

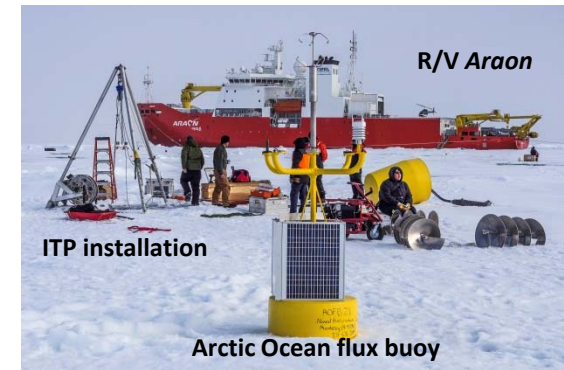
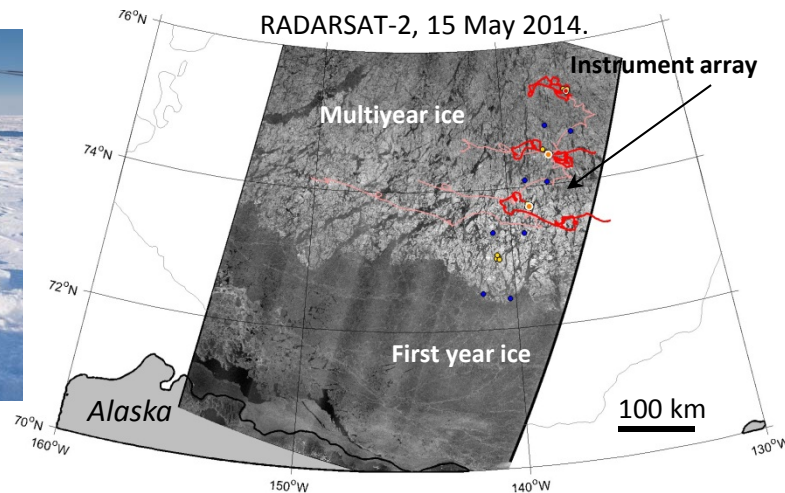


## ***Marginal Ice Zone Project*** **Main Field Experiment, March-October 2014**

1. Understand atmosphere-ice-ocean-waves interactions and feedbacks in the summer marginal ice zone of the Beaufort Sea.
2. Demonstrate robotic technology for integrated observation of the coupled atmosphere-ice-ocean-waves system of the marginal ice zone.



