Arctic Modeling Workshop
NASA Headquarters, DC
[originally March 14, 2017, re-scheduled to June 26, 2017]

Organized under auspices of GCRP/IGIM,

by the Climate Modeling Center representatives, and IGIM Staff,

with Local arrangements by NASA Hqrs.

Climate Modeling Summit (USGCRP/ IGIM)

- To enhance coordination and collaboration toward a common national climate modeling strategy and communication with the broader modeling community.

- The CMS is an annual opportunity for US Federal Climate Modeling Centers.
  - ✓ Modeling center leaders to engage in discussion on major objectives and difficulties
  - ✓ Agency representatives to present relevant current priorities, directions, issues
  - ✓ Dialogue regarding whether and how we might improve strategies to further U.S. climate science and mission objectives

Workshop on Modeling the Arctic

All 6 Centers interested in the subject; area and depth of interest varies:

- Seasonal to decadal variations/trends.
- Processes: chemistry, aerosols, clouds, radiation, sea-ice.
- Role of atmosphere and oceans.
- Subseasonal-to-seasonal predictions e.g., sea-ice extent, thickness.
- Linkages to midlatitude weather; other connections.
- Detection and attribution.

Arctic Modeling Workshop

- Welcome and Logistics [V. Ramaswamy (NOAA/GFDL), D. Considine & E. Yoseph (NASA)]
- Introduction to the Workshop [G. Geernaert (DOE), V. Ramaswamy (NOAA/GFDL)]

Focus on Modeling – Successes, weaknesses. Needs.

1. Seasonal to decadal variations/trends. Processes: chemistry, aerosols, clouds, radiation, sea-ice. Role of atmosphere and oceans. Subseasonal-to-seasonal predictions e.g., sea-ice extent, thickness. Arctic-midlatitude weather and circulation linkages. Detection and attribution. Gaps in modeling.
2. What are the Centers doing on this topic? Representation of Arctic physics, modeling of Arctic weather and climate, and model simulations.

A. State of the Science, Understanding, Predictability, and Predictions

Moderators: J-F Lamarque (NCAR) and S. Bauer (NASA-GISS). Rapporteur: D. Barrie (NOAA/CPO)

8.50 – 10.10: [each presentation 20 minutes including 5 minutes for discussions]

Scope: Observed variations and changes. Seasonal prediction perspective – gaps, requirements. Decadal-scale perspective (variability and trends). Summertime Arctic ice features. Arctic reanalyses. Challenges in modeling the Arctic climate.

- M. Serreze (Natl Snow Ice Data Center): Regional Sea Ice Predictability at Seasonal Time Scales and the Problem of Summer
- B. Tremblay (McGill Univ): Seasonal forecasting of the minimum sea ice extent
- C. Bitz (Univ. of Washington) (on webex/phone): The first decade of seasonal ice predictions
- D. Bromwich/ A. Wilson (Ohio State) (on webex/phone): Modeling and Analysis of the Arctic Atmosphere by the Arctic System Reanalysis

➢ 10.10 – 10.25: Break

B. Current Research and Modeling: Successes and Limitations, and Gaps

Moderators: H. Tolman (NOAA/NWS) and R. Leung (DOE/PNNL). Rapporteur: F. Lipschultz (USGCRP)

10.25– 11.35: [each presentation 10 min including 5 min for discussions]

Scope: Gaps, limitations, 'low-hanging fruits'.

➔ T. Ringler (DOE/LANL). R. Grumbine (NOAA/NWS). R. Cullather (NASA-GMAO). G. Schmidt (NASA-GISS). J-F. Lamarque (NCAR). M. Winton (NOAA/GFDL). S. Harper (Navy)

Moderators: G. Schmidt (NASA-GISS) and D. Bader (DOE/LLNL). Rapporteur: D. Li (CICS, Princeton)

11.35 – 12.20: [each presentation 15 minutes including 5 minutes for discussions]

Scope: Arctic climate and variability; mechanisms. Arctic sea-ice prediction skill. Arctic, midlatude weather.

- M. Bushuk (NOAA/ GFDL): Regional Arctic sea ice prediction: Mechanisms, forecast skill, and future outlook
- J. Perlwitz (NOAA/CIRES-CU): Mechanisms for Linkages between Arctic Amplification and Mid-Latitude Weather, and Their Representation in Models
- M. Patterson (US CLIVAR): Workshop on Arctic Change and Possible Influence on Mid-latitude Climate and Weather

➢ 12.20 – 1.20: Lunch

C. Future Research & Modeling: Forming strategies based on the identified gaps in knowledge

Moderators: S. Pawson (NASA-GMAO), V. Ramaswamy (NOAA/GFDL)

1.20 – 1.35: E. Hunke (DOE/LANL): CICE Consortium (10 min for talk, 10 min for discussions)

1.35 – 1.45: A. Bamzai (NSF): IARPC (7 min for talk, 3 min for discussions)

1.45 – 2.00: Setting the stage for the afternoon discussions

2.00 – 3.20: Break up into 3 groups. Identifying and framing the key issues.

- Group A [Discussion Leaders: T. Ringler (DOE/LANL) and W. Maslowski (NPS). Rapporteur: J. Fyke (DOE/LANL)] – *Modeling the Arctic processes*
- Group B [Discussion Leaders: M. Winton (NOAA/GFDL) and M. Cai (NSF). Rapporteur: H. Archambault (NOAA/CPO)] – *Arctic predictability*
- Group C [Discussion Leaders: R. Cullather (NASA-GMAO) and W. Wang (NOAA/NWS/CPC). Rapporteur: L. Andrews(NASA-GMAO)] - *Arctic reanalyses*

3.20 – 3.40: Break

3.40 – 5.30: **Concluding Plenary**

Summaries from Groups A, B and C by the Discussion Leaders and Rapporteurs. [10 minutes each]

➔Framing the Outcomes and Plans

[Panel: A. Molod (NASA-GMAO), J. Dunne (NOAA/GFDL), A. Chawla (NOAA/NWS), G. Schmidt (NASA-GISS), W. Large (NCAR), D. Bader (DOE)]

Questions for "Outcomes and Plans"

What are the principal challenges for the models to address? How? What can the models accomplish in the next 3-5 years? What resources are needed? What additional observations may be required?