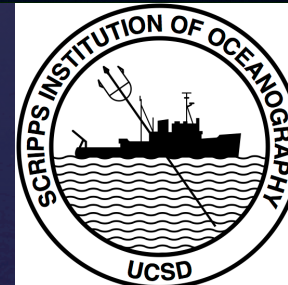


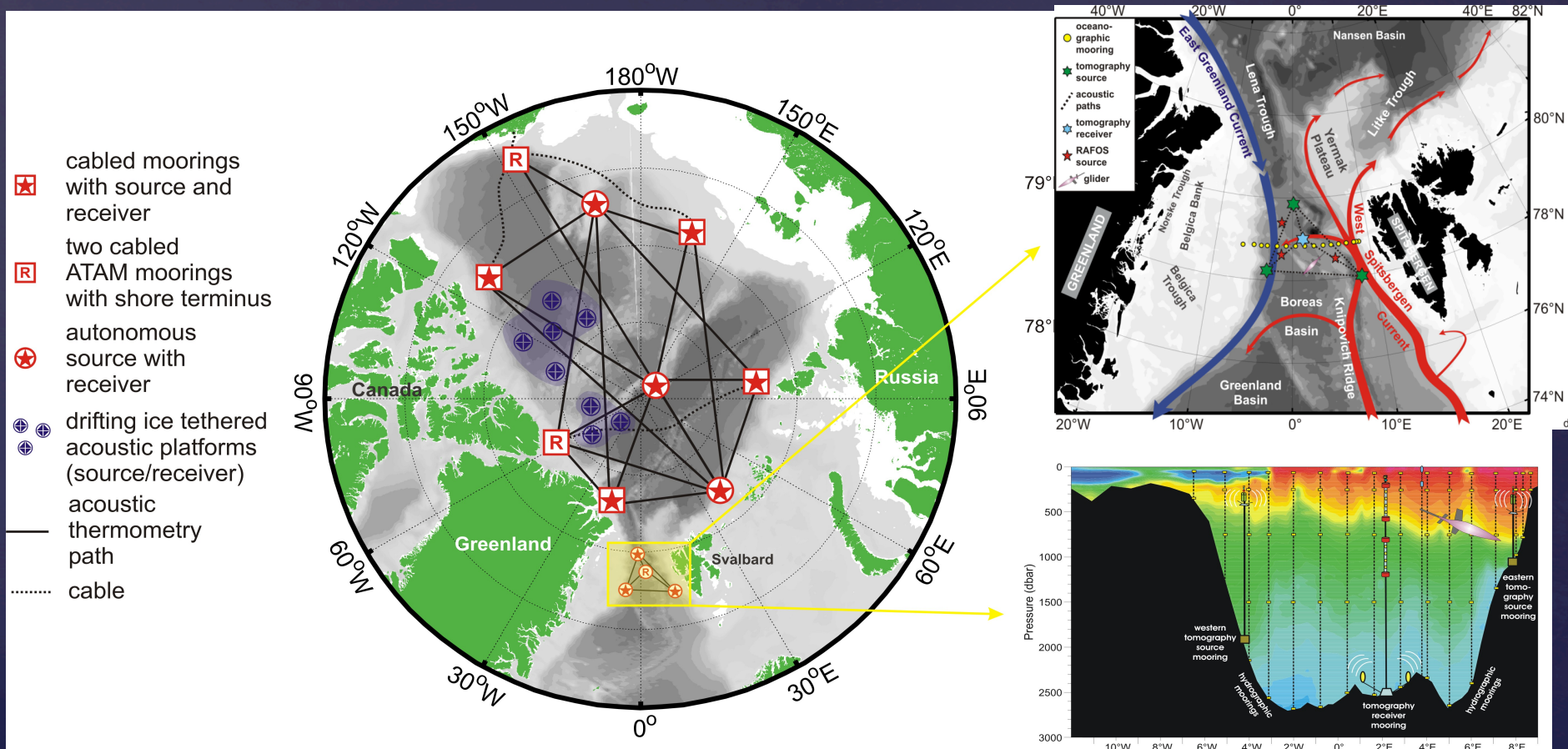
Arctic Watch: Acoustics in an Arctic Ocean Observing System.