Wave buoy



# ONR Marginal Ice Zone Project

## Key Events and Assets Deployed

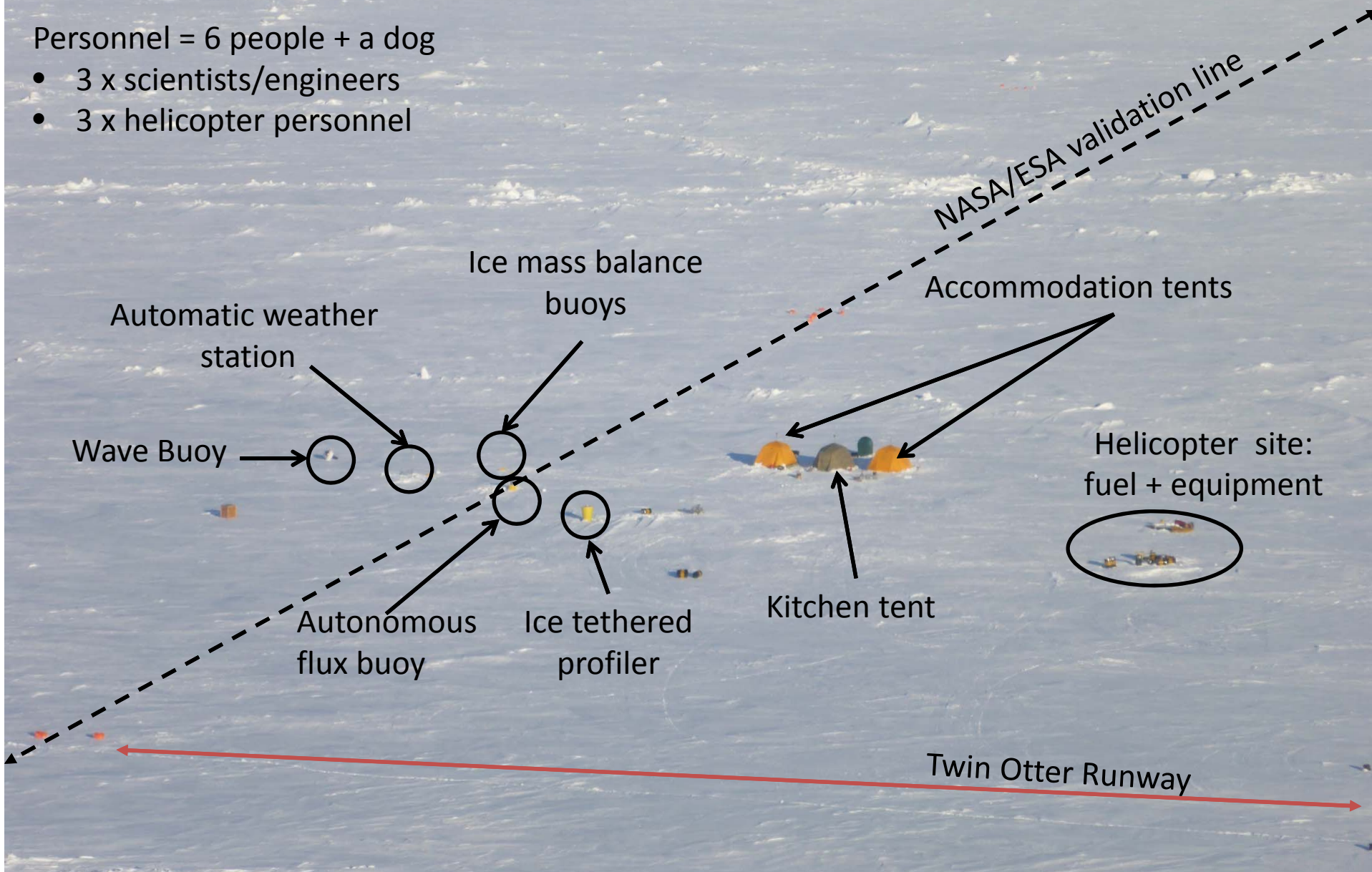
1. Experiment begins in **March 2014** with airborne/ice camp deployment, from Sachs Harbour, Canada, of the initial robotic/autonomous array in the eastern Beaufort Sea: weather stations, wave buoys, ice mass balance buoys, flux buoys, ice-tethered profilers, polar profiling floats, acoustic sources.
2. Seagliders, Wavegliders and SWIFT wave floats deployed in **late July** in the south-central Beaufort Sea from the R/V *Ukpik* out of Prudhoe Bay.
3. Wave buoys, ice mass balance buoys, flux buoy, ice-tethered profiler deployed in **mid-August** in the north-central Beaufort Sea from the R/V *Araon*.
4. Seagliders, Waveglider and SWIFT floats recovered in **late September** by the Norseman II.
5. Remote sensing: Declassified high resolution electro-optical (collaboration with the intelligence community) & synthetic aperture radar imaging with RADARSAT-2 and TerraSAR-X.
6. Collaborations: British Antarctic Survey; Korea Polar Research Institute; NASA Operation IceBridge; NOAA National Weather Service; U.S. National Ice Center.

