



MEOPAR

MARINE ENVIRONMENTAL OBSERVATION
PREDICTION & RESPONSE NETWORK

The Observation Core

Brad deYoung
Memorial University



MEETING THE CHALLENGES OF OUR CHANGING OCEAN



Core Components

To develop and enable ocean technology for MEOPAR and the wider ocean community

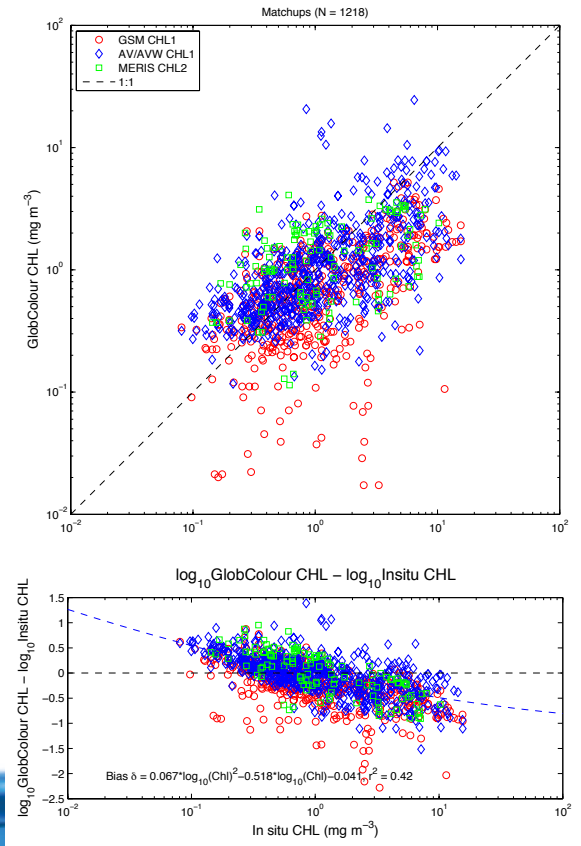
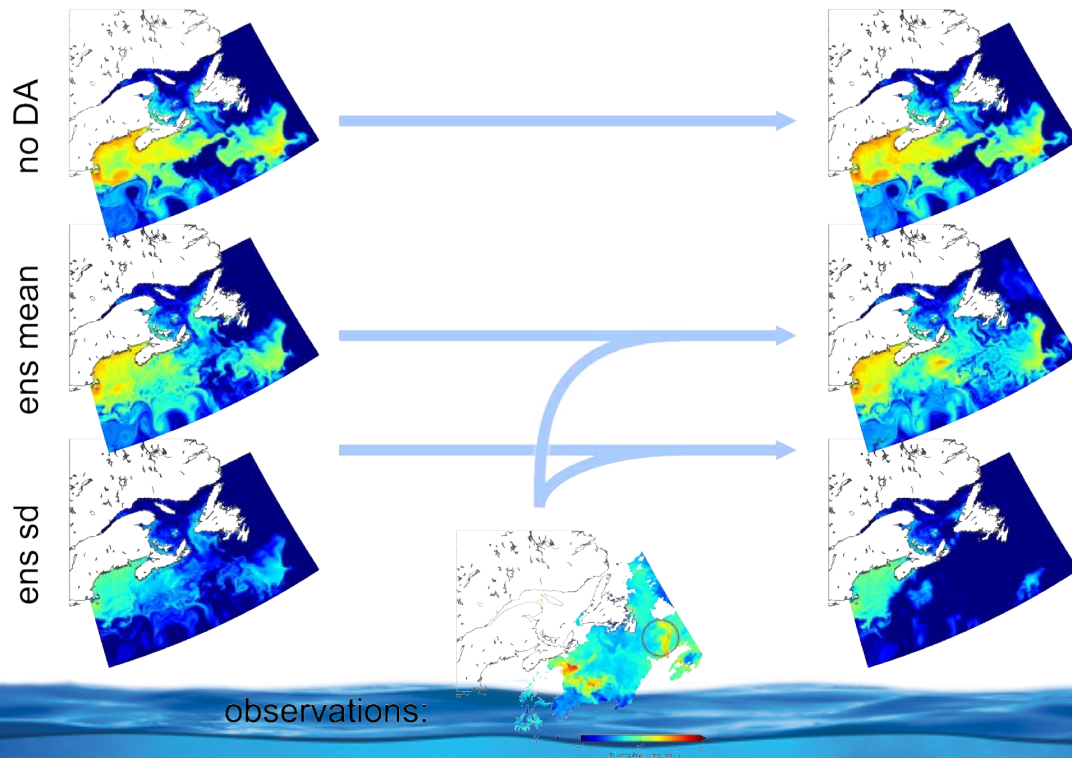
- Remote Sensing – M. Babin – Universite Laval
- CODAR Coastal Radar – B. deYoung – Memorial University S. Pecknold DRDC
- Ocean Data View – D. Wallace – Dalhousie University
- Dorado Vehicle Development – D. Wallace – Dalhousie University
- Vertical Profiler Development – B. deYoung & R. Bachmayer – Memorial University
- Community Initiatives
 - Ocean Gliders Canada
 - IAOOS and SmartAtlantic
- What's next?



