

# 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