<http://www.apl.washington.edu/project/project.php?id=miz>



Personnel = 6 people + a dog

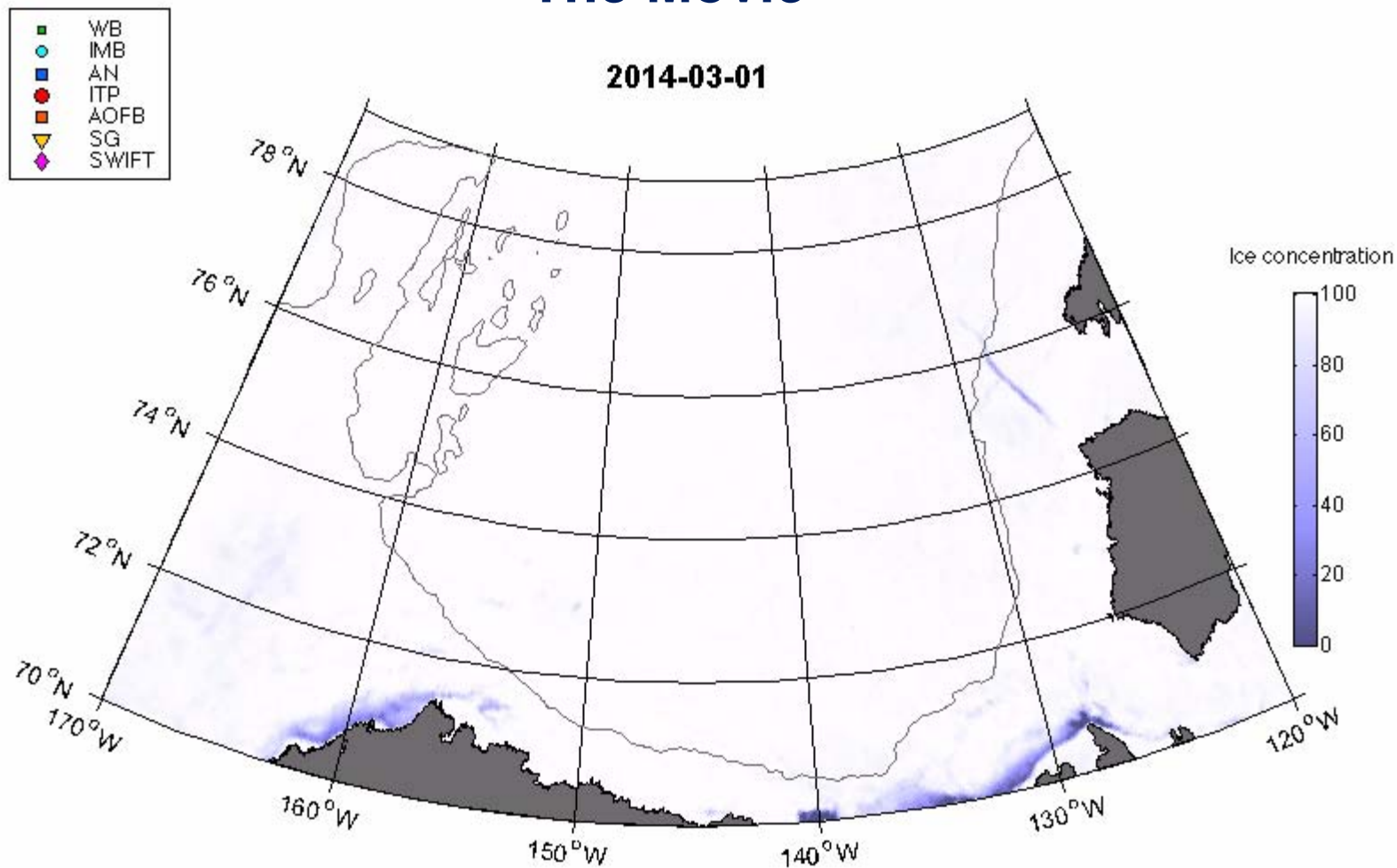
- 3 x scientists/engineers
- 3 x helicopter personnel