Hanne Sagen, Peter Worcester, Peter Mikhalevsky,
Stein Sandven, Matthew Dzieciuch, Brian Dushaw,
and Walter Munk.

Presenter: Hanne Sagen, NERSC

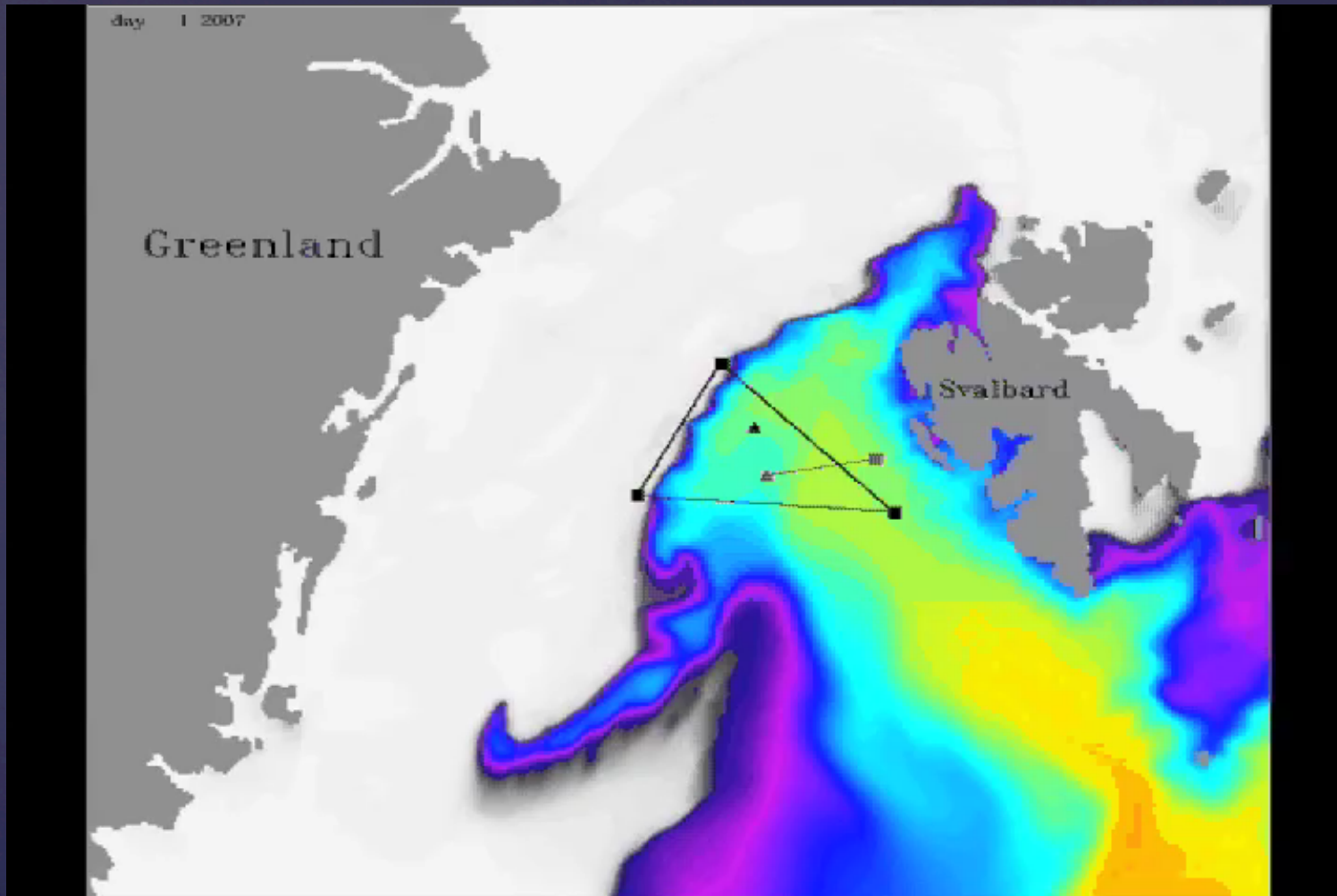


Multipurpose Acoustic Networks in the Integrated Arctic Ocean Observing System



A future underwater acoustic network – GPS for floats and gliders, listening system, and to measure averaged temperature and current. See Mikhalevsky, Sagen, Worcester et al. 2015

