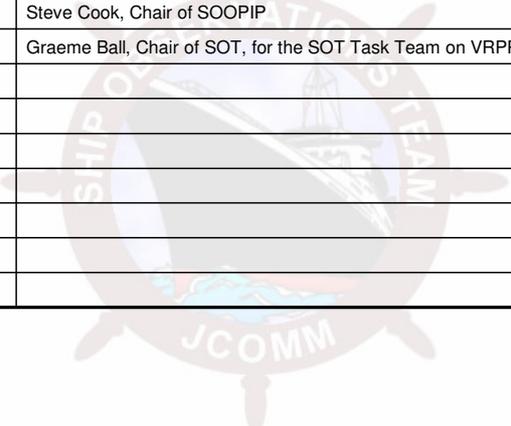






Version History

Version	Released	Updated by
1	2003	Steve Cook, Chair of SOOPIP
2	May 2005	Steve Cook, Chair of SOOPIP
3	June 2008	Graeme Ball, Chair of SOT, for the SOT Task Team on VRPP
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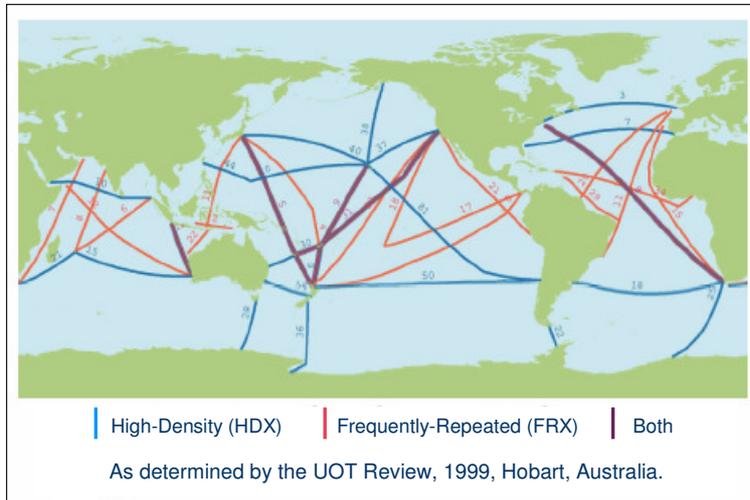
(slide does not show)

XBT SOOP

- Upper-ocean temperature profiles on repeat sampling lines using **ex**pendable **b**athy**t**hermographs (XBT).
- Sampling is performed every 4-6 hrs & sent free-of-charge from ship to shore. The reports are distributed globally to meteorological & oceanographic agencies.
- Globally ~ 60 ships and ~ 24,000 profiles annually.
- An XBT profile, including QC of data, takes 10 - 15 mins to complete. Message preparation & transmission is automatic.

Regular profiles on repeat sampling lines detects changes in the thermal structure.

Global XBT Sampling Lines



Sampling mode by line as at the Upper Ocean Thermal Review meeting, Hobart 1999

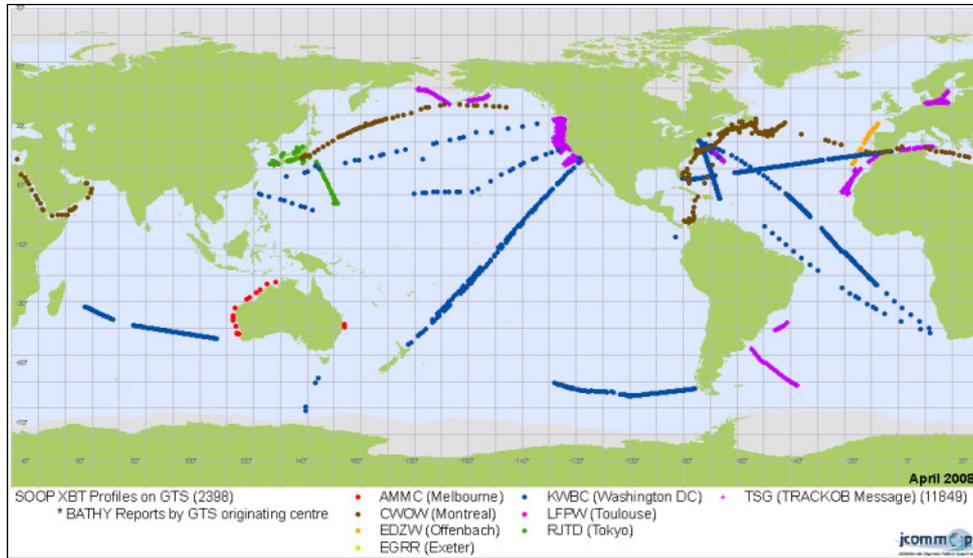
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FRX (frequently-repeated XBT) : 18 transects per year. Temporal separation of observations (4-6 hours depending on ship speed)

