Pacific Arctic Group (PAG)

Synthesis Update

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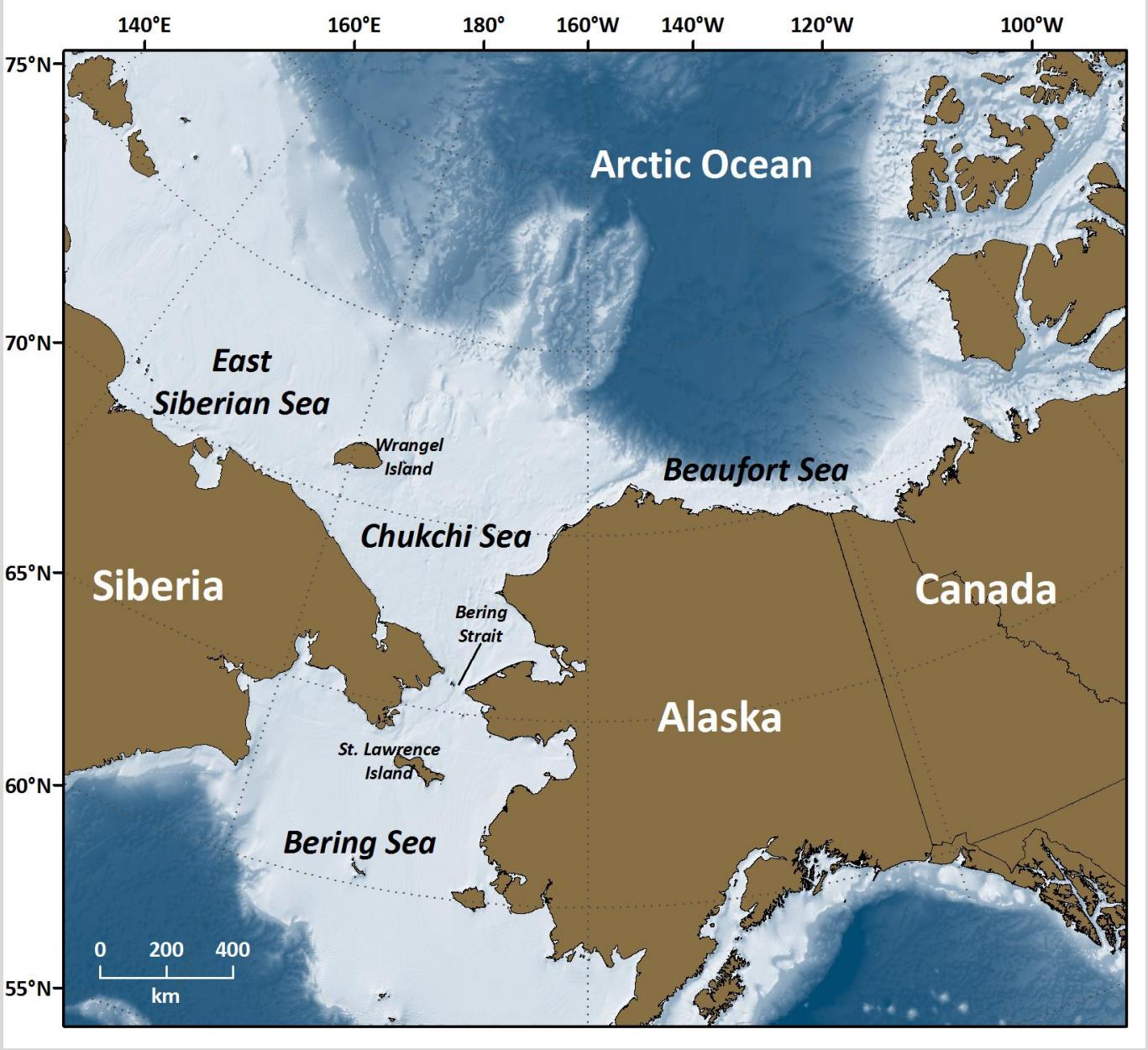
17 November 2011