Takuvik-Meopar: Satellite products

Delivery of times series of Chlorophyll-a concentration (Chl-a) and Sea Surface Temperature for data assimilation in Computation of regional error budget for chl-a concentration. PI: K. Fennel, Dalhousie, Halifax, NS

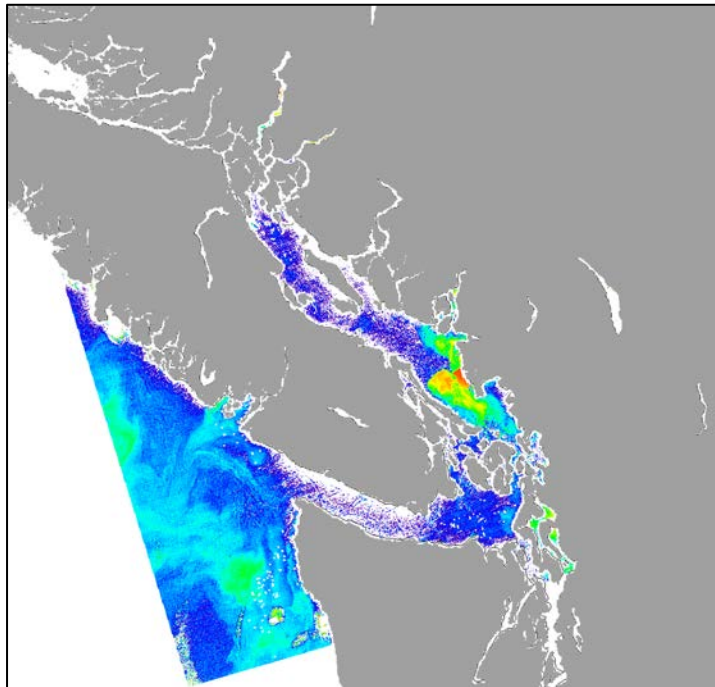
EnKF: impact of observations



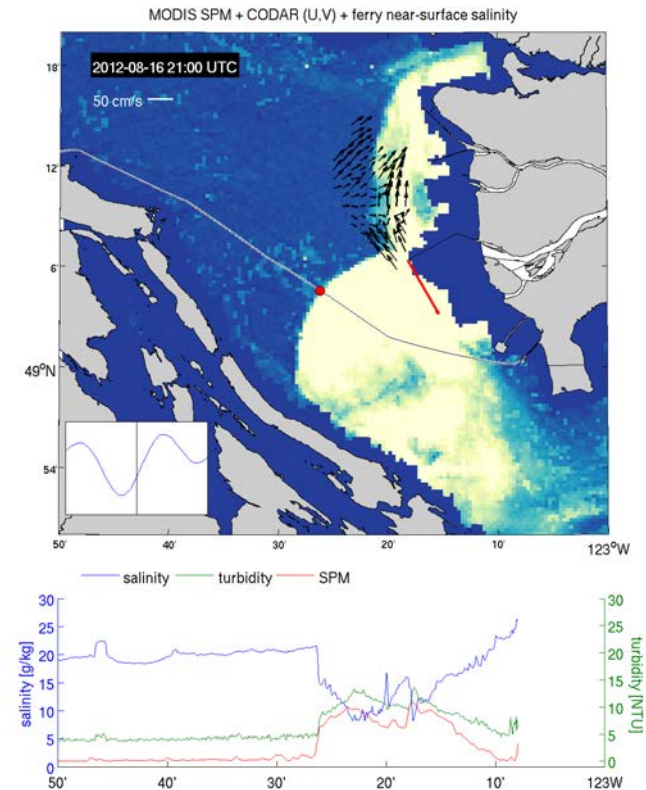
Takuvik-Meopar : Satellite products

Times series of high resolution satellite images of Suspended Particulate Matter in the strait of Georgia, characterisation of the Fraser River Plume.

PI: Rich Pawlowich, UBC, Vancouver, BC

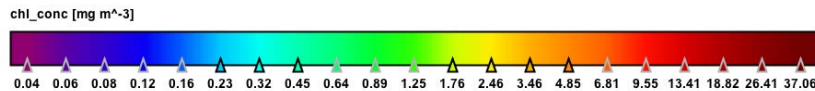
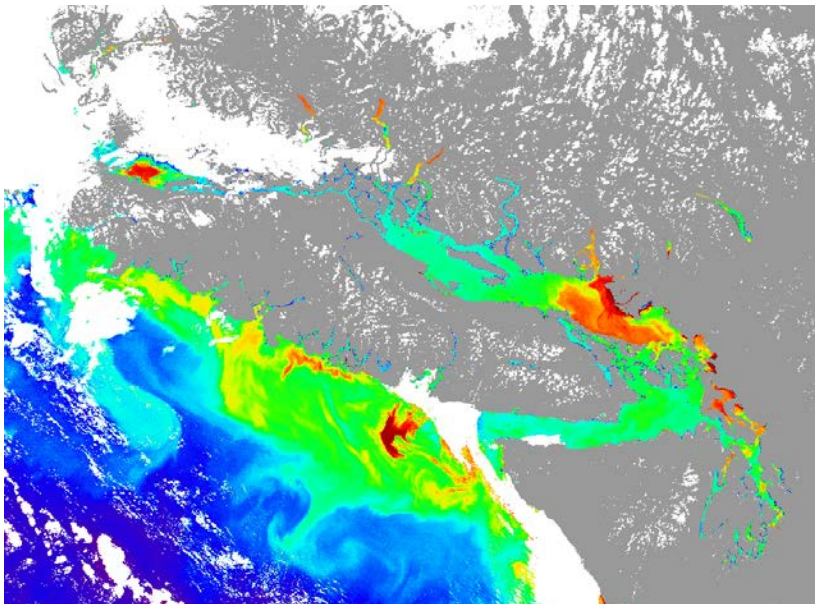


