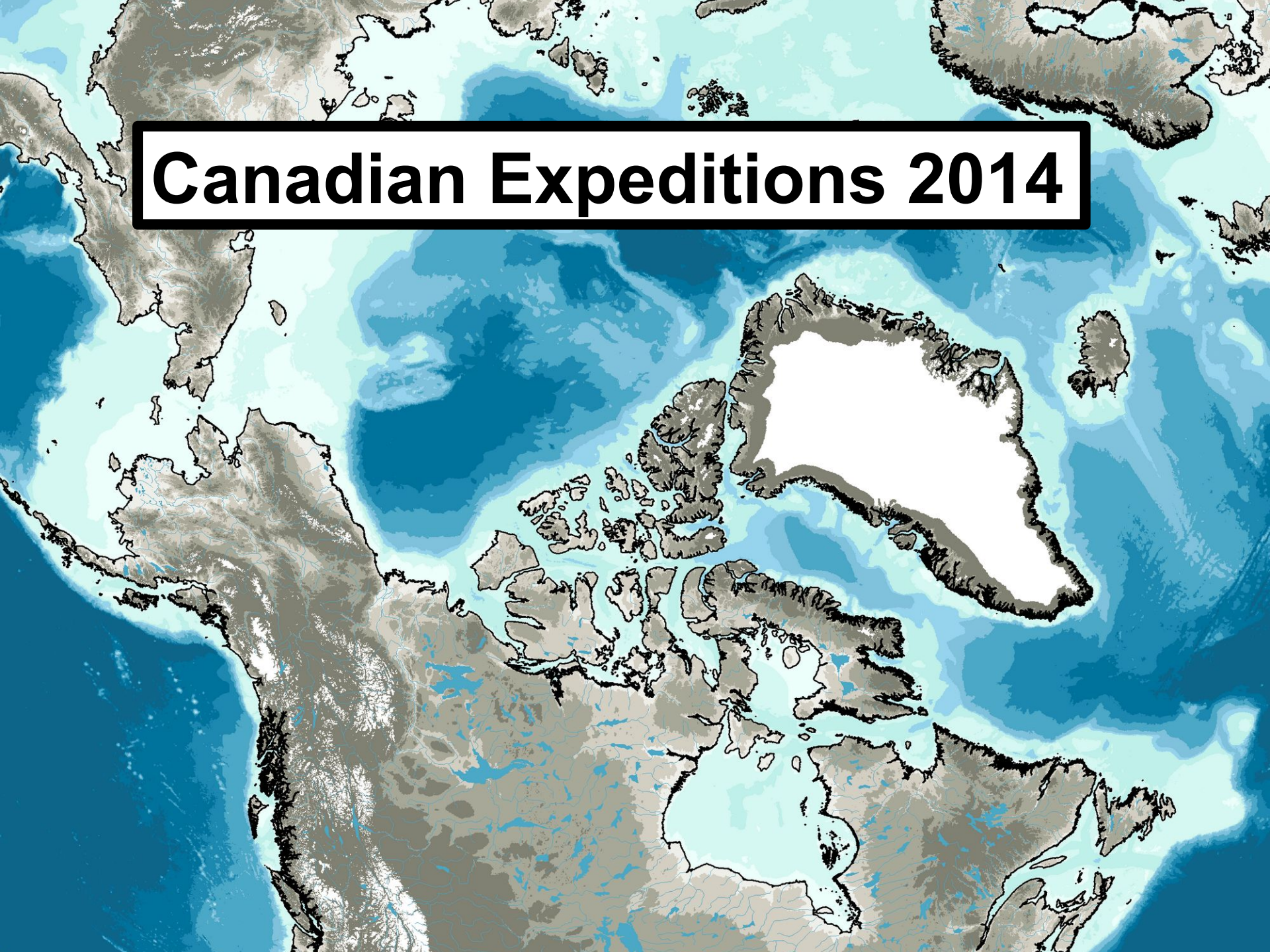


Canadian Expeditions 2014





2014 JOIS/AON-BGOS

2014 C30/DBO

**Pacific Arctic Group meeting
Arctic Science Summit Week, Helsinki**

April 6, 2014

JOIS/AON-BGOS

CCGS Louis S. St-Laurent: Kugluktuk to Beaufort Sea/Canada Basin

- **19 September – 15 October, 2014 (26 days)**
- **35 berths requested**
- **CTD/rosette profiling and sampling**
- **Vertical net casts**
- **XCTD and UCTD casts**
- **Recover 3 moorings (WHOI)**
- **Deploy 5 moorings (WHOI, NIPR)**
- **Recover 2 & deploy 4 Ice Tethered Profilers**
- **2 Ice-Based Observatories**
- **Underway measurements**
- **Ice Observations (ship, ice and helicopter)**








(Photo: Jeffrey Charters)

