2009, SWIFTs have been deployed to study air-sea interaction, wave breaking, and surface mixing at locations worldwide, totally over 20,000 hours of data collection. SWIFTs have also been deployed to study wave-ice interactions in the Arctic and have been air-dropped by helicopters to study extreme wave conditions. The original SWIFT drifter and associated methods are detailed in 2012 article in the Journal of Atmospheric and Oceanic Technology (vol. 29, p. 1866-1882). More information, and online data, are available at http://www.apl.uw.edu/swift .

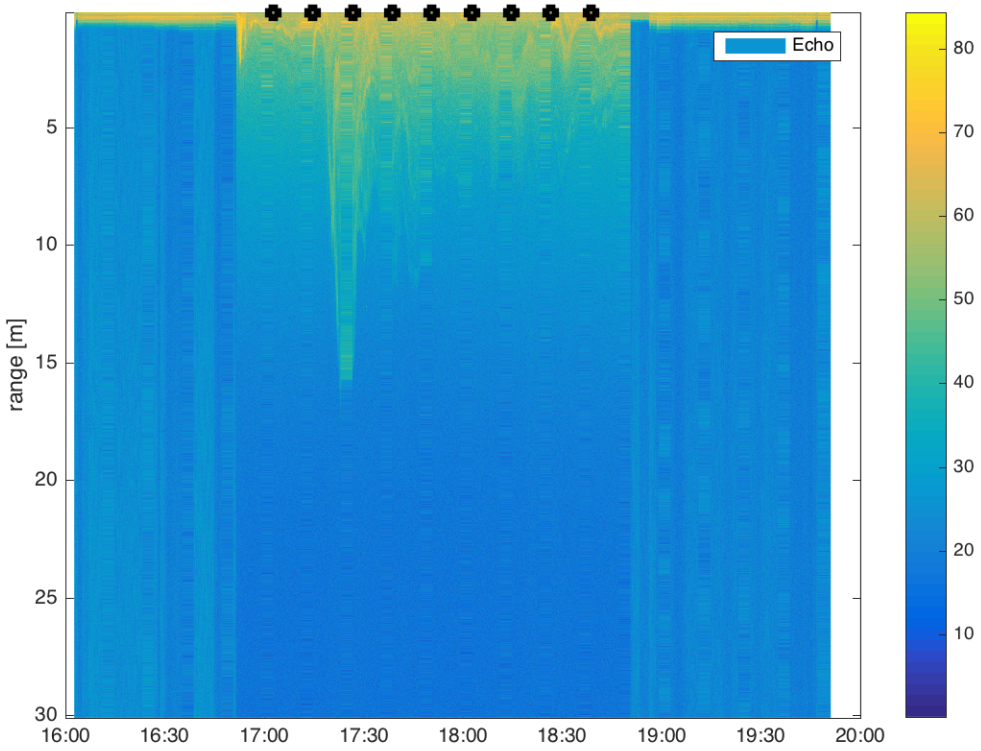
SWIFT v4 Data Examples



Turbulent dissipation rate profiles below the ocean surface under moderate winds and waves. Red profiles are from the Signature1000 (center beam, HR mode) on a v4 SWIFT and blue profiles are from the Aquadopp (HR mode) on a v3 SWIFT.



Mean current profiles below the ocean surface in a drifting reference frame. Profiles are from the Signature1000 (slant beams, broad band mode).



Echogram beneath the ocean surface under moderate winds and waves from the Signature1000 (center beam). Black symbols are the centers, in time, of the bursts for the HR velocity profiles.