MODIS 250m resolution, suspended particle matter 16-08-2012

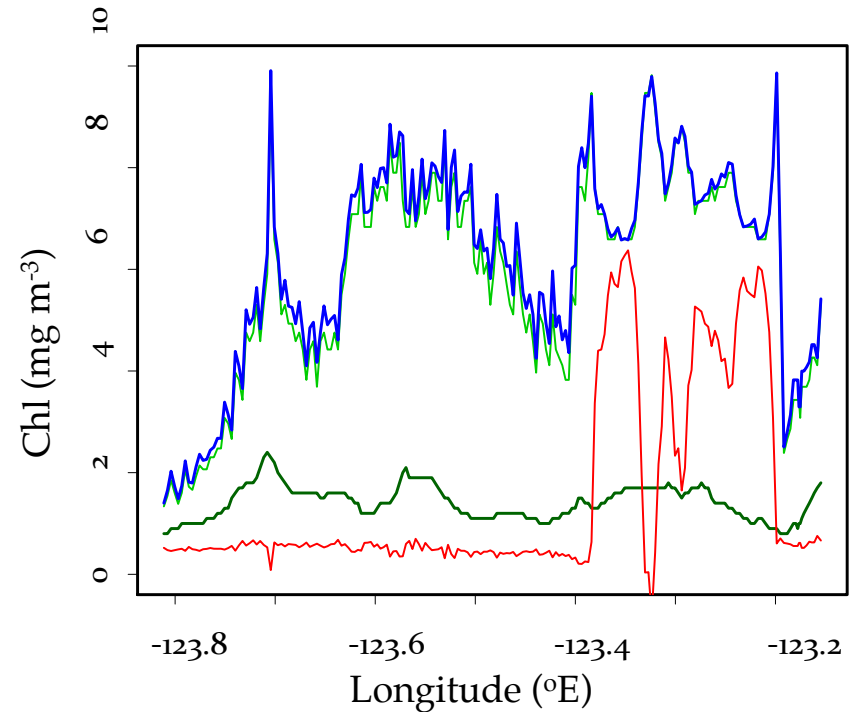


Takuvik's MEOPAR: Satellite products

Performance assessment of chlorophyll-a algorithm in the Strait of Georgia.
PI S. Allen, UBC, Vancouver, BC.



Chl (mg m⁻³)



— Ferry Chl — NN Chl
— FLH — NN Chl + case 2 AC

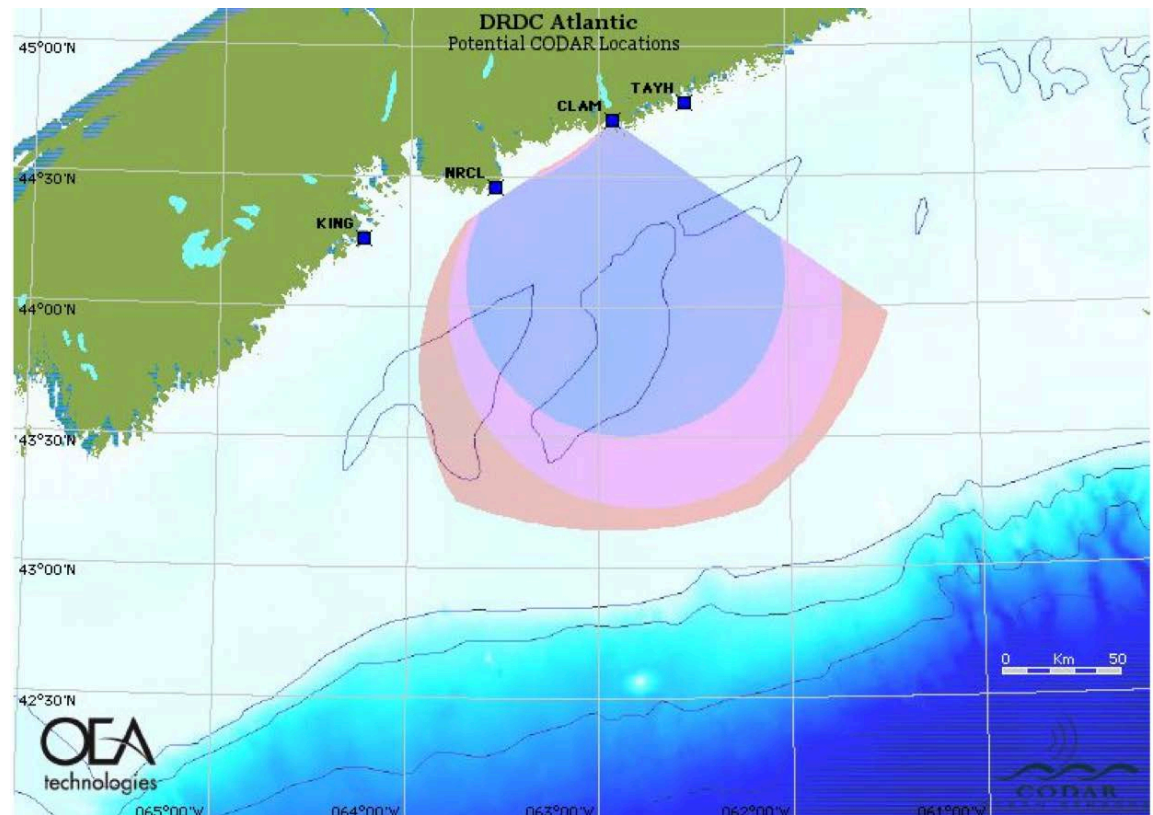
Need to develop and validate a local algorithm