Sidney, BC, Canada



PAG defines the **“Pacific sector”*** of the Arctic as the marine area from the Northern Bering Sea into the Chukchi Sea and adjacent Seas, and extending into the deep basins of the Arctic Ocean, with model boundaries from Aleutian Island and deep Bering Sea northward to Arctic Basin

OBJECTIVES OF PAR SYNTHESIS

1. present results from research, observation and modeling activities related to the PAG area, both retrospective and IPY efforts

2. share information on current modeling activities covering the PAG synthesis area; work toward a shared modeling system

3. identify status trends, and major new findings and understanding of state and processes in the PAG area

4. using best available model projections, prepare hypotheses regarding the future evolution of the physics and biology of the region

5. prepare scientific conclusions and recommendations to guide future PAG science activities

6. specifically for the PAG region, identify critical marine components of a future Arctic Observing Network

PAR Overview

1. Geographic area over which data is to be considered: Upstream (Bering Sea) to downstream (Chukchi Sea, portions East Siberian and Beaufort Sea, Canadian Arctic Archipelago, Arctic Ocean)

2. Time period to be considered: Decades leading up to IPY, IPY, and build scenarios decades past IPY

3. Science questions to be addressed by the synthesis and types of data to be included in the synthesis: Pacific-influenced Arctic system status and trends in atmosphere, sea ice, physical forcing, and biogeochemical/biological ecosystem response

4. Linkage between observational data and modeling: results from PAG modeling/data fusion workshop and other chapters

5. Products: Special book volume confirmed in Springer for PAG synthesis chapters; other special science volumes

6. Scope: Synthesis through workshops and invited participants

7. Endorsed by: IASC, AOSB:MWG, and the ICSU IPY project office as an IPY legacy effort

Summary of PAR Synthesis Activities

- **Fall 2007:** PAG created PAR synthesis group
- **Jan. 2008**: PAR Modeling Workshop #1, Sanya, China; resulted in special issue of Chinese Journal of Polar Science, Vol. 9, 2008; 13 papers
- **May 2009:** PAR Biology Workshop #2, Seattle, WA, USA; Feature article in EOS (May 2010); producing chapters for book in progress
- **June 2009:** PAR Marine Carbon Cycling Workshop #3, Xiamen, China; Special issue Deep Sea-Research in progress, Lead editor: Wei-Jun Cai et al.
- **Feb. 2010**: AGU/ALSO/TOS Ocean Sciences Meeting, Portland, Oregon, USA: Oceans10-IT24: Ecosystem Change in the Pacific Arctic in Relation to the Pan-Arctic System (Leads: Grebmeier, Moore, Maslowski, Zhao), orals and posters
- **June 2010**: OSLO IPY Conference, Oslo, Norway; Session T3-1: Ecosystem Change in the Pacific Arctic in Relation to the Pan-Arctic System (Leads: Grebmeier, Zhao, Mathis)
- **June 2010:** PAR Synthesis Lead author meeting, OSLO IPY Conference, Oslo, Norway
- **September-December 2011**: submission of chapter manuscripts, in review and revisions; submission volume to Springer in early spring 2012
- **2012:** Plan release of Springer book

Title Springer Book: THE PACIFIC ARCTIC REGION: ECOSYSTEM STATUS AND TRENDS IN A RAPIDLY CHANGING ENVIRONMENT

Springer, est. publ. date, 2012 (chapters pending submission)

Ch. 1 Introduction (Guest editors: Grebmeier, J.M. and W. Maslowski)-in progress

Ch. 2 Recent and Future Change in the Meteorology of the Pacific Arctic (**Overland, J.E.,** J. Wang, R.S. Pickart, and M. Wang), Lead editor: Wieslaw Maslowski, in review