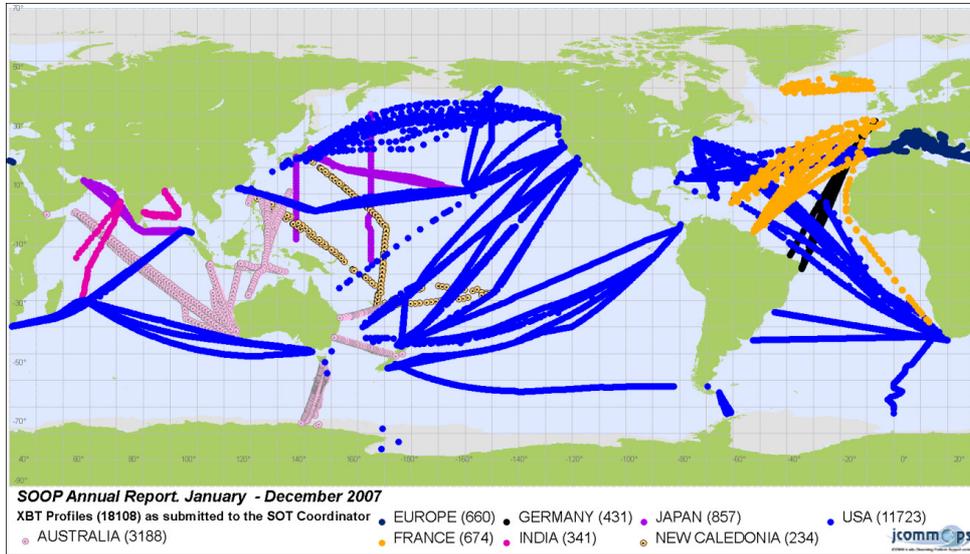
HDX (high-density XBT) : Few transects per year with agency ship rider onboard to do sampling. Spatial separation of observations (~ every 30 km).

LDX (low-density XBT, not shown on map) : 12 transects per year. Temporal separation of observations (4-6 hours depending on ship speed) on many more sampling lines than shown. LDX, or broadscale XBT sampling, is discontinued as the number of profiling floats reaches 3000 globally. In reality, some retained LDX lines that were converted to FRX are still transitioning from LDX to FRX.

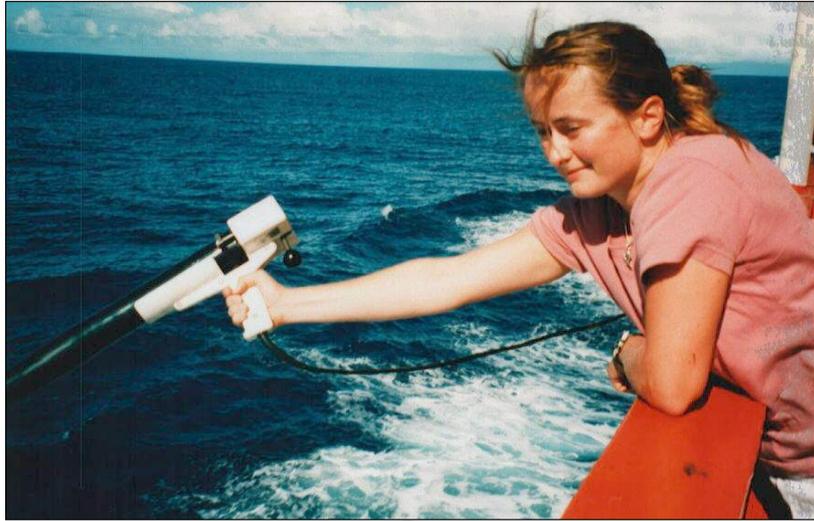
Real-time BATHY Messages



Distribution of BATHY Messages in 2007



Launching an XBT



Shipboard XBT System



Devil XBT System as used by the Australian Bureau of Meteorology

Photo of shipboard XBT system (Devil XBT used by the Australian Bureau of Meteorology)