Codar – Halifax Deployment

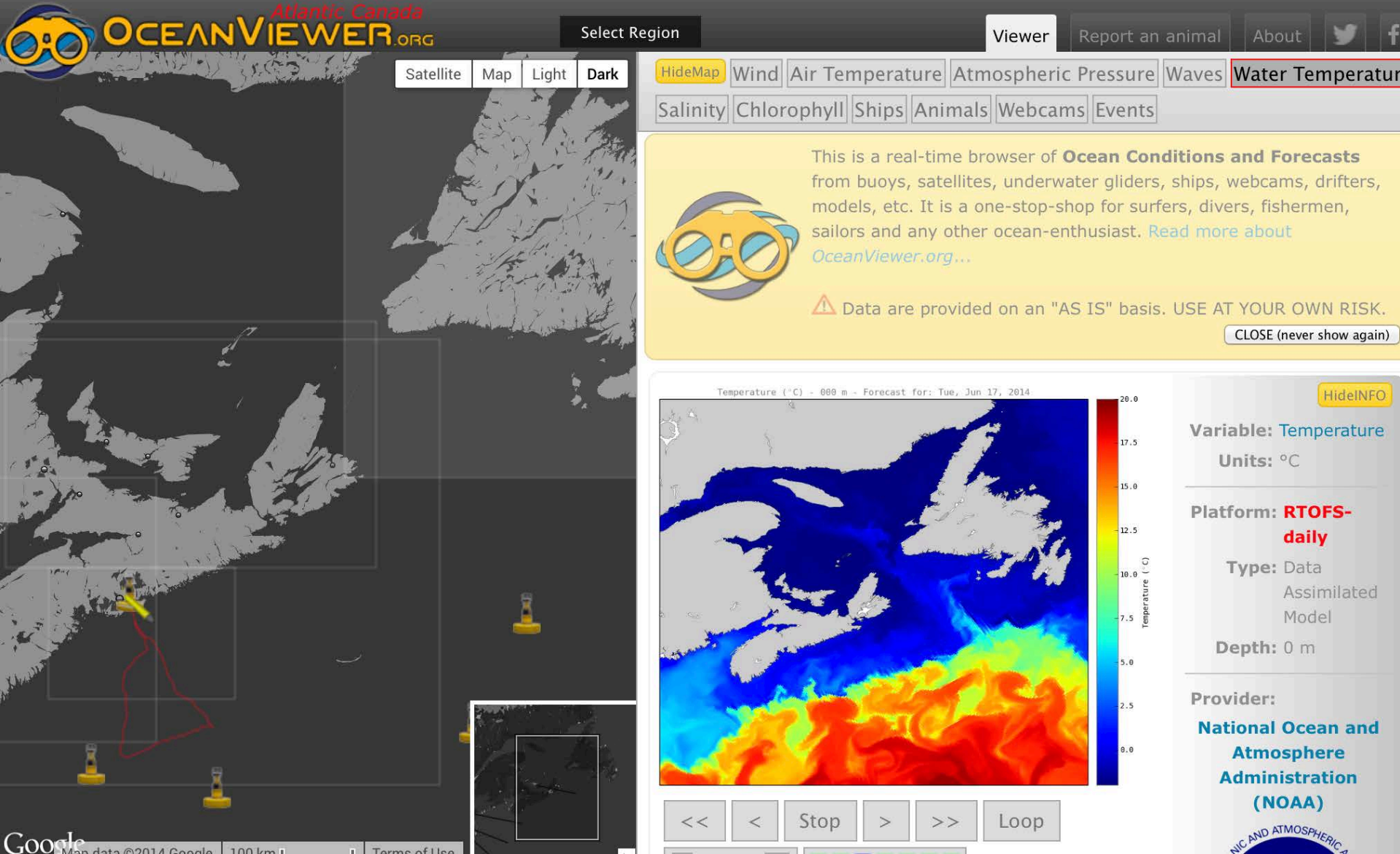
Partnership between Dalhousie and Memorial Universities and Defense Research Development Corporation and partnership with OEA Technologies

Brad deYoung
Jinyu Sheng
Brian Whitehouse



Ocean Data Viewer

Dalhousie – Doug Wallace, Diego Ibarra



The screenshot shows the Ocean Data Viewer web application. At the top left is the logo for "Atlantic Canada OCEANVIEWER.ORG". The main navigation bar includes "Select Region", "Viewer", "Report an animal", "About", and social media icons. A secondary menu contains various data categories: "HideMap", "Wind", "Air Temperature", "Atmospheric Pressure", "Waves", "Water Temperature" (highlighted), "Salinity", "Chlorophyll", "Ships", "Animals", "Webcams", and "Events".

Below the navigation is a map of the Atlantic region with several yellow buoy icons. A sidebar on the right contains a descriptive text box with the Ocean Viewer logo and a warning: "Data are provided on an 'AS IS' basis. USE AT YOUR OWN RISK." Below this is a detailed data panel for "Temperature (°C) - 600 m - Forecast for: Tue, Jun 17, 2014". This panel includes a color-coded map of the temperature distribution, a vertical color scale from 0.0 to 20.0 °C, and metadata: "Variable: Temperature", "Units: °C", "Platform: RTOFS-daily", "Type: Data Assimilated Model", "Depth: 0 m", and "Provider: National Ocean and Atmosphere Administration (NOAA)".

At the bottom of the interface are navigation controls: "<<", "<", "Stop", ">", ">>", and "Loop".