Ch. 3 Recent Variability in Sea Ice Cover, Age, and Thickness in the Pacific Arctic Region (Karen E. Frey, James A. Maslanik, Jaclyn Clement Kinney, Wieslaw Maslowski); pending submission, Lead editor:Jackie Grebmeier

Ch. 6 Model-Data Fusion Studies of Pacific Arctic Climate and Ice-Ocean Processes (Wang, J., H. Eicken, Y. Yu, J. Zhang, H. Hu, M. Ikeda, K. Mizobata, and J. Overland), Lead editor: Wieslaw Maslowski, in revision

Ch. 4 Physical oceanography, hydrography, and shelf-basin exchange processes (Williams, B. et al.)-pending submission, Lead editor: Wieslaw Maslowski

Ch. 5 The large scale ocean circulation and physical processes controlling Pacific-Arctic interaction (W. Maslowski, W., J. Clement Kinney, S.R. Okkonen, R. Osinski, G. Panteleev); pending submission; Lead editor: Jackie Grebmeier, pending submission

Ch. 7 On the Flow Through Bering Strait: A Synthesis of Model Results and Observations (Clement Kinney, J., W. Maslowski, Y. Aksenov, B. de Cuevas, J. Jakacki A. Nguyen, R. Osinski, M. Steele, R.A. Woodgate, and J. Zhang), Lead editor: Jackie Grebmeier, in revision

Ch. 8 Carbon Fluxes Across Boundaries in the Pacific Sector of the Arctic Ocean in a Changing Environment (Cai, W.J., N. Bates, L. Guo, L.G. Anderson, L. Chen, et al.), Lead editor: Jackie Grebmeier in review

Ch. 9 Carbon Biogeochemistry of the Western Arctic: Primary Production, Carbon Export and the Controls on Ocean Acidification
(Mathis, J.T., J.M. Grebmeier, D.A. Hansell, R.R. Hopcroft, D.L. Kirchman, S.H. Lee, S.B. Moran, N.R. Bates, S. VanLaningham, J.N. Cross, W-J. Cai), Lead editor: Wieslaw Maslowski, in review

Ch. 10 Biodiversity & Biogeography of Lower Trophic Systems in the Pacific Sector (Nelson, R,J., C. Ashjian, B. Bluhm, K. Conlan, R. Gradinger, J. Grebmeier, V. Hill, R. Hopcroft, B. Hunt, H. Joo, D. Kirchman, K. Kosobokova, S. Lee, W. Li, C. Lovejoy, M. Poulin, E. Sherr, K. Young), Lead editor: Wieslaw Maslowski, in review

Ch. 11 Marine Fishes, Birds and Mammals as Sentinels of Ecosystem Variability and Reorganization in the Pacific Arctic Region (Moore, S.E., E. Logerwell, L. Eisner, E. Farley, L. Harwood, K. Kuletz, J. Lovvorn, J. Murphy, L. Quakenbush), Lead editor: Jackie Grebmeier, in revision

Ch. 12 Progress and Challenges In Biogeochemical Modeling Of The Pacific Arctic Region (Deal, C.J., N. Steiner, J. Christian, J.Clement-Kinney, K. Denman, S. Elliott, G. Gibson, M. Jin, D. Lavoie, S. Lee, W. Lee, W. Maslowski, J. Wang, E. Watanabe), Lead Editor: Jackie Grebmeier, in revision

Ch. 13 Paleoceanograpy over the last 10,000 yrs in the Pacific Arctic (Caissie, B. and J. Brigham Grette), Lead editor: Jackie Grebmeier, pending submission

Ch. 14 **Biological time series observations**: DBO and others; Grebmeier et al., Lead editor: Wieslaw Maslowski, pending submission

Comments from Springer reviewers

- Book heavy on physical oceanography, want more biology
  - Added DBO

- Change title to: “The Pacific Arctic Region: Ecosystem Status and Trends in a Rapidly Changing Environment”
  - Note some comments about using “PAR” as acronymn, comments?

- Need decadal scale change forecast in modeling chapters, if possible

Comments and/or Questions?