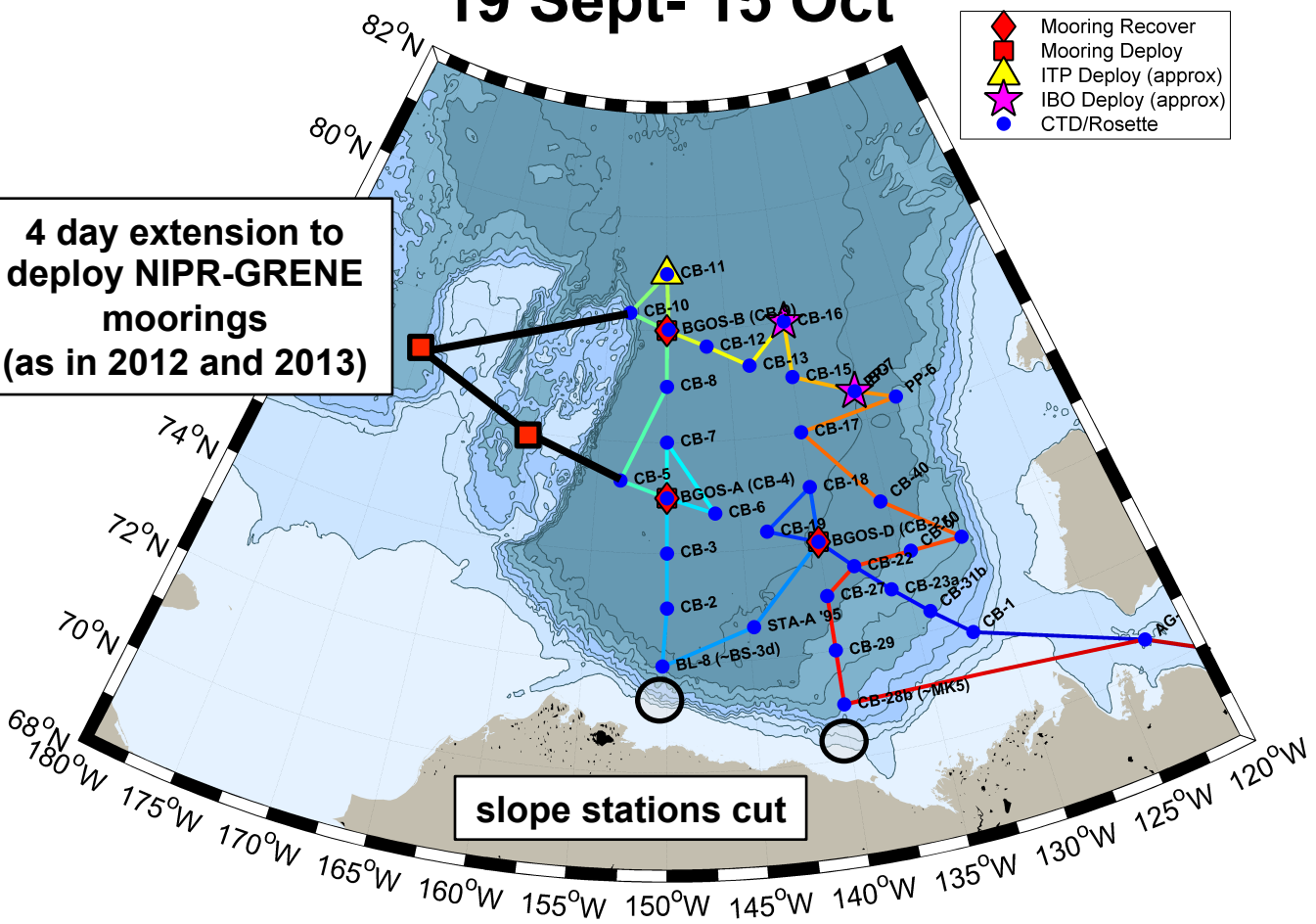


JOIS/AON-BGOS

19 Sept- 15 Oct

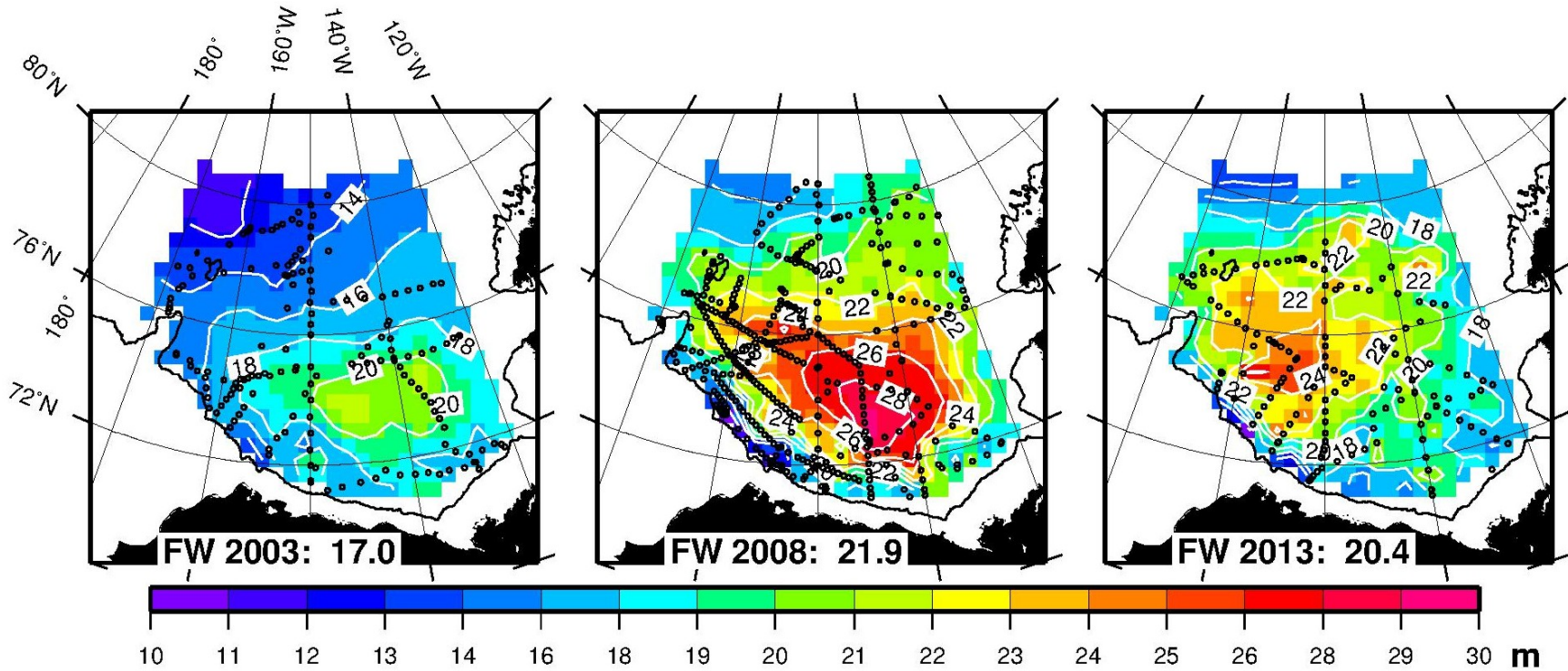
-  Mooring Recover
-  Mooring Deploy
-  ITP Deploy (approx)
-  IBO Deploy (approx)
-  CTD/Rosette

**4 day extension to
deploy NIPR-GRENE
moorings
(as in 2012 and 2013)**



AON-BGOS/JOIS

Time series of freshwater content:



From Rick Krishfield, WHOI

(Photo: Jeffrey Charters)



