a pan-Arctic Research Program

Are Olsen
Øyvind Paasche
3 critical changes in ocean properties

The ‘Triple Whammy’ affects:
• Circulation
• Ecosystems
• Harvestability

Discussion Meeting Issue 'Greenhouse gases in the Earth system: setting the agenda to 2030'

- Are Olsen, Synoptic Arctic Survey, Polardag, Bergen 2016 -
Many ways to observe ocean change

Argo bouy network

- Reference quality data of T, S, oxygen, nutrients, carbon, water mass age, exotic tracers, etc
- From the entire water column
- Global coverage every ten years
- Can not be obtained any other way
- Important also for calibrating the other networks

Global VOS/SOOP network

Repeat hydrography program

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Global Repeat Hydrography Program

1990s, WOCE/JGOFS

2000s, CLIVAR

open data that allow robust estimates of decadal changes in:
- heat
- oxygen
- carbon
- ventilation

- Are Olsen, Synoptic Arctic Survey, Polardag, Bergen 2016 -
Arctic Ocean biogeochemistry data 1980-2011
Eddy Carmack:
"Our current view of the Arctic Mediterranean is decidedly ‘regional’ because historical efforts have focused on regions with the result that we sense the parts but not the whole. A synoptic view of the Mediterranean Arctic Ocean is lacking and is sorely needed. “
Why not that many observations from the Arctic
Ample opportunities for observing the Arctic

- Are Olsen, Synoptic Arctic Survey, Polardag, Bergen 2016 -
In principle we should be able to,
by coordinating global resources,
be able to do something like
Disclaimer: None of the ships have been allocated or promised to the SAS.

- An international, coordinated field campaign in the Arctic
- Each nation covers respective zones of interest with already planned or dedicated cruises
- Mutual sampling strategies and measurement protocols
- Hydrography, CO$_2$ and biogeochemistry, ecosystems
- Share data
- Makes the whole much bigger than the individual parts.
- Milestone in Arctic Observing
A researcher (and diplomacy) driven venture

- Are Olsen, Synoptic Arctic Survey, Polardag, Bergen 2016 -
An international initiative
Next step: finalising a Science Plan

Science plan ready by spring 2017
Will for the basis for obtaining funding and ship time
Timing for actual survey: early 2020s
A researcher driven initiative for a coordinated multiship operation in the Arctic Ocean in one season, one year.

Main objectives are:
- to determine and understand ongoing change in the Arctic Ocean’s hydrography, ecosystems and carbon cycle,
- to promote international cooperation in the Arctic
- and set the scene for future Arctic observing and science.

Process initiated in 2015, network in 9 different nations, and a Science Plan is being prepared.

Complete Science Plan, consolidate network.
Obtain funding and ship time.

Interested to contribute, contact me and Øyvind Paasche.
Check out www.synopticarcticsurvey.info

Thank You