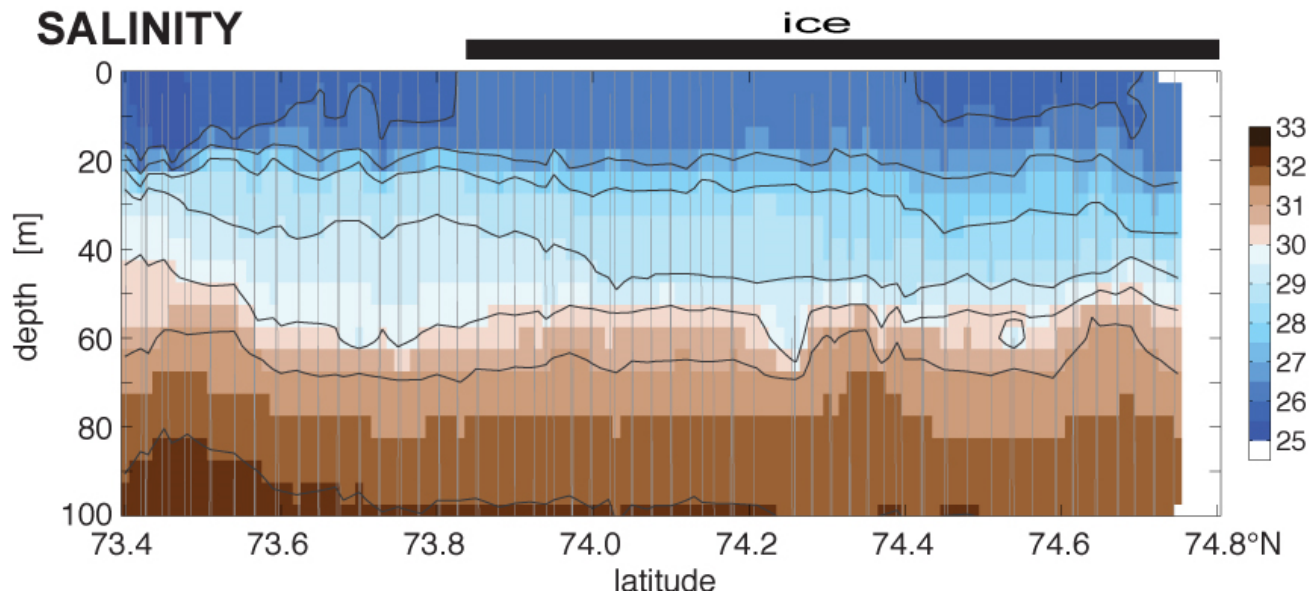
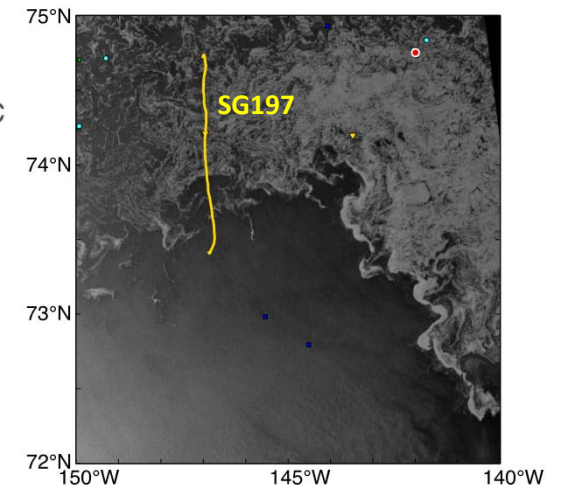