Dorado Project

Doug Wallace, Chris L'Esperance

- Construct automated, miniature gas chromatograph capable of measuring tracer compound SF_5CF_3
- Install in Dorado ASV together with underway T, S, pCO₂ and fluorescence sensors
- Test ability of Dorado vehicle to measure and map a deliberately introduced tracer “patch”
- Prepare for tracer dispersion study on the Scotian Shelf

Autonomous *Surface* Vehicles

e.g. for Mine Counter Measures

DEFENCE



DÉFENSE



Autonomous *Surface* Vehicles

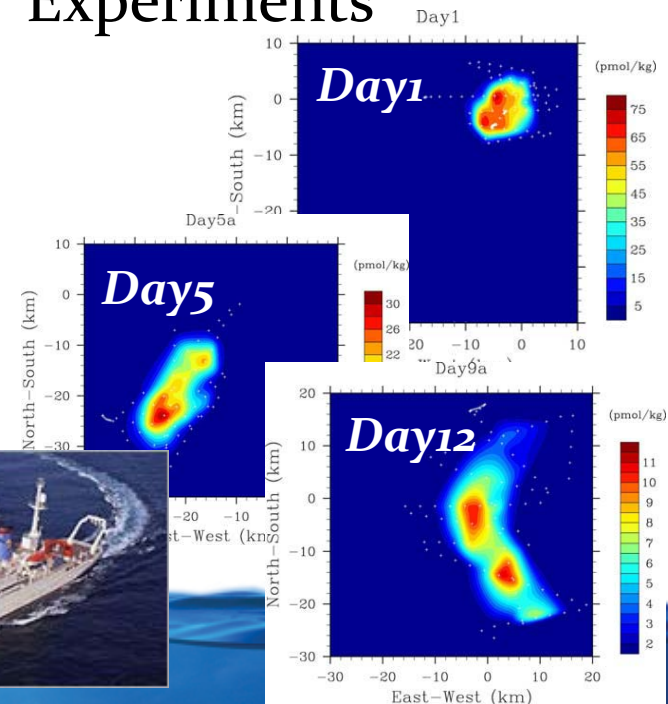
New Tools for Performing Ocean Experiments



Rapid Environmental Assessments
Oil Dispersion Experiments
Models for Search and Rescue

Open-Ocean
Tracer
Experiments

„Fast-GC“ to
measure
tracers (e.g.
SF₆) in-situ



Tethered Vertical Profiler

Joe Singleton, Brad deYoung, Ralf Bachmayer
Memorial University



High resolution spatial and temporal data

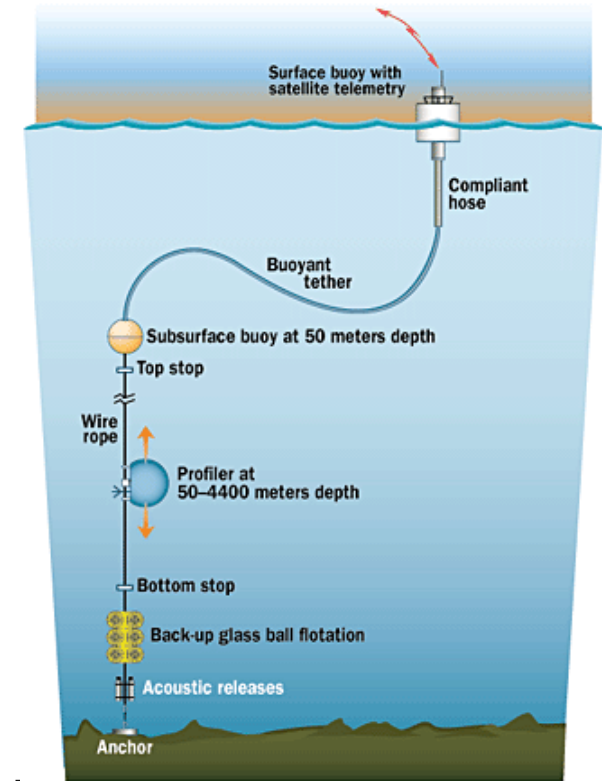
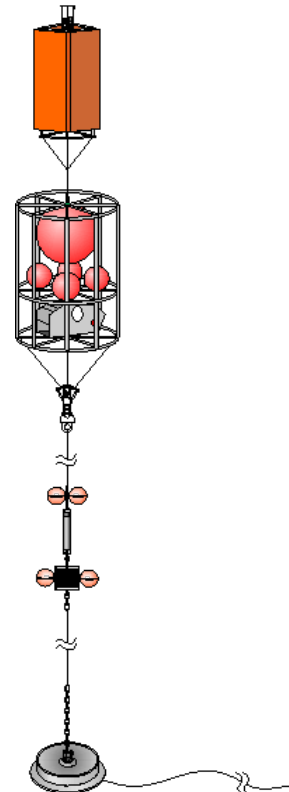
Periodic profiles