C3O Pacific-Arctic + DBO

CCGS Sir Wilfrid Laurier: Victoria to Barrow

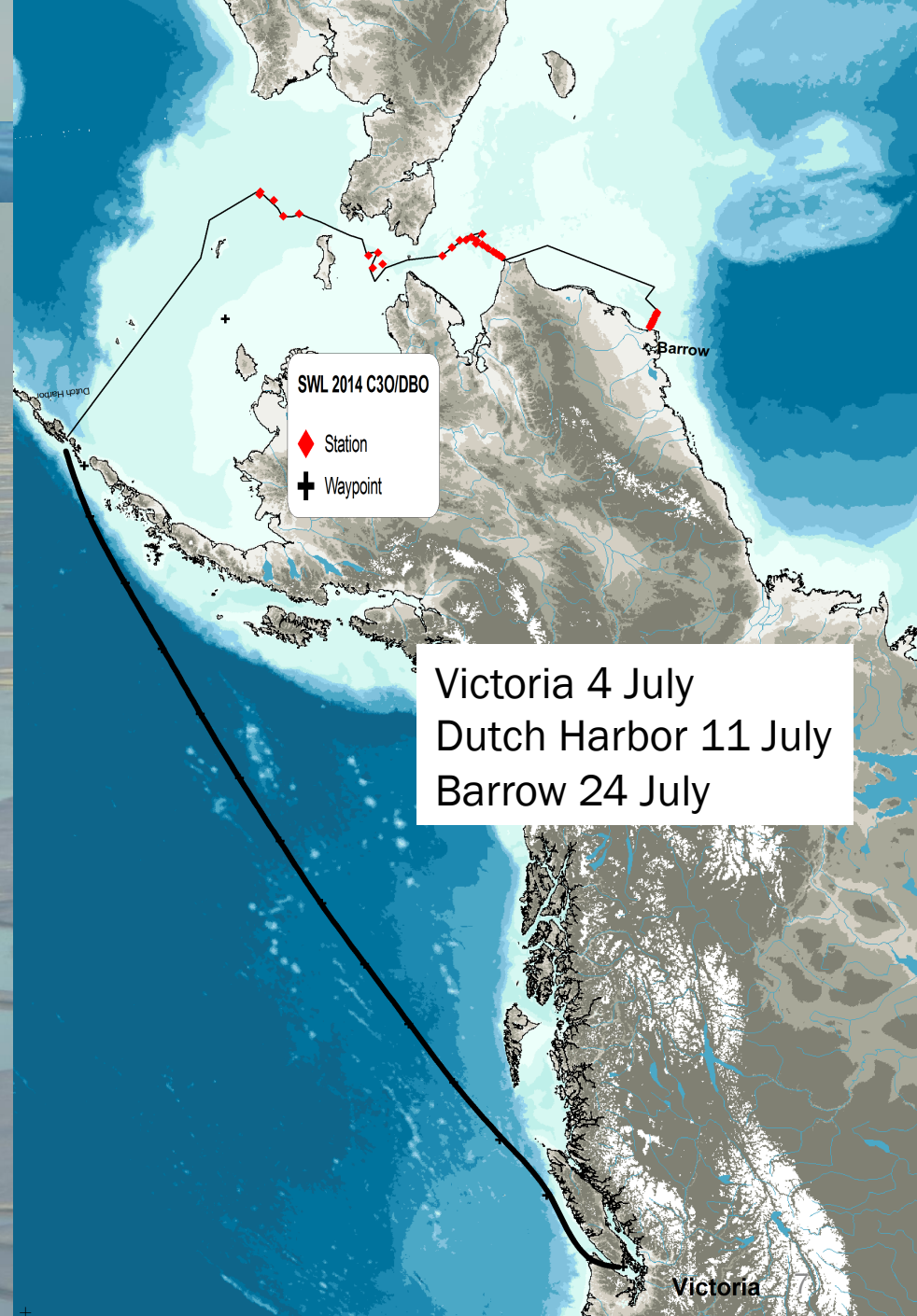
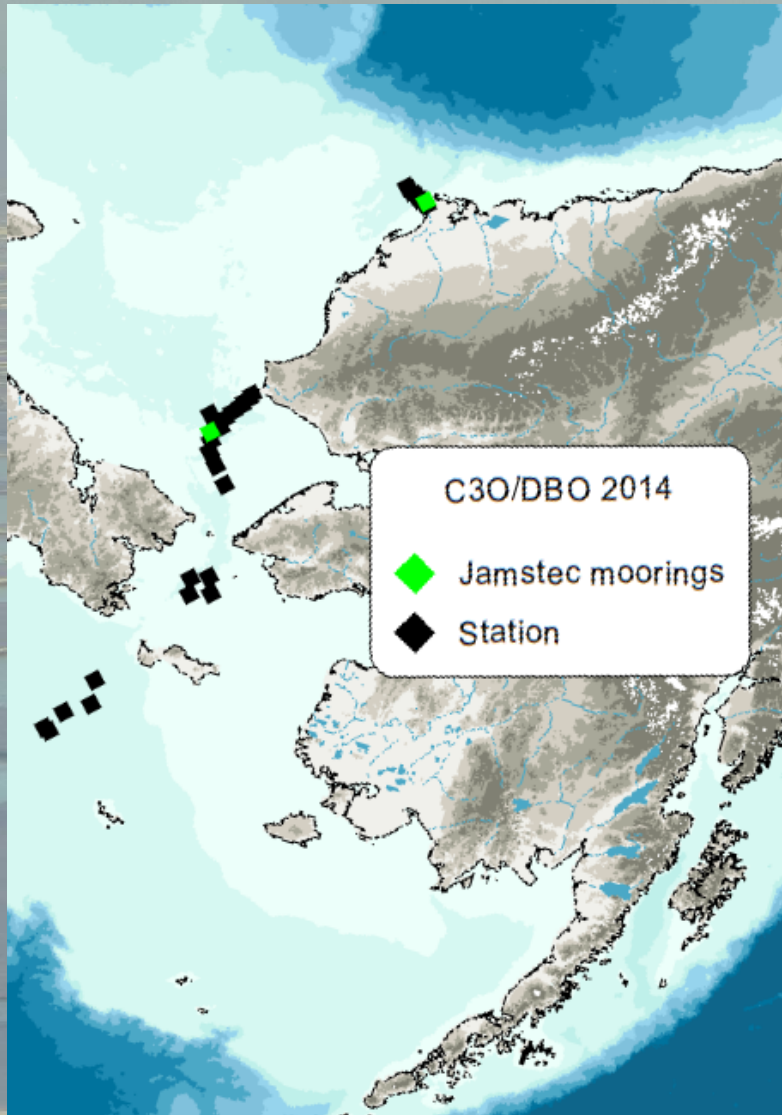
- 6 days, 14 berths requested,
- Stop at Dutch Harbor to pick up about 12 scientists
- UCTD and XCTDs deployed from stern during transit
- Underway seawater sampling
- Bird observations
- Deployment of Argo floats (no deviation from track)
- Collect sediment samples using VanVeen grabs and Happs corer at stations in the Bering and Chukchi Seas. Also, collect CTD and geochemical samples with the rosette and plankton samples with vertically towed bongos.
- Recover and redeploy 2 pairs of physical-bio-geochemical moorings for JAMSTEC

Victoria 4 July
Dutch Harbor 11 July
Barrow 24 July



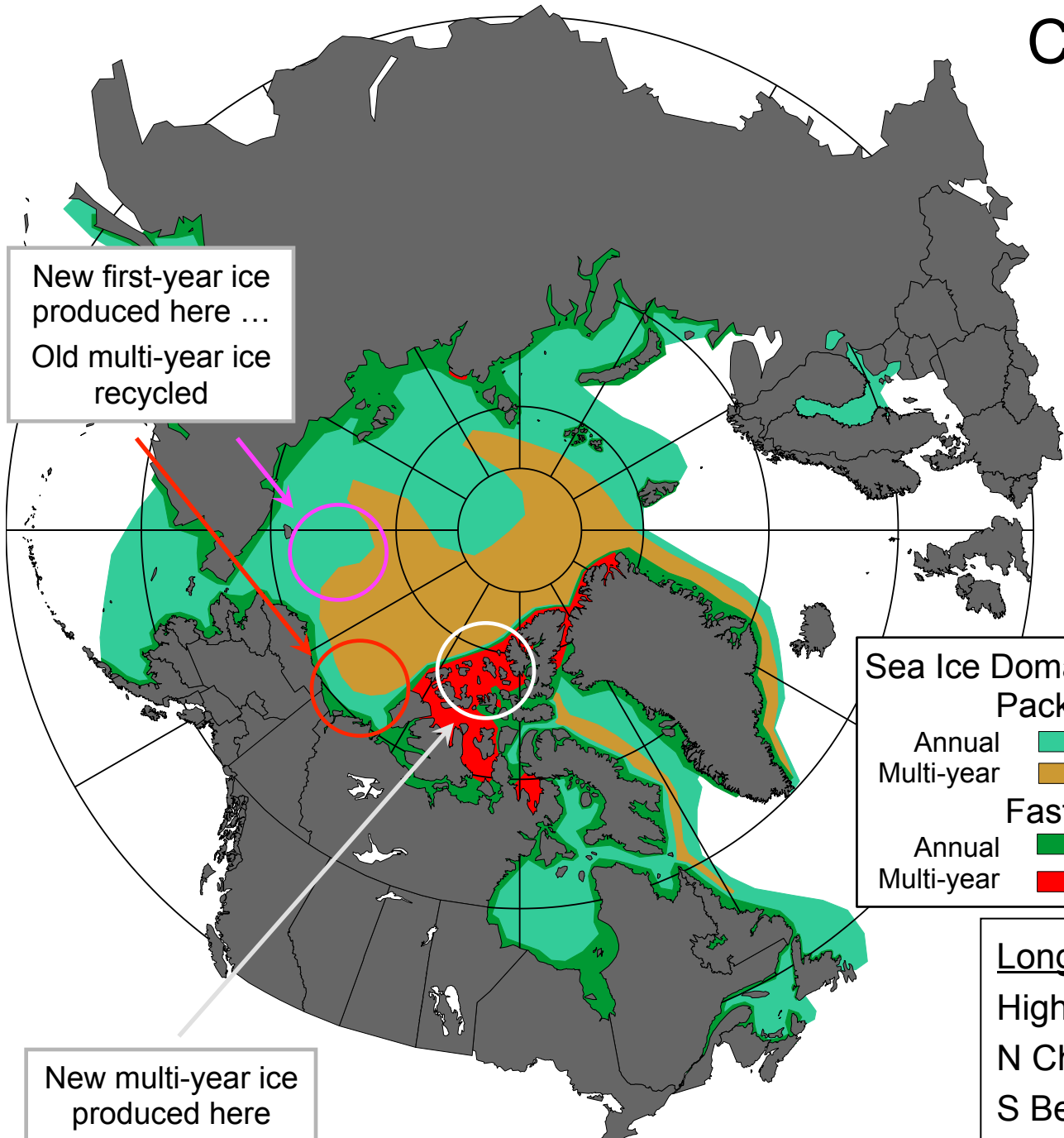


C30 Pacific-Arctic + DBO





Canada's moored ice-ocean observatories



New first-year ice produced here ...
Old multi-year ice recycled

Year-round installations to monitor the creation & deterioration of sea ice within 2 distinct domains