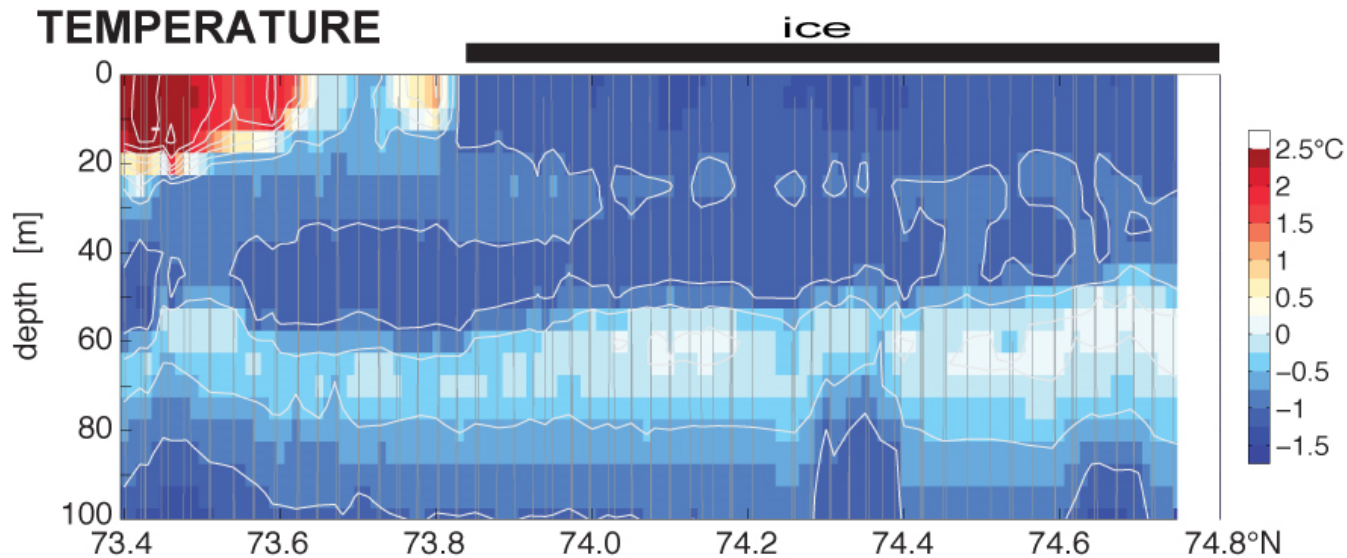
# ONR Marginal Ice Zone Project