The Fram Strait

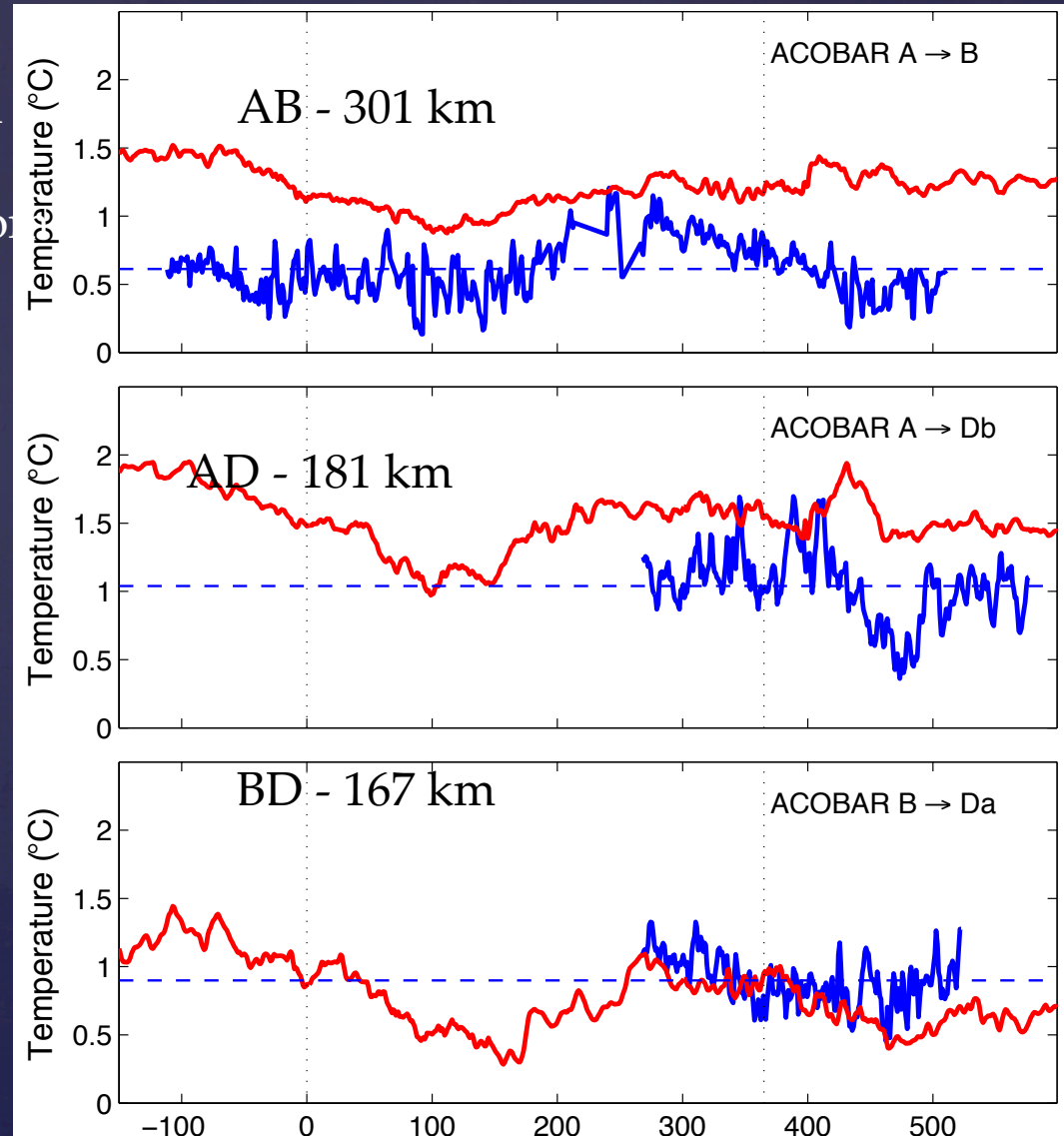
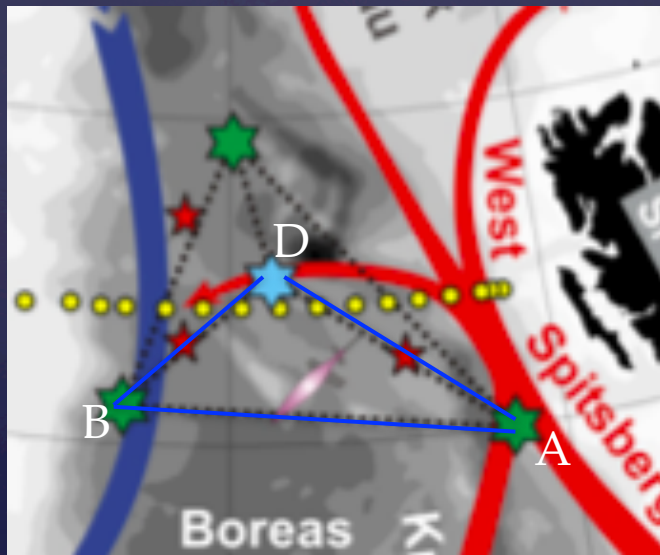