Partners are:
NOAA / CRREL
Shell
Conoco-Phillips
Govt of Nunavut

Sea Ice Domains

Pack ice

Annual ■

Multi-year ■

Fast ice

Annual ■

Multi-year ■

New multi-year ice produced here

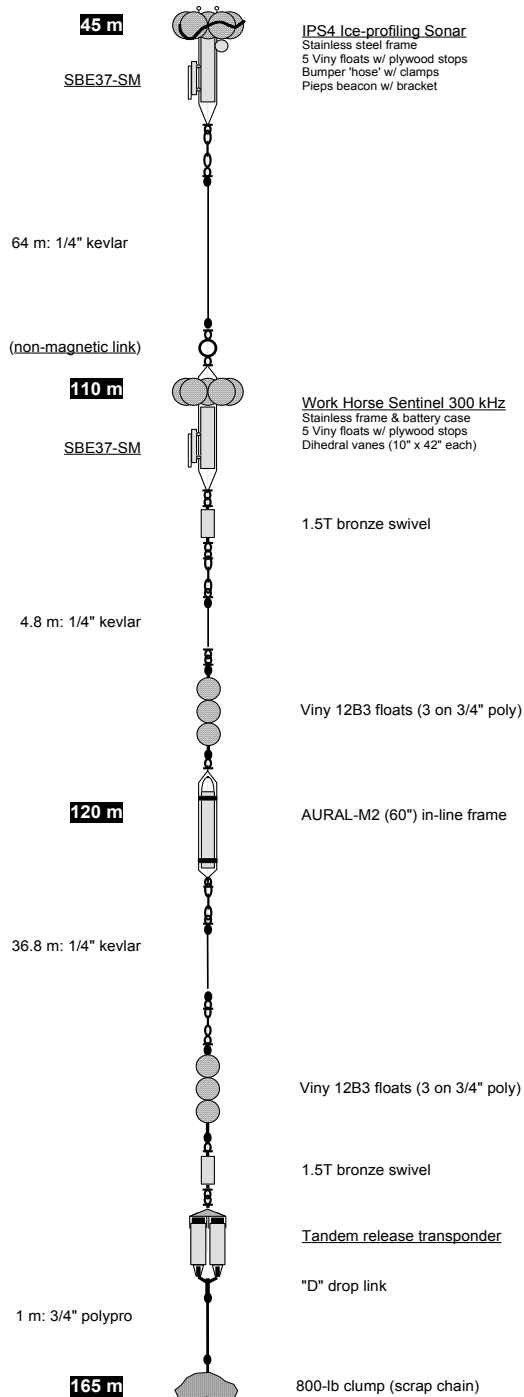
Longevity of AIM sites

High Arctic: 4 years at 1-2 sites

N Chukchi: 10 years at 1 site

S Beaufort: 23 years 2-4 sites

Submerged sonar (IPS & ADCP) do much of the work at these sites



Sonar provide ice draft,
drift, ocean current,
plankton echoes.

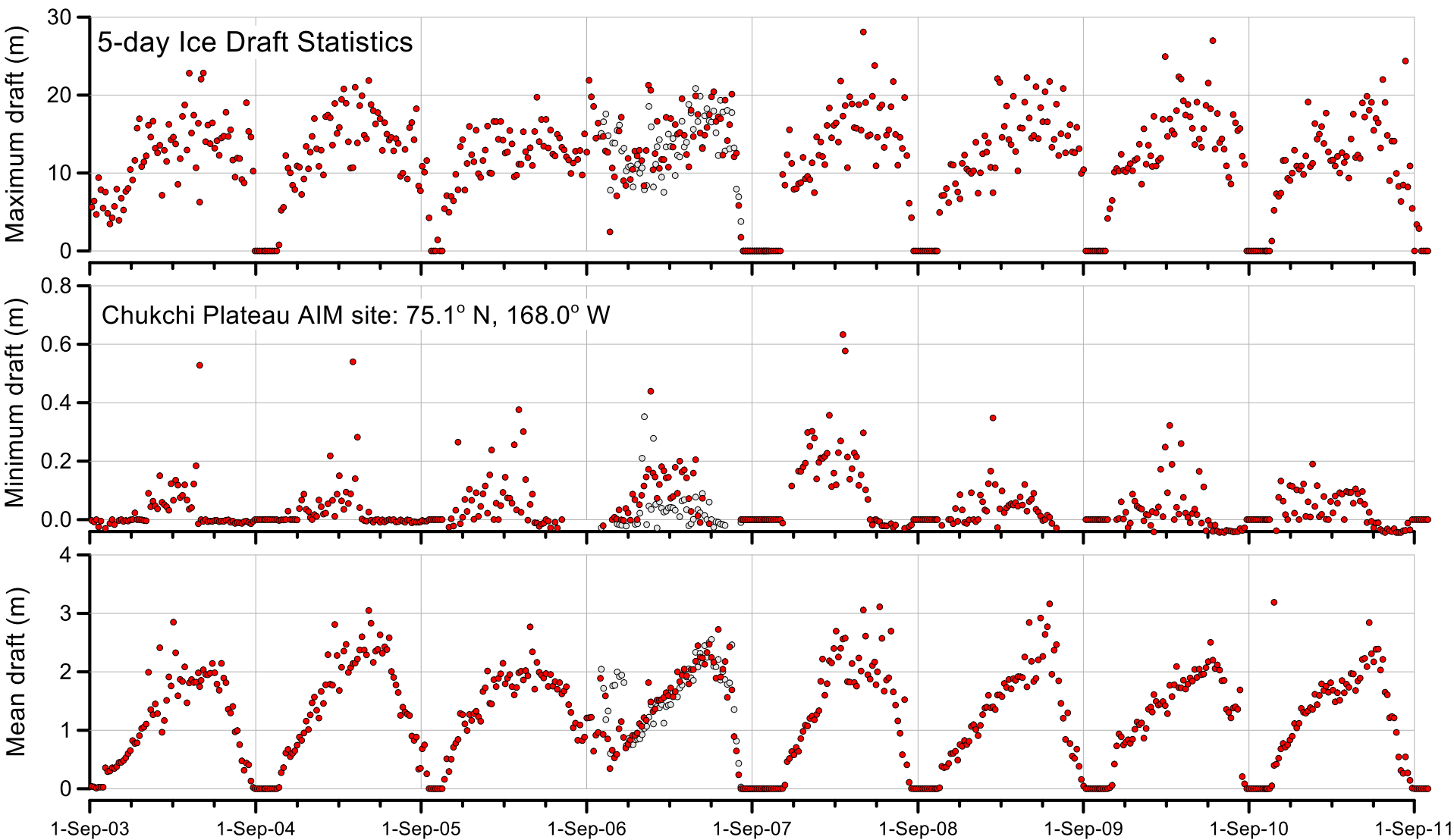
Other sensors for T & S,
ambient sound, etc....