Fixed location

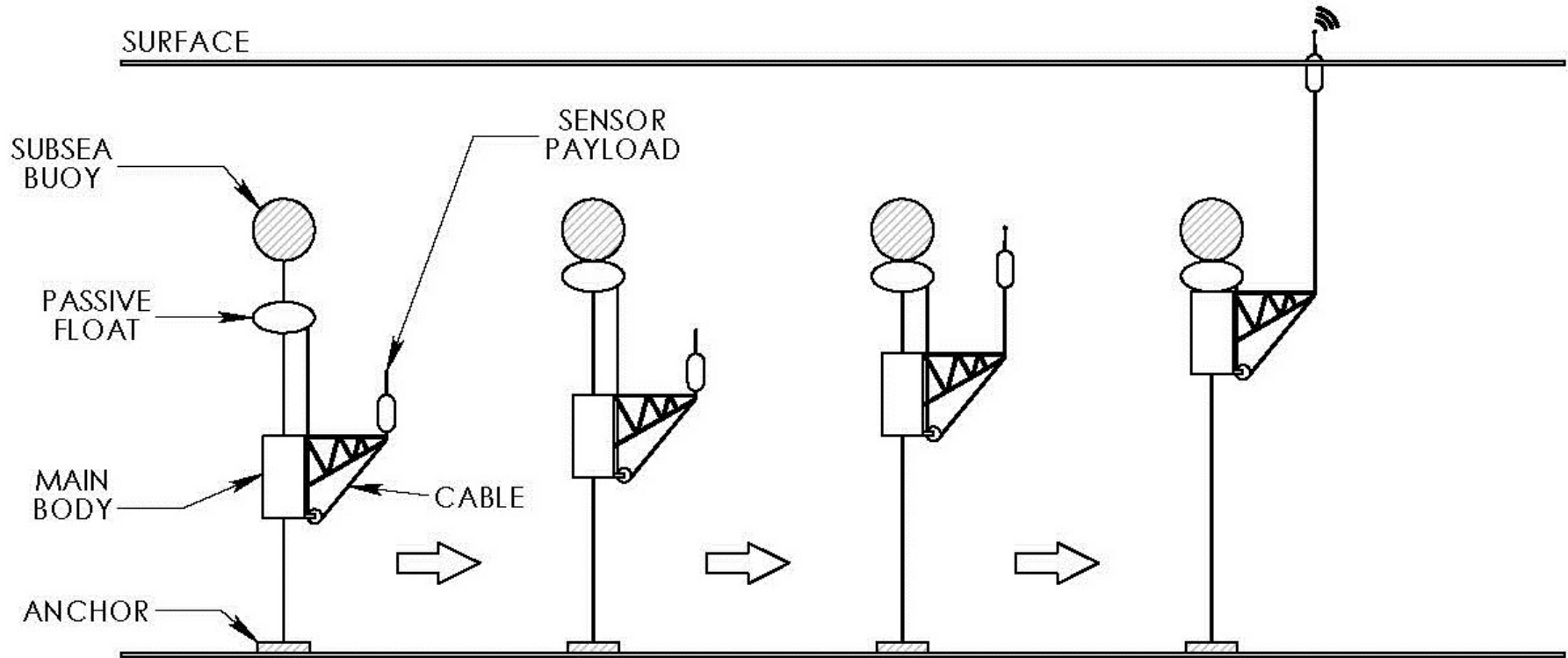
Two Standard Systems

Dynamic Mooring Line

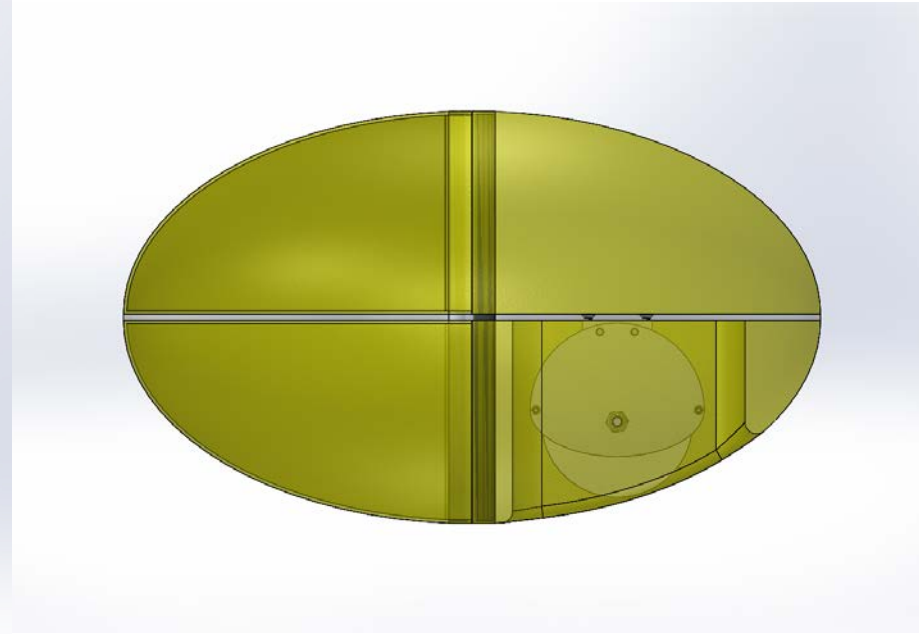
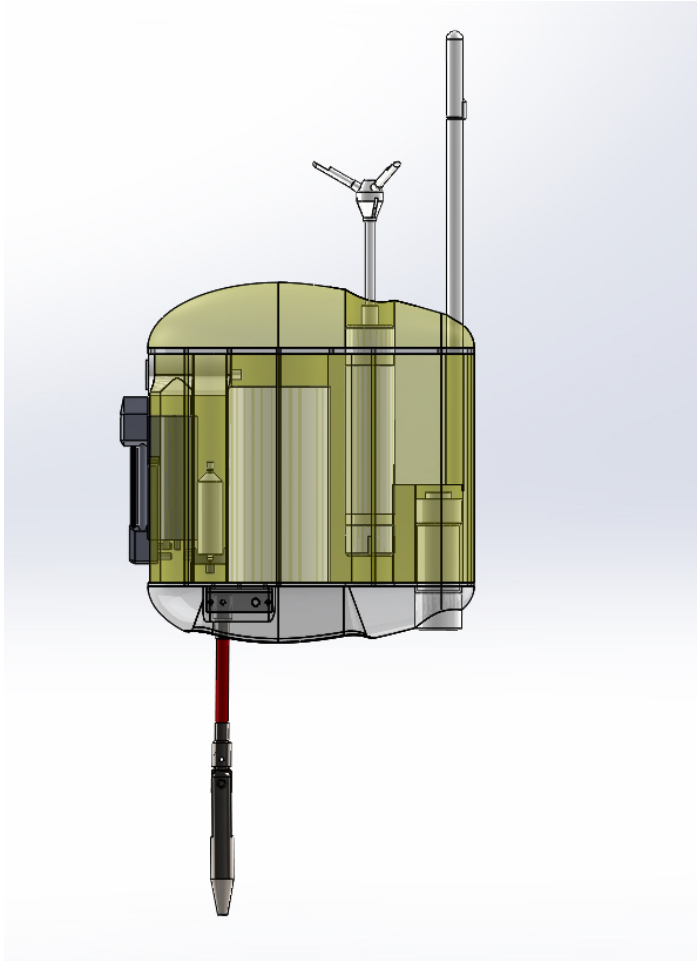
Static Mooring Line