Goal is to combine in-situ observations, including acoustic thermometry, with ice-ocean models through data assimilation to improve the estimates of heat, mass and freshwater fluxes through the Fram Strait.

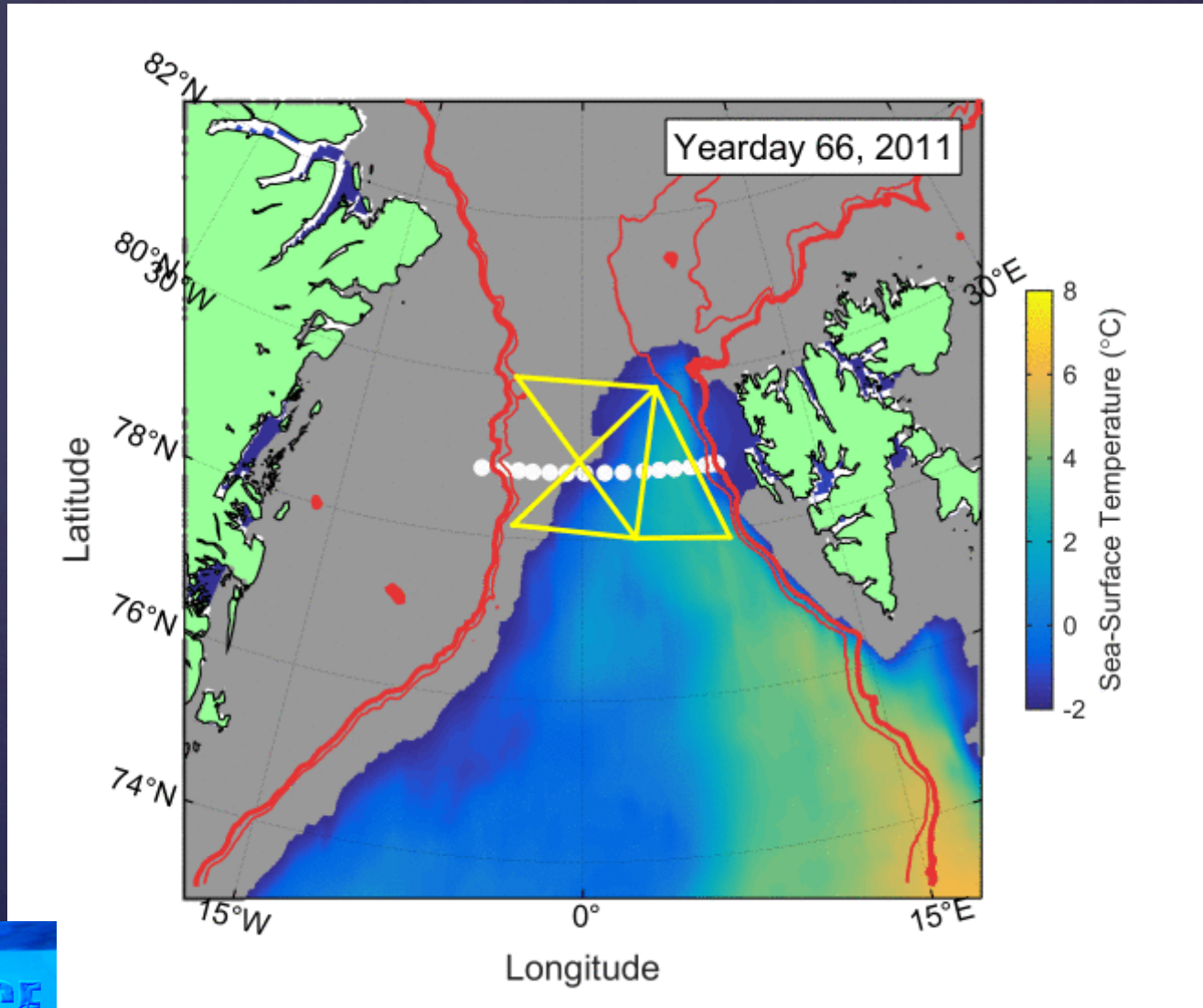
Model validation results with depth averaged ocean temperatures from acoustic thermometry