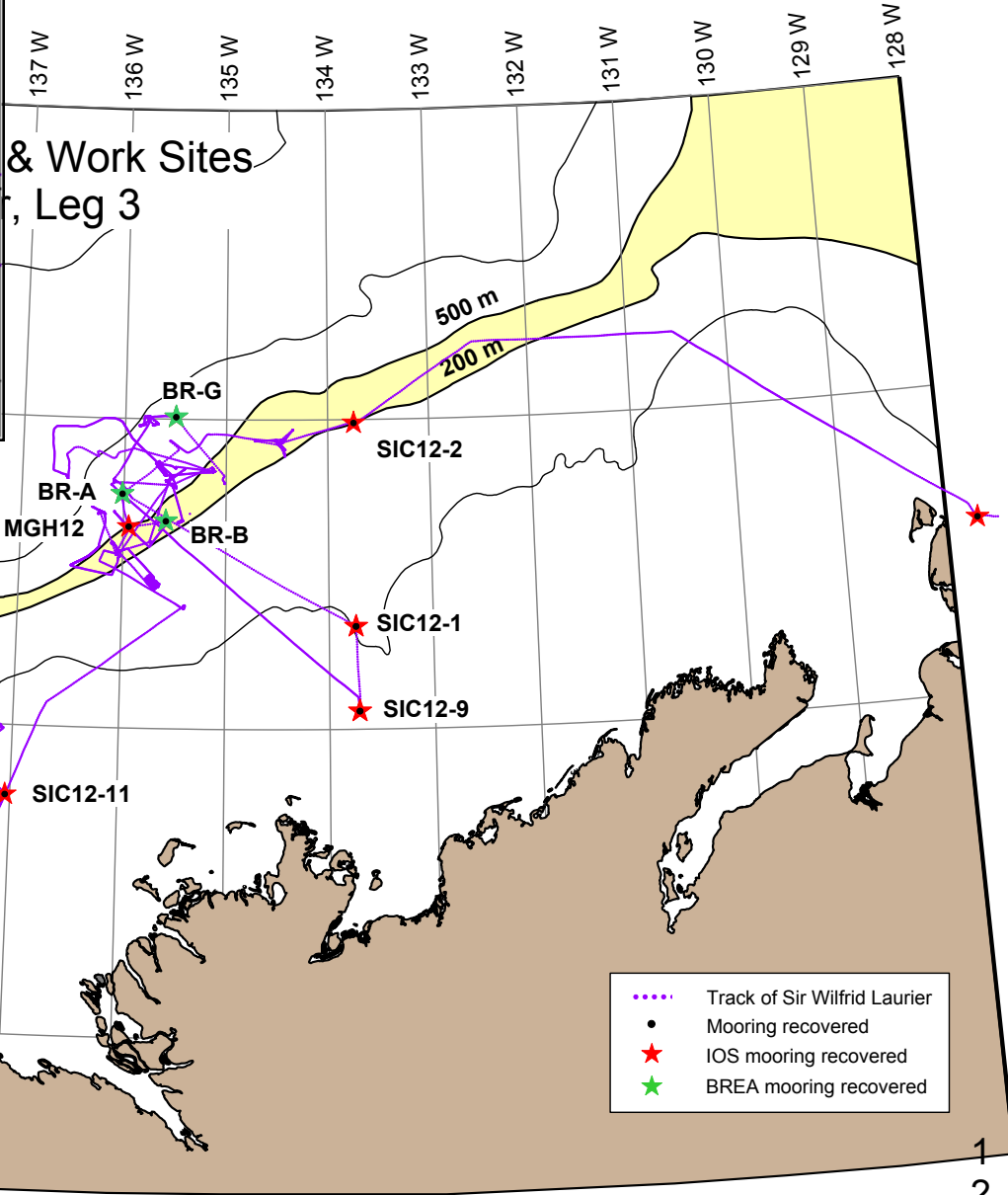
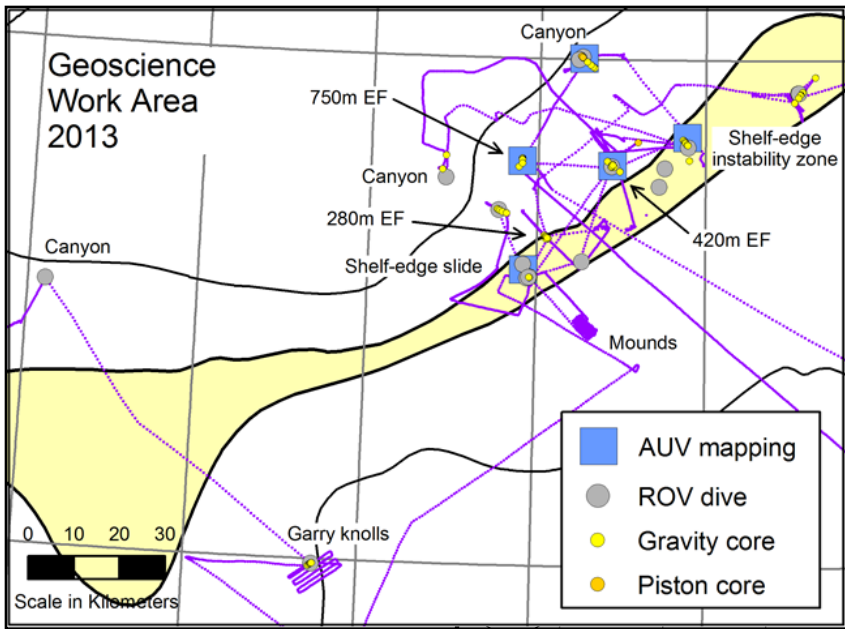
Autonomous with ...
3-yr endurance
1 m scale ice relief at
 ± 5 cm accuracy

At the AIM site, Chukchi Plateau, ice has changed little in 8 y 23-y series, southern Beaufort, supports same conclusion

AIM site 75.1°N, also FYI



Cruise activity Sep-Oct 2013



Geoscience (above):
Methane seeps, expulsion features, landslides, glacial sediments.

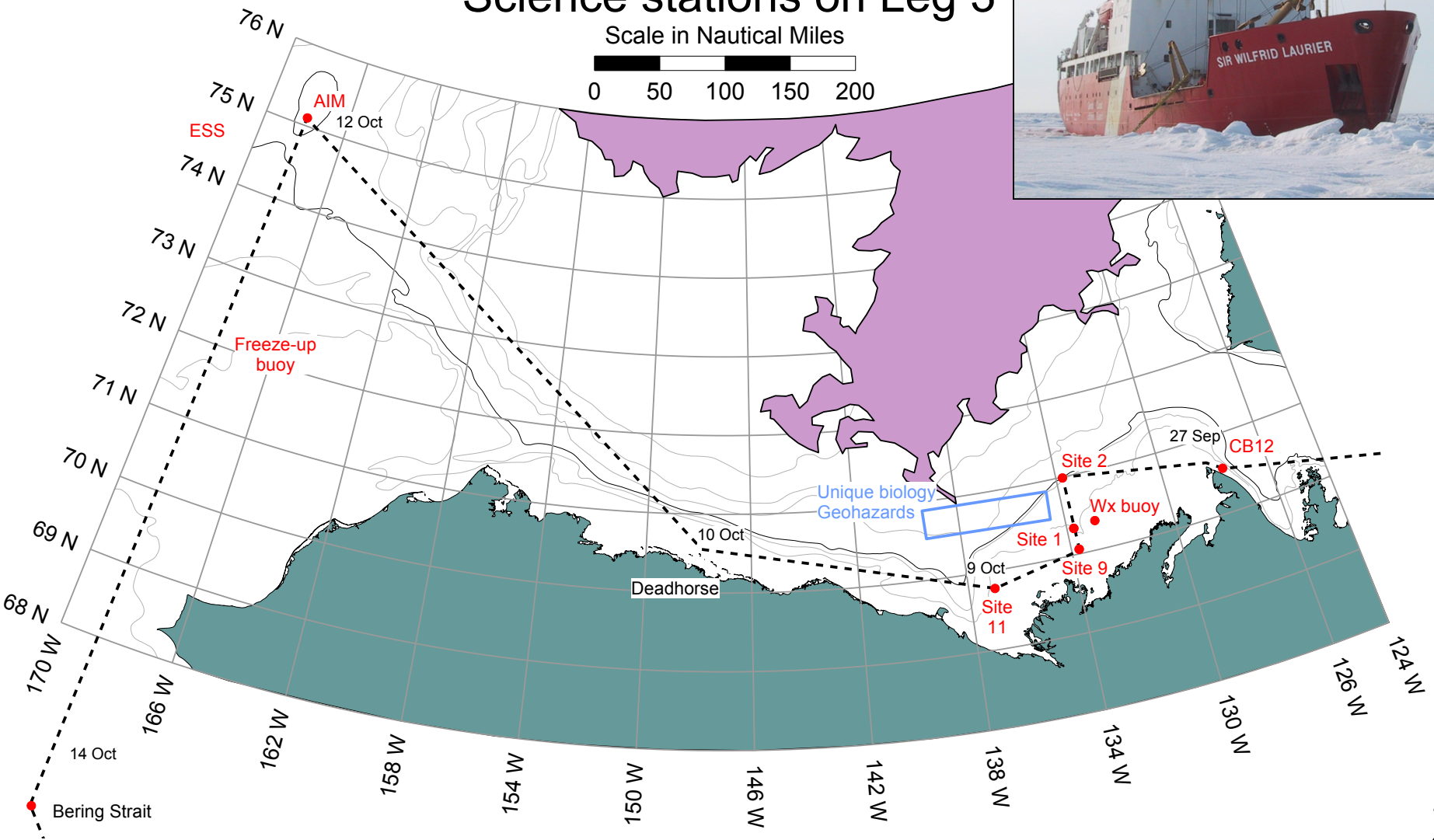
Ocean moorings (right):
Ice thickness, current, T & S, ambient sound, particle flux, suspended sediment