We are building a tethered ocean glider



Design Completed



Ocean Gliders Canada

- Coordinating glider activity across the country
 - Memorial University – AOSL
 - Dalhousie University – OTN
 - Universite Laval – Takuvik
 - UQAR
 - McGill
 - UBC
 - University Victoria – ONC

Sharing equipment, information, software, sensors, data, experience through a web center, meetings and workshops

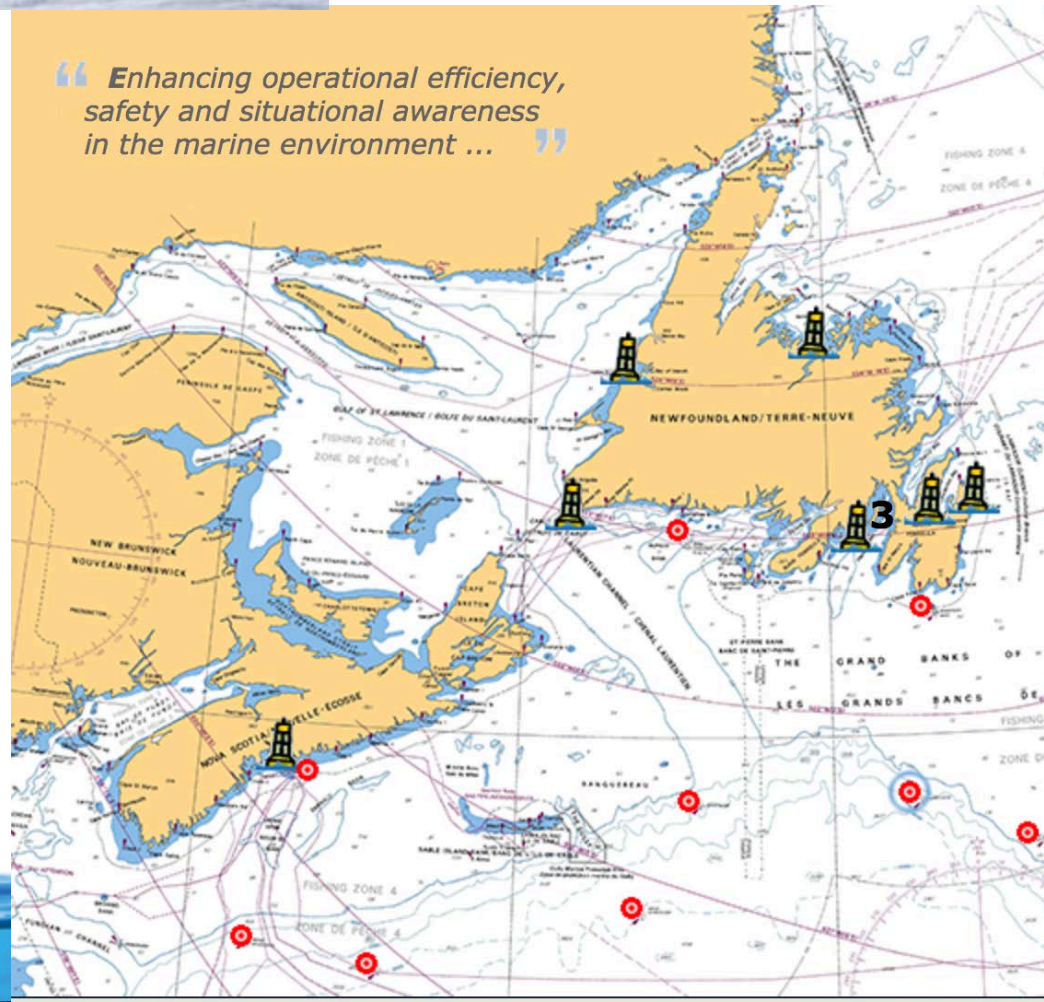
Integrated Atlantic Ocean Observing System (IAOOS)

- Building on the Smart Atlantic Initiative
- Define requirements and opportunities for an Atlantic initiative to develop sustainable, integrated ocean observing
- White Paper to be delivered at the MTS/IEEE meeting in St. John's in December
- Developed through a process of workshops and meetings