Blue line is the acoustically observed
Depth-range averaged temperature
Red line modelled measurements from
High resolution ice-ocean model
(Hycom, 3 km, 28 layers)

Dushaw, Sagen et al. in prep.



Ongoing: Regional multipurpose acoustic monitoring system FRAM STRAIT – UNDER-ICE 2014-2016



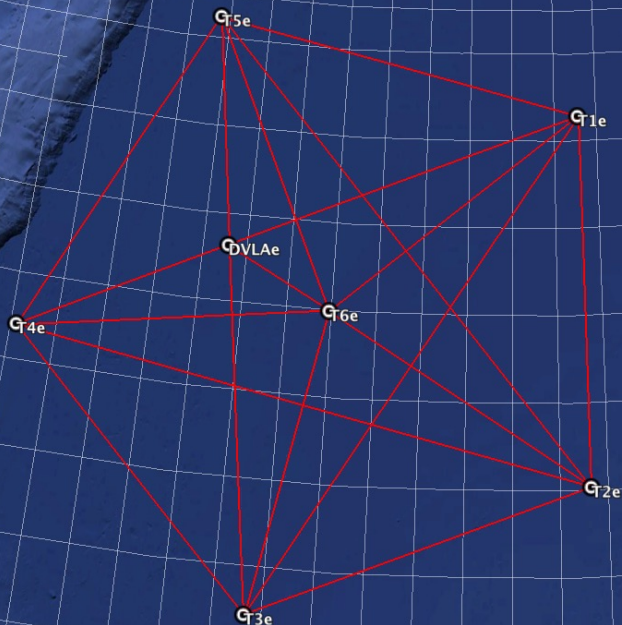
UNDER ICE

Planned regional multipurpose acoustic monitoring systems

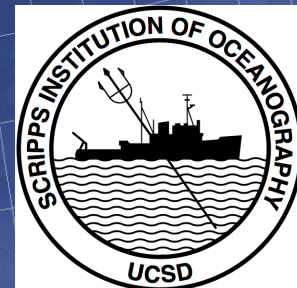
CANAPE – Beaufort Sea 2016-2017

CANAPE 2016–2017

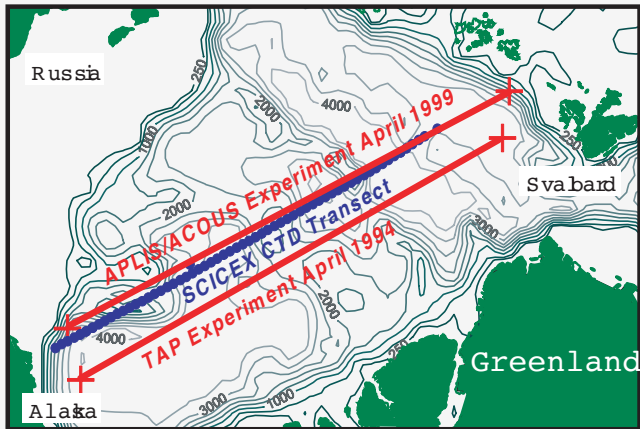
Legend
● Feature 1
● Feature 2



PI: Peter Worcester