## The Movie



# SeaGlider 197 Section from under ice to open water

## 8 days, 146 km, 52 dives, 1-9 September 2014



Acoustic communication and navigation (GPS) over distances of 200-250 km (maximum 400 km) due to a sound channel between 50-200 m. Reduced ice interference with acoustic signals.



# ***Sea State & Boundary Layer Physics of the Emerging Arctic Ocean***

## **Main Field Experiment, September-November 2014**

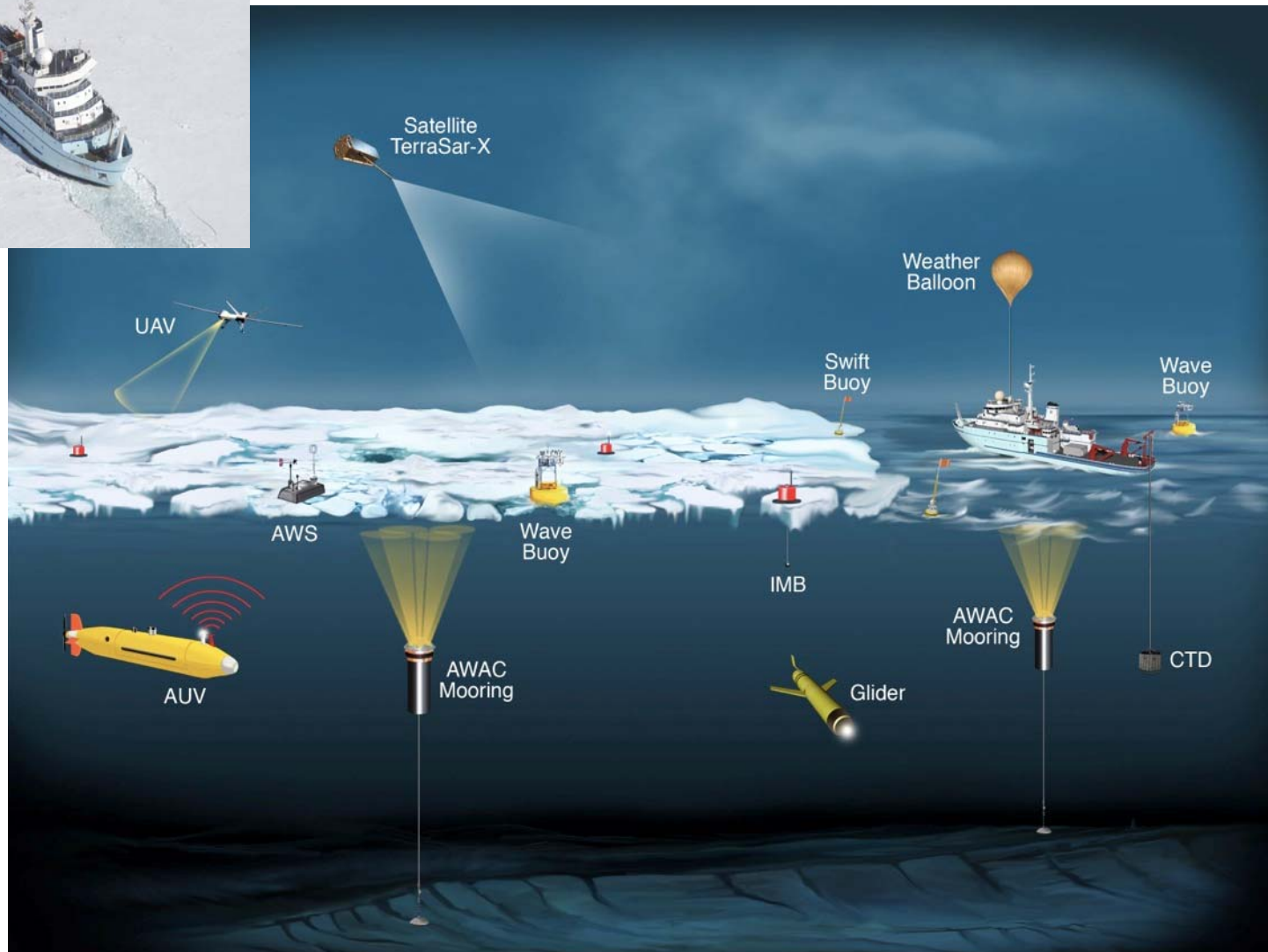
In situ observations, remote sensing and modeling to address the following objectives:

1. Develop a sea state climatology for the Arctic Ocean.
2. Improve wave forecasting in the presence of sea ice.
3. Improve theory of wave attenuation/scattering in the sea ice cover.
4. Apply wave–ice interactions directly in integrated Arctic system models.
5. Understand heat and mass fluxes in the air–ice-ocean-waves system.