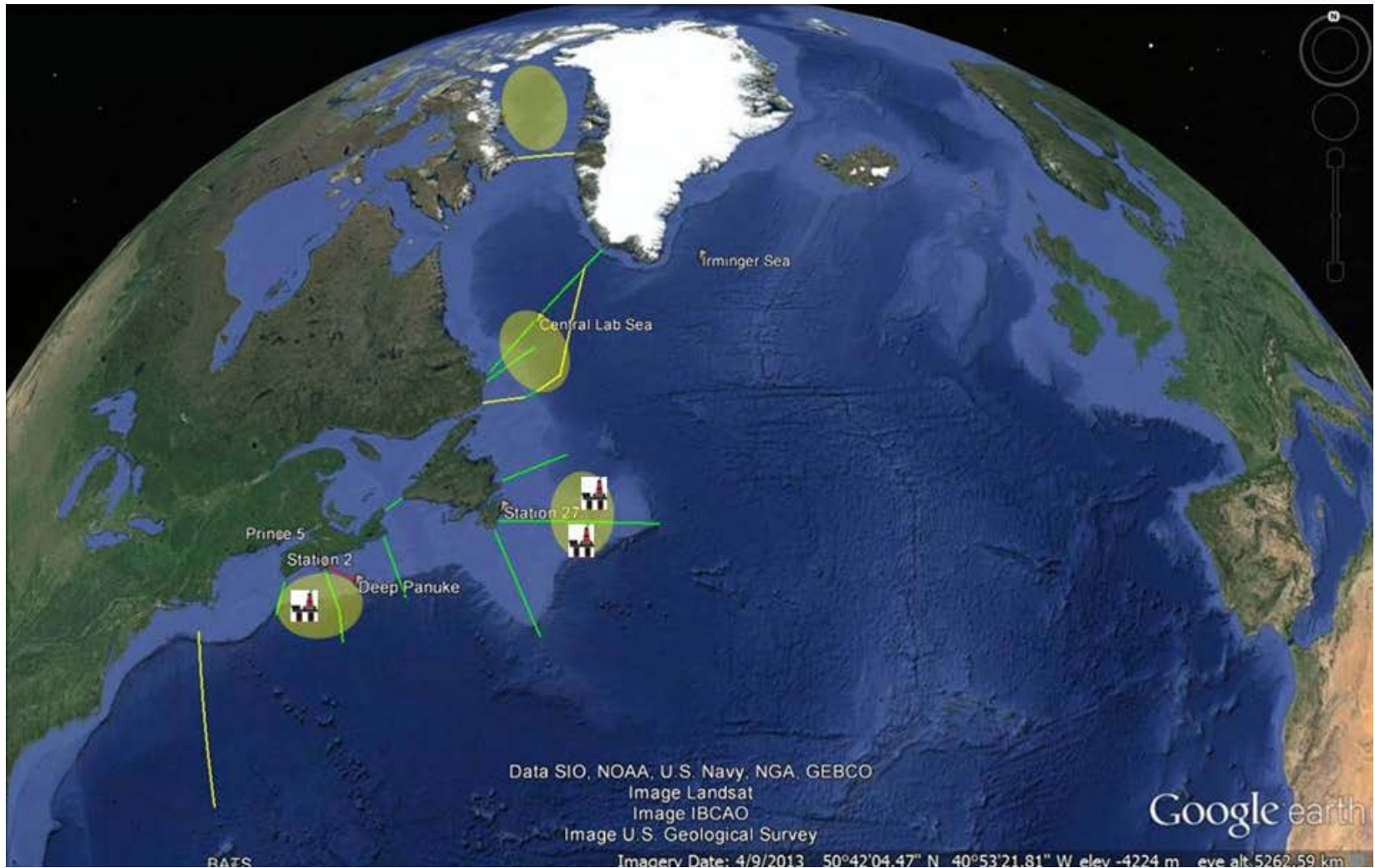
Developing Atlantic Wide Framework

SmartAtlantic Alliance

“ Enhancing operational efficiency, safety and situational awareness in the marine environment ... ”



Developing Atlantic Wide Framework



What is next?

- Work with newly funded teams to determine needs
- Get projects running
 - Codar
 - OGC
 - IAOOS
- Codar/drifter experiment 2015
- Plan for Scotian Shelf tracer/dispersion study 2016



Questions?



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www.meopar.ca

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Static Mooring Lines

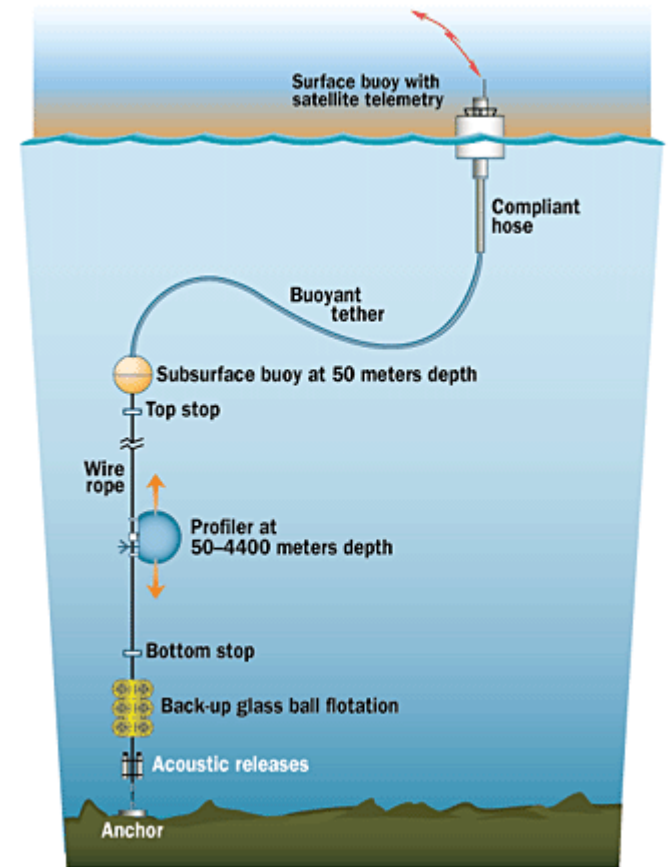
Wire Followers

Fixed mooring line to secure and direct the vehicle

Neutral Buoyancy

Bottom-subsurface or surface
Surface-subsurface or bottom.

Drives (traction, buoyancy, ratchet)



Dynamic Mooring Lines

Winched

- Mooring line is payed in/out
- Winch is mounted on, the seafloor, a subsea platform, the vehicle or at the surface
- Net positive or negative buoyancy
- Cable management system