- Track of Sir Wilfrid Laurier
- Moorings recovered
- IOS mooring recovered
- BREA mooring recovered

Planned Cruise Sep-Oct 2014

CCGS Sir Wilfrid Laurier

Science stations on Leg 3



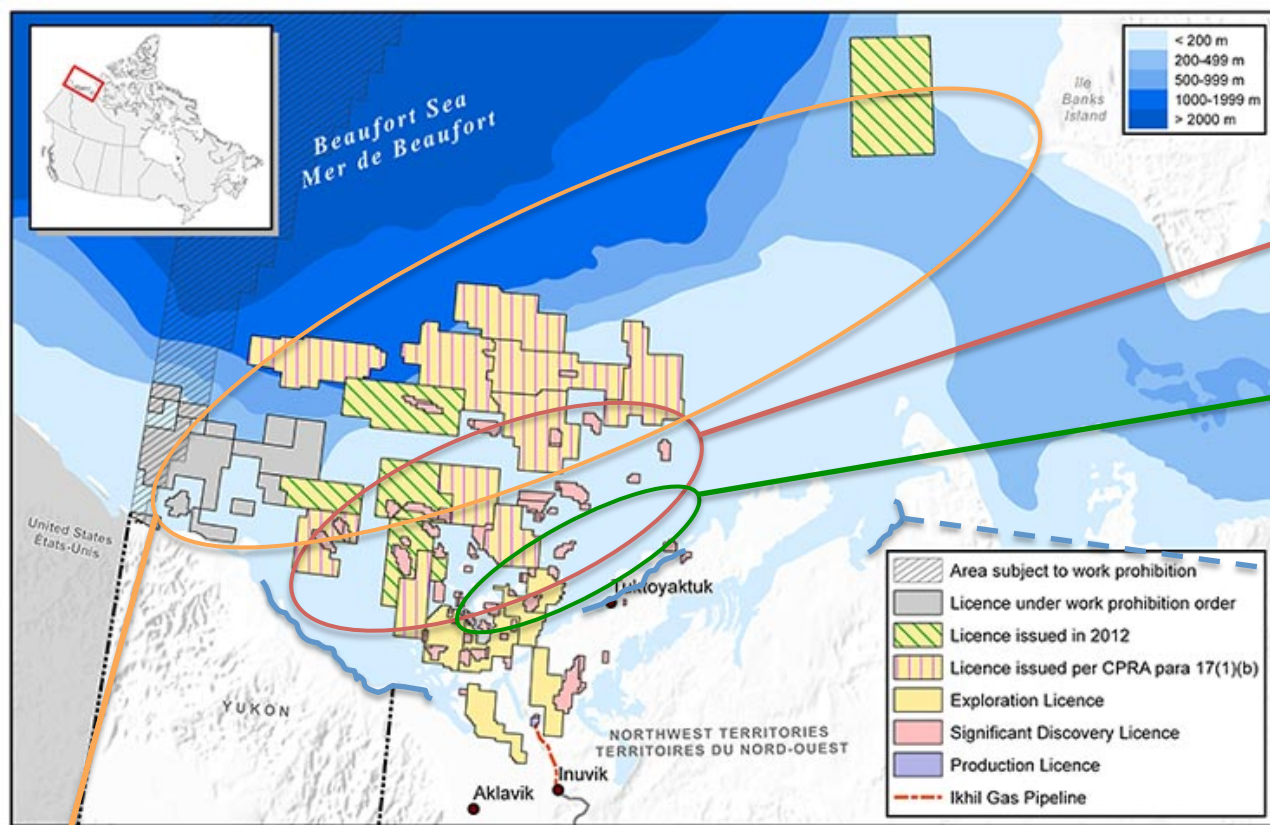


Marine Fishes of the Canadian Beaufort Sea: “BREA– Marine Fish Project”

2014 Study Plan

**Andy Majewski, Jim Reist (lead PI) + DFO Staff from Arctic Aquatic Research
Division, Winnipeg, MB & Institute of Ocean Sciences, Sidney, BC; plus
collaborators
IGC , Inuvik, March 2014**

Canadian Beaufort Sea Bathymetry, Leases & Previous Fish Studies



Fish Research in Area

- 2003-2009 – **Northern Coastal Marine Studies** (5-150m on shelf)
- 1984-1987 – **Northern Oil & Gas Action Program** Marine Studies (10-100m on shelf)
- 1970-present – **nearshore & coastal (0-5m) assessments** of anadromous & marine fish communities