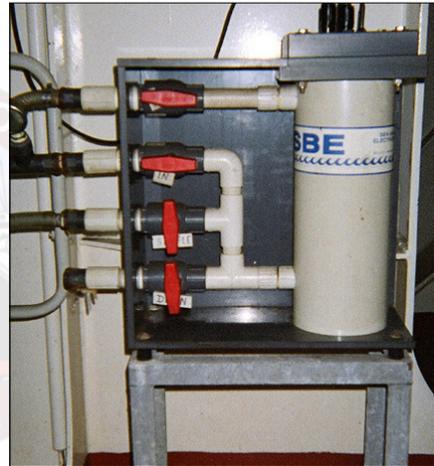
Complementary Underway Sampling

- Measurements include: atmospheric and ocean carbon, fluorescence, pigments, salinity & temperature.
- Sampling is mostly from research ships, and generally in association with high density XBT sampling.
- Temperature & salinity underway profile data are distributed globally to oceanographic & meteorological agencies.
- Other parameters are used & archived by the operator.

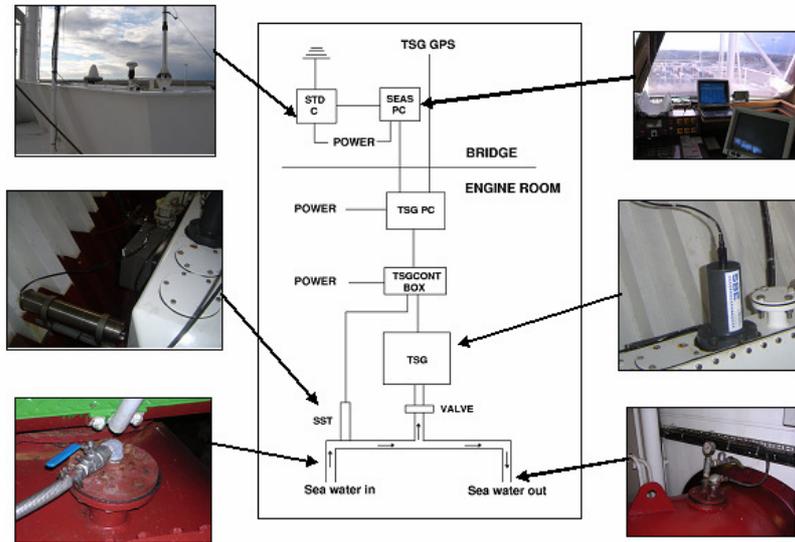
high-density XBT : Few transects per year but with agency ship rider onboard to do sampling. Spatial separation of observations (~ every 30 km).

Complementary Underway Sampling (cont)

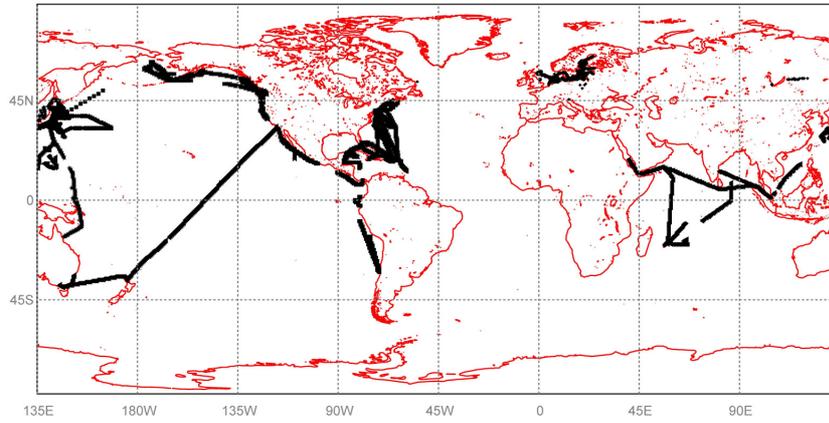
- Some continuous underway sampling systems require the system to be 'plumbed' to a sea-water or air inlet & outlet.
- The thermosalinograph (TSG) shown here, measures sea-surface temperature & salinity every 10 seconds along the ship's track.



Typical TSG Installation



Distribution of TRACKOB messages in 2007



TRACKOB – temperature and salinity along ship's track