Discussion of Potential New PAG Activities

Pacific Arctic Group

October 28, 2014

Seattle, Washington USA

Session Purpose

- Introduce and discuss new research focus areas that would be appropriate for joint and/or coordinated efforts by PAG participants
- Confirm identity of potential participants and coordinators for each focus area
- Identify next steps toward implementation

Points to Consider

- 1. What is the overarching rationale for the proposed activity? (Why this location or activity? Why is it a priority?)

Need to develop specific outcomes

- 2. What are the specific outcomes of the proposed activity?
- a. Survey/characterization
- b. Establish basis for long-term trend detection
- c. Improved understanding through process studies and data analyses
- d. Develop/drive/improve computer models
- e. Support management actions
- f. Support operations
- g. Develop/test new technologies

Operational issues

- 3. Should testable hypotheses be stated to guide specific activities?
- 4. Should specific space-time coordinates for stations and moorings be defined in advance?
- 5. Should specific key observables be defined in advance?
- 6. To what extent and how should national field/lab/modeling activities be coordinated in advance?
- 7. How should results from national activities be integrated?

Updates and Planning of PAG Joint (and Coordinated) Field and Modeling Activities

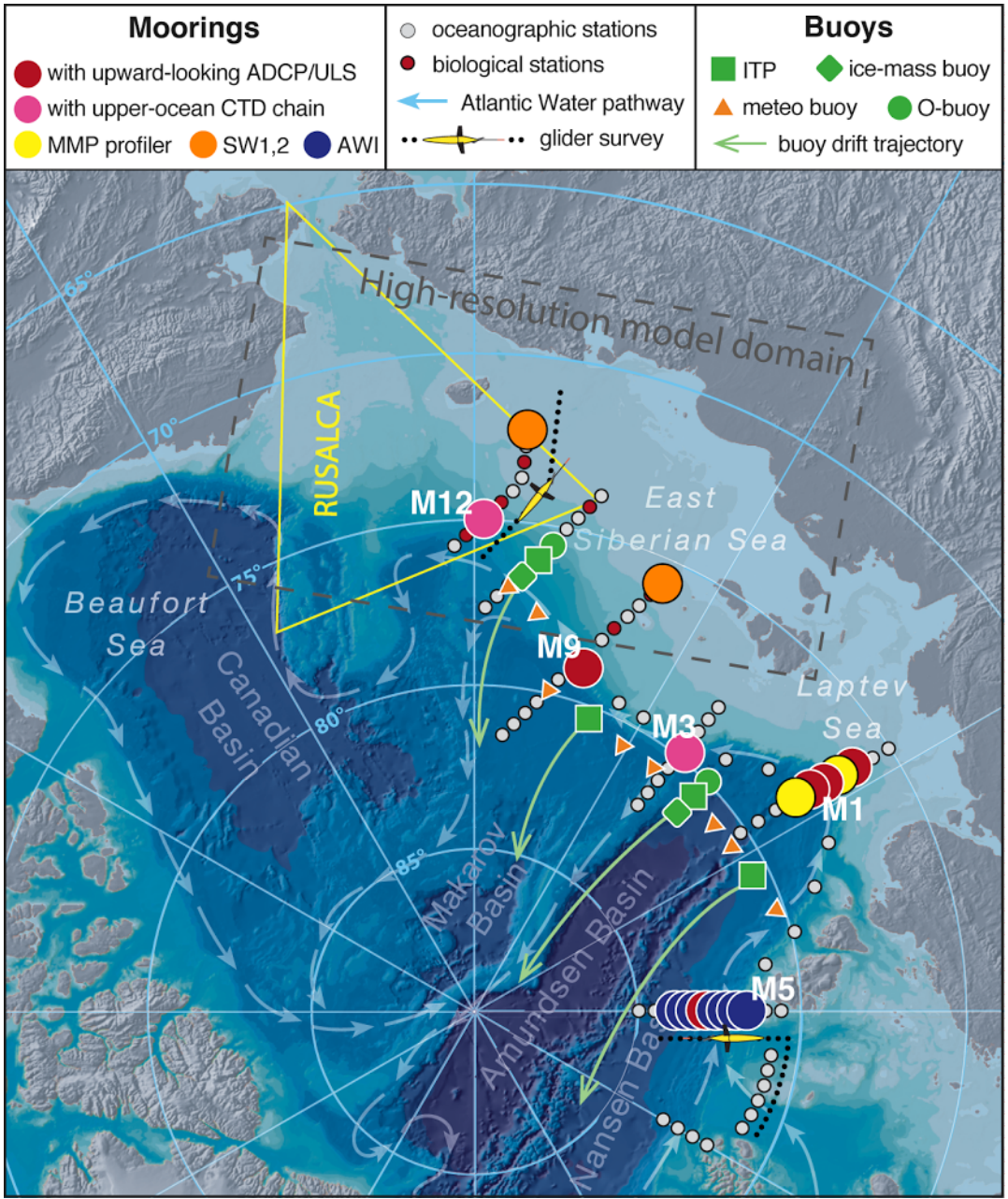
- RUSALCA northern expansion - Crane
- Chukchi Borderland/Arctic Basin/Shelf-Basin Exchange – Shimada, Kang, Williams, Pickart, Melling, Kikuchi, Krishfield
- Biodiversity – Hopcroft, Ashjian
- Sea Ice and Atmosphere – Kim, Uttal
- Modeling -
  - Sea ice modeling – M. Wang
  - BGC model – Deal, Jin
  - Ocean modeling – J. Wang, Hu

- Coordinating mooring locations –
  - NABOS – Alkire
  - Currents, waves and sea ice observations - Francis
- Other - ?

Existing Supporting Comments for Northerly Climate Observations

- Arctic ocean is vigorous and links to climate changes (K. Shimada, PAG, April 2014)
  - Upper ocean heat content a major factor in sea ice loss and regrowth (e.g., much sea ice loss in 2007/2008 from ocean heat
  - Positive feedbacks on sea ice loss exist from altered atmospheric circulation and increased ocean heat
  - Ocean heat entering from Atlantic, Pacific, and atmospheric sources
- Opportunity to decipher how the changing atmosphere, ice, ocean, ecosystem and benthic flux system is altering in response to increasing heat flux from the northward flowing Pacific Water, the eastward flowing Atlantic Water, enhanced mixing of surface waters, and increased solar radiation (reaching ocean surface) (K. Crane, NOAA call for proposals 2014)

NABOS


Moorings
with upward-looking ADCP/ULS
with upper-ocean CTD chain
MMP profiler
SW1,2
AWI
oceanographic stations
biological stations
Atlantic Water pathway
glider survey
Buoys
ITP
ice-mass buoy
meteo buoy
O-buoy
buoy drift trajectory
High-resolution model domain
RUSALCA
M12
M9
M3
M1
M5
East Siberian Sea
Laptev Sea
Beaufort Sea
Canadian Basin
Makarov Basin
Amundsen Basin
Nansen Ba
65°
70°
75°
80°
85°

Emerging Research Questions* Relevant to PAG Science

- How much of the variability of the Arctic system is linked to ocean circulation?
- How will primary productivity change with decreasing sea ice and snow cover?
- How will species distributions and associated ecosystem structure change with the evolving cryosphere?
- How will the rapid arctic warming change the jet stream and affect weather patterns in lower latitudes?
- How will climate change affect exchanges between the Arctic Ocean and sub-polar basins?

*The Arctic in the Anthropocene, US National Research Council, 2014