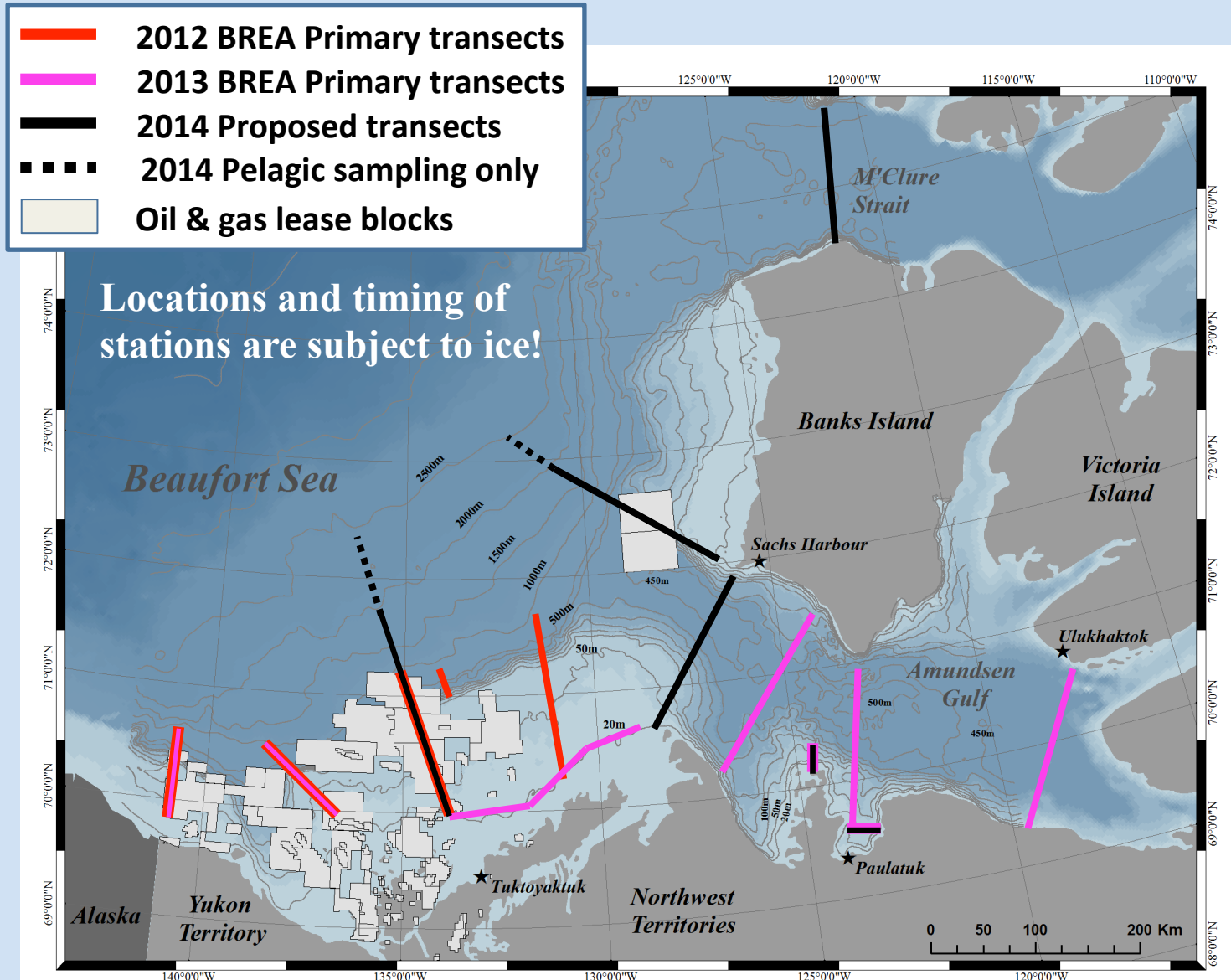
Priority Research Gap: persistent summer sea ice & absence of suitable vessel precluded work on **offshore deepwater fishes**, their biodiversity & ecological relationships especially in deep waters – **BREA Marine Fishes Project** (2011-2015) designed to fill gap.

BREA Marine Fishes Project Objectives

- 1) Field survey of offshore area to 1000m+ depths to establish:
 - a) fish occurrence and community diversity,**
 - b) habitat associations, and**
 - c) foodweb & energy pathways within and among offshore (~50-1000m) habitats****
- 2) Study the energetic linkages within/among offshore and coastal habitats**
- 3) Establish regional contexts (i.e., baselines) for future monitoring & assessments (e.g., hydrocarbon metabolites, PAH, Hg, species diversity, habitat usage)**

First-ever systematic study of fishes and habitats in the offshore Beaufort Sea.

Beaufort Sea Marine Fishes Sampling 2012 - 2014



Fishing Equipment - 2012 & 2013

1) Small beam trawl

- Extend coverage from Nahidik program
- Comparable to Alaskan data
- Catches small bodied fishes
e.g., sculpins, lumpsuckers, snailfishes



2) Larger research trawls

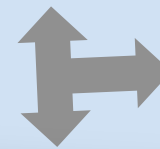
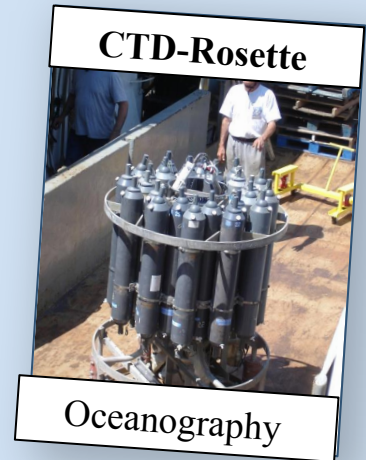
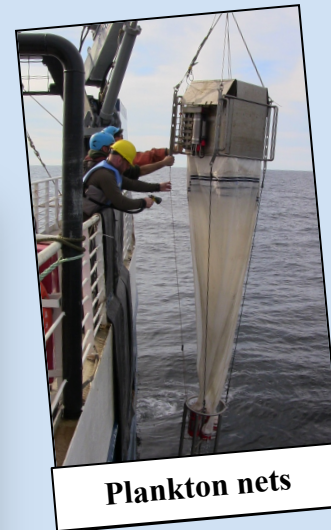
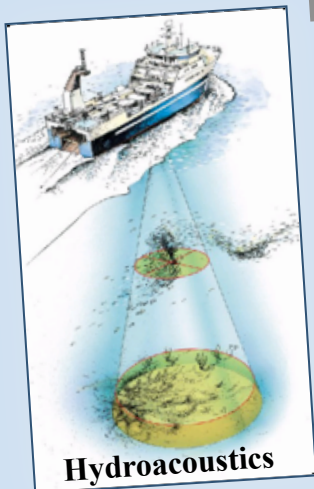
- Bottom and mid-water
- Assessment of diversity across broad spectrum of species & sizes including larger, faster fishes
e.g., flatfishes, skates



Other Sampling Equipment – 2012 & 2013

Fishes

Habitats & Foodweb



Tentative Dates & Locations - 2014

Date	Event			
08-Jul	F/V <i>Frosti</i> transits from Richmond, BC to the Beaufort Sea			
01-Aug	Embarkation - offshore of Tuktoyaktuk, lab setup			
02-Aug	Begin science operations – Leg 1, Mackenzie Shelf-slope & half of west Banks Island transect			
14-Aug	Crew change and resupply – Tuktoyaktuk			
15-Aug	Begin science operations – Leg 2, Finish W Banks Transect & Amundsen Gulf			
21-Aug	Ship tour and science demo offshore of Paulatuk?			
28-Aug	Disembark – Location TBD (likely Tuktoyaktuk)			
29-Aug	F/V <i>Frosti</i> transits to Richmond, BC			

*Fueling will need to be done in conjunction with crew change and resupply. Timing and location will be largely dependant on availability of fuel barge.

Beyond 2014..?