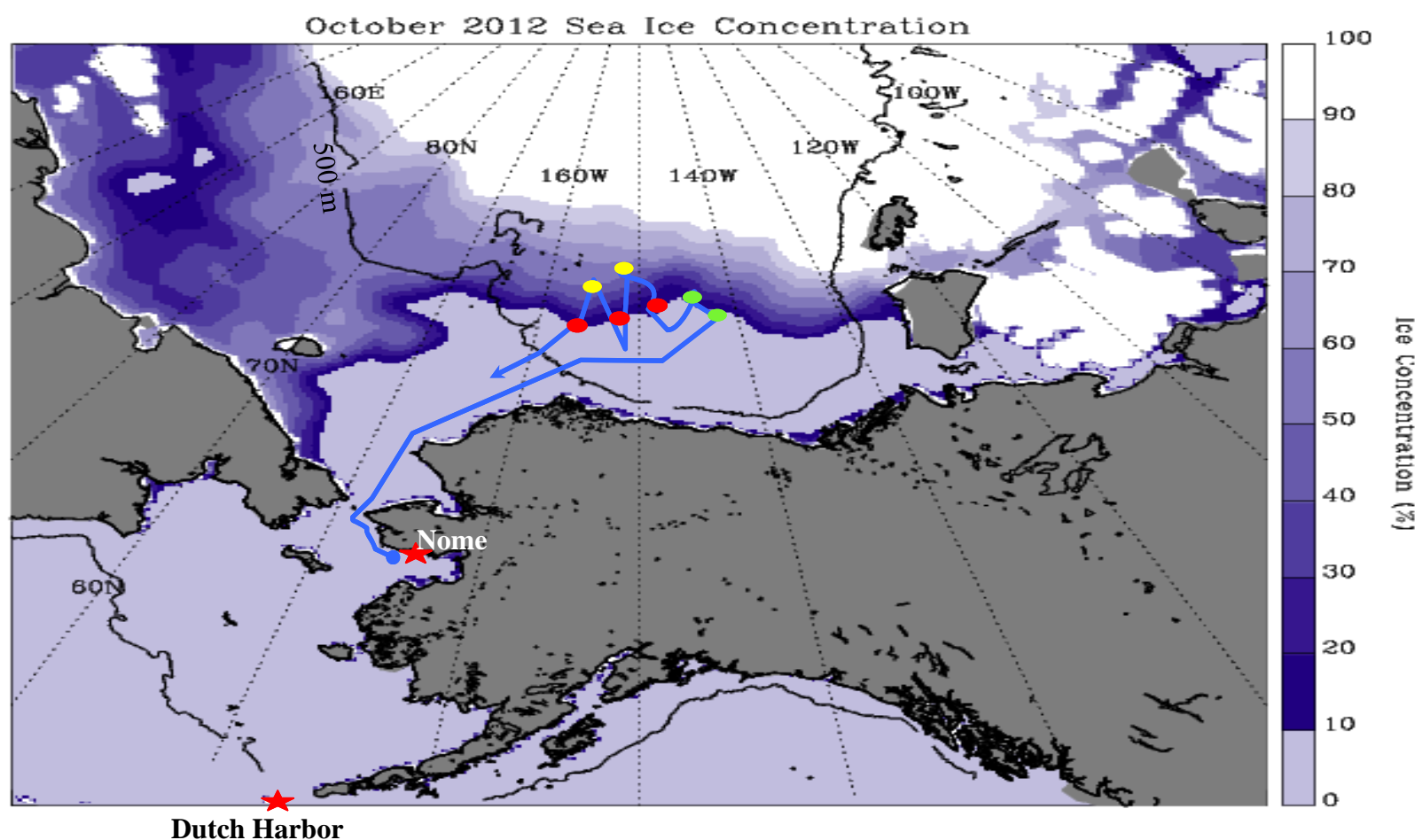
[http://www.apl.washington.edu/project/project.php?id=arctic\\_sea\\_state](http://www.apl.washington.edu/project/project.php?id=arctic_sea_state)

# Sea State Project: Observing Plan - 1

R/V Sikuliaq, 25 September - 4 November, 2015



# Sea State Project: Observing Plan - 2



- Boundary layer fluxes (underway meteorology, wave radar, temperature, salinity)
- Open water, sea state / flux study (SWIFTs, wave buoys, CTDs, glider)
- Solid ice edge, wave reflection study (wave buoys, CTDs, SWIFTs)
- Advancing ice study (AUV under-ice transects, LiDAR, EMI, CTDs, UpTempOs)
- Ice pack/transect study (IMBs, AUV, LiDAR, EMI, CTDs)





***Thank You!***