

# Nansen Environmental and Remote Sensing Center and Scripps Institution of Oceanography

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## Acoustic observations from the Fram Strait

The objectives are 1) Use acoustic thermometry to observe the mean ocean temperature along sections criss-crossing the Fram strait. 2) Collect baseline information about the 'ocean sound' in the region.

Fram Strait is the only deep-water connection between the Arctic Ocean and the world oceans, and an important area for water-mass and sea-ice transports into and out of the Arctic Ocean.

**Acoustic thermometry** is used to observe the large scale ocean temperature variability. The data can be used by the ocean and climate modelling community to validate and ultimately to constrain their models. **Passive acoustic** data can be used to observe how in the ocean sound characteristics are sensitive to environmental changes due to climate change and increased human activities. The seasonal variability in vocalization of marine mammals can be used to indicate migration patterns. **Ocean Sound** is recently approved as an essential ocean variable.

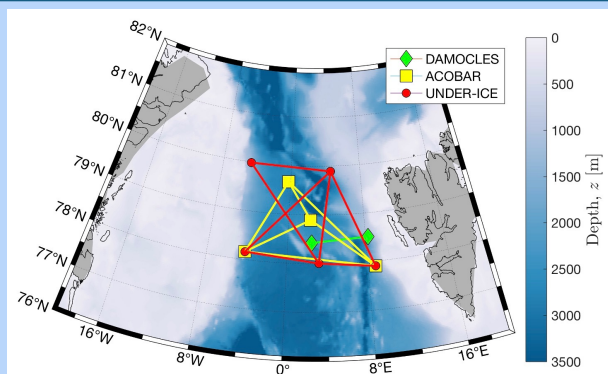


Figure 1. Data collection from three experiments: DAMOCLES 2008-2009: one location (Green) ACOBAR 2010-2012: three locations (Yellow). UNDER-ICE 2014-2016: five locations (Red)

### Data product:

Acoustic travel times, inverted to range-depth averaged sound speed and converted to mean ocean temperature. Passive acoustic data presented as spectrogram.

Example of two years of mean ocean temperature across the Fram Strait is derived from the acoustic travel times obtained under the ACOBAR project.



Figure 2 . Photo of an acoustic source used in the experiments.

### References:

H. Sagen, B. D. Dushaw, et al. 2016, J. Geophys. Res., 121, <http://dx.doi.org/10.1002/2015JC011591>.  
H. Sagen, P. F. Worcester; M. A. Dzieciuch; et al. (2017) J. Acoust. Soc. Am., 143.

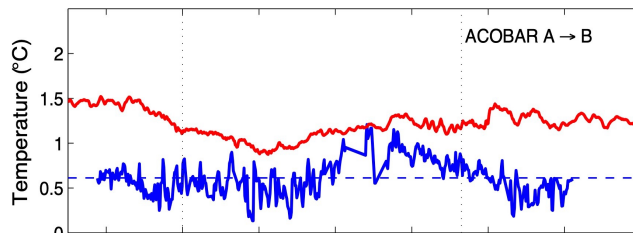


Figure 3 . One year temperature in the Fram Strait from acoustic data (blue) and an ocean model



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