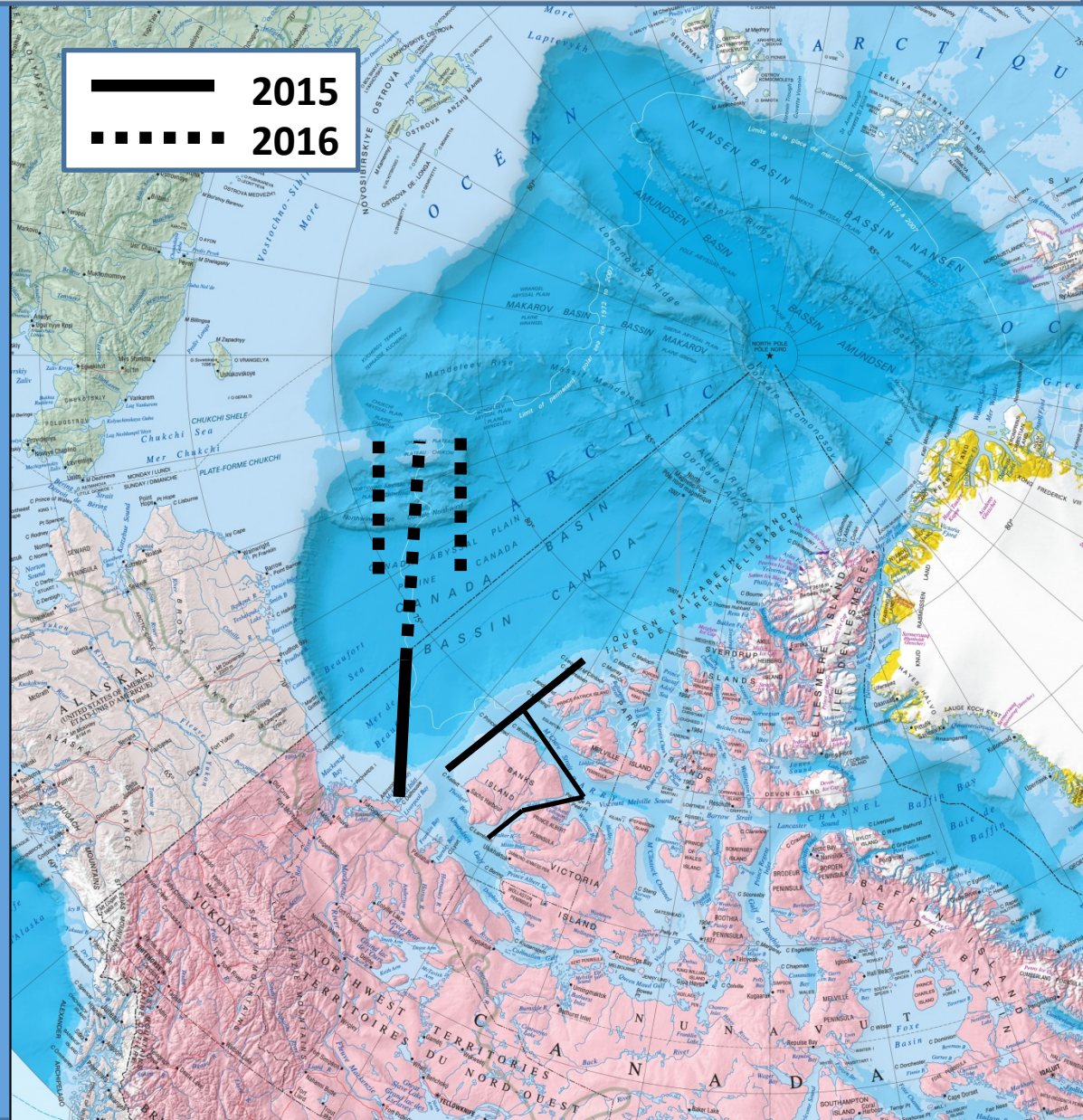
Proposed field studies

2015 (proposals to ESRF & SPERA):

- Additional sampling in Canada Basin and/or areas of Canadian Archipelago
- Potential relevance to future O&G and emerging fisheries
- Ecosystem linkages with southern Beaufort Sea

2016 (proposals to ESRF, SPERA, DFO-IGS):

- Sampling within International High Seas
- Links to international governance
- Ecosystem linkages to CBS



CCGS AMUNDSEN

Canadian Research Icebreaker



Overview of 2014 Expedition Plan

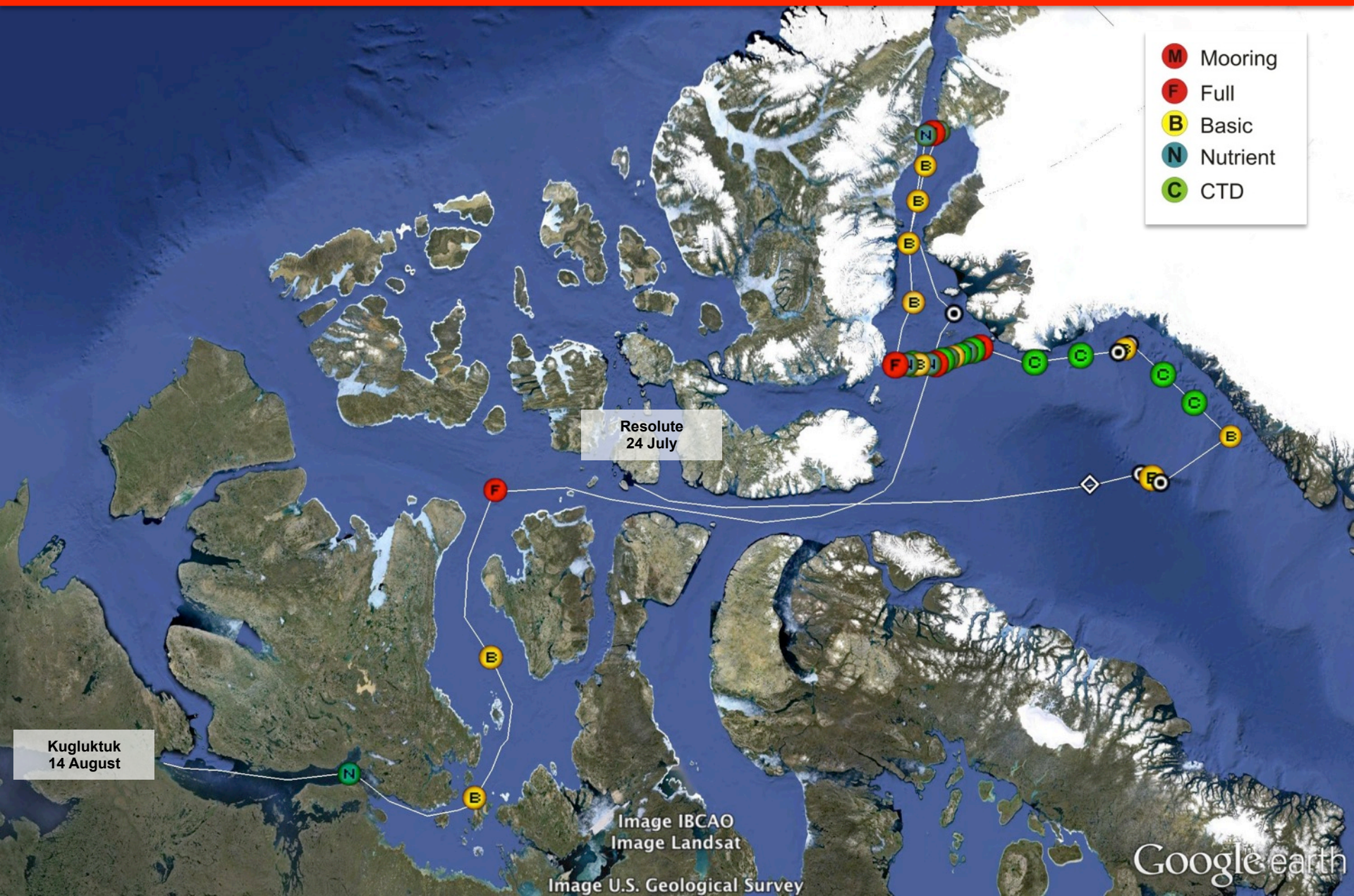




Overview of 2014 Expedition Plan









Barrow, AK
09 September

Kugluktuk
14 August

- M Mooring
- F Full
- B Basic
- N Nutrient
- C CTD
- Coring

Image IBCAO
Image Landsat

CCGS AMUNDSEN

Canadian Research Icebreaker

Leg 2b (16d)



CCGS AMUNDSEN

Canadian Research Icebreaker

Leg 3 (17d)





	2013	2014
Days at sea	72*	95
Participant days at sea	2266	3640
Canadian participants	100	103
International participants	9	17
Distance travelled (nm)	11783	19885
Stations sampled	110	140

Programs supported in 2014:

Canada: ArcticNet (NCE), BREA (AANDC), Netcare (NSERC), STAC (NSERC)

Denmark: RECONICE (GEUS)

Japan: NIPR, JAMSTEC

France: CNRS/Takuvik