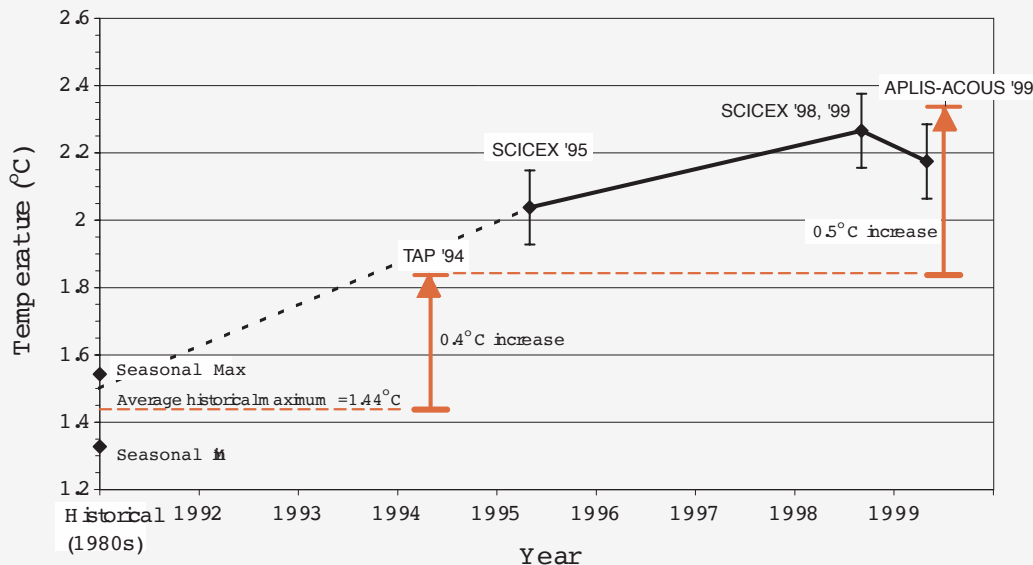


Trans Arctic experiment 1994-1999



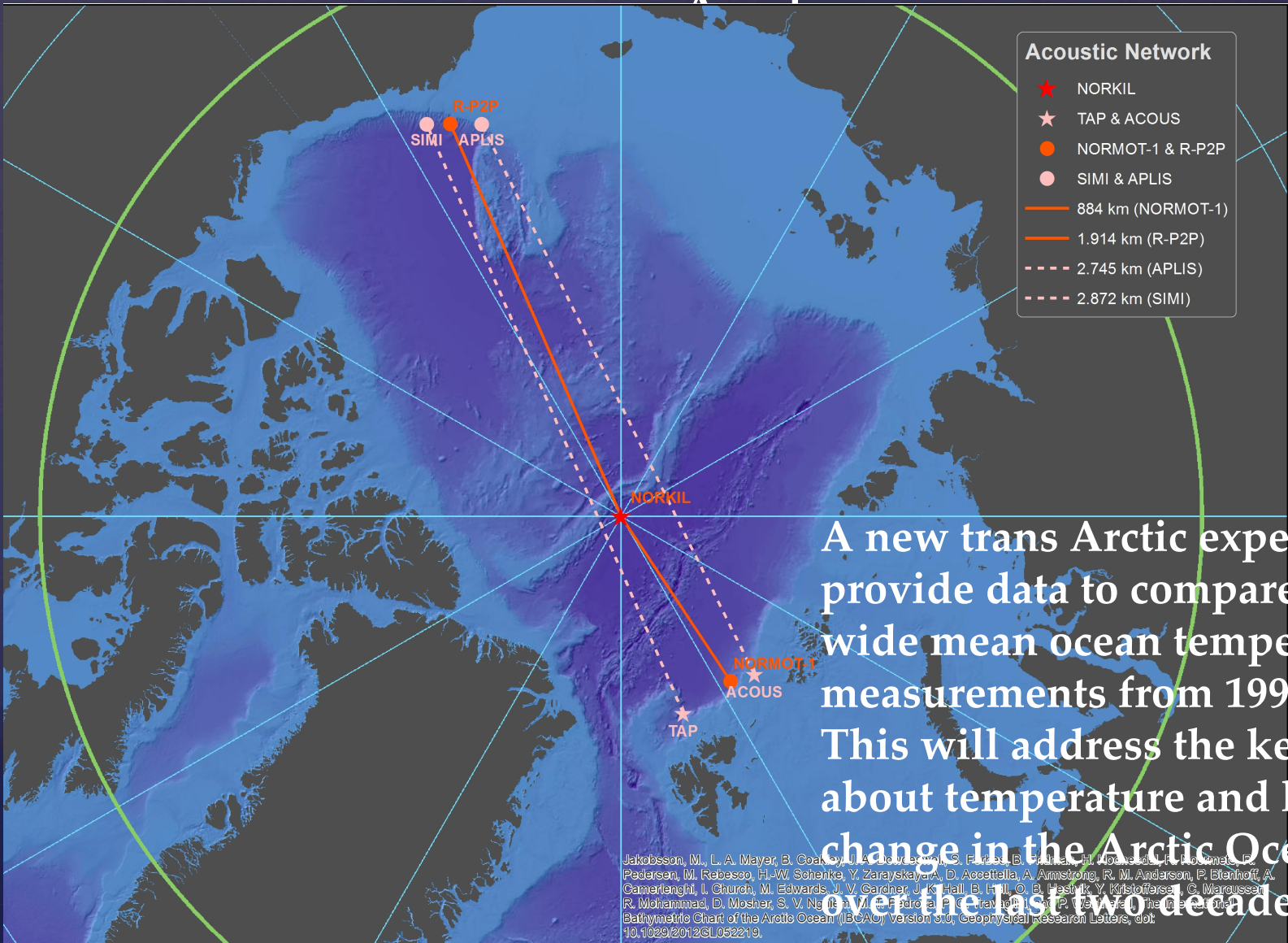
Acoustic thermometry documented increased averaged ocean temperature in the Arctic.

This was confirmed by oceanographic section obtained during SCICEX



Mikhalevsky.
Ocean Obs 99

Arctic Watch : Pilot multipurpose acoustic system for underwater GPS and thermometry in central



A new trans Arctic experiment will provide data to compare with basin wide mean ocean temperatures measurements from 1994 and 1999. This will address the key question about temperature and heat content change in the Arctic Ocean interior over the last two decades.

Technologies for regional Multipurpose acoustic systems are mature and used in several regions.

Acoustic thermometry provide range averaged ocean temperatures from regional to basin wide scales.

Baseline measurements for validation and calibration of climate and ocean models to assess their capabilities to predict future climate both in the Arctic and on global scale.

Our ultimate goal is to use the acoustic measurements to constrain the models to provide better short and long term predictions.