

Big Synthesis Questions

- 1) Robin: Can we document and explain the impacts of the recent multidecadal warming in the Arctic? What are the spatial and temporal signature of the warming and the impacts?
- 2) Robin: What would be the impact of significant rapid warming in the Arctic? What is the likelihood of significant rapid warming in the Arctic in the century?
- 3) Marika: What climate thresholds have been passed as documented in the paleorecord and what threshold we might encounter in the next 50 years
- 4) Mark: What would be the impact of rapid change in Arctic on the global system?
- 5) Terry: What threshold changes in the Arctic system have occurred or are projected to occur that would significantly effect the earth systems. What are the linkages among these changes.
- 6) Peck: How would future Arctic change effect the global system (separate the effect of natural and anthropogenic change)?
- 7) How does climate forcing in differentially affects terrestrial and ocean carbon storage and cycling in the Arctic
- 8) John: How do you connect a variety of systems together using parameterizations and numerical modeling?
- 9) Joe: Which aspects of changing the seasonality of the Arctic would impact the Arctic and global systems?
- 10) Assessment of the role of the ocean versus land in energy, hydrologic, geochemical cycling and storage in the Arctic, including interconnections and feedbacks.
- 11) Don: what changes in the arctic system are expect in the next 50, 100 years and what will be their implact on the global system
- 12) Don: how does the arctic system work and what are the interconnection and feedbacks.
- 13) What would be the impact of rapid climate change in Arctic be on the global system?
Carbon cycle and reservoir impacts, ocean margins as a carbon sink/storage

Preamble

- ❖ *We hold these truths to be self evident.*
- ❖ *Changes in the Arctic have been well documented and the next big step is to explain the global significance of those changes*
- ❖ *Therefore we the people of group 1 propose the following big question for synthesis*

Group 1: Big Synthesis Questions

How would future rapid climate change in the Arctic impact the earth system?

What will be the impacts on seasonality?

What will be the impact on the relative roles of the ocean and land in energy, hydrologic, geochemical cycling and storage in the Arctic, including interconnections and feedbacks?

What are the critical physical, biological, societal thresholds?

How will key coupling and linkages between the physical, biological, and societal systems change?

To what extent is the Arctic an early warning sensor in the global system?

To what extent is the Arctic an amplifier in the global system?

Arctic System

- 1) Defined through latitude and unique physical geography that regulate the global atmosphere and ocean circulation, carbon budget, food webs
- 2) Polar air mass and arctic ocean/marginal seas and the terrestrial/hydrologic systems that are directly connected to them.
- 3) The spatial domain of processes feeding into the northern polar region.
- 4) Where Santa Claus rules