



# Tahoe Ah-Ha's



# Thresholds

(Andi, Barbara, Craig, Greg, Konrad, Larry, Mark)

- Land-use change within the Arctic can have direct impacts on more of the system's components than almost any other single component (e.g. permafrost, woody tundra, soil carbon, runoff)
- Big global players (Greenland, THC, soil C) have small **direct** impacts on Arctic system components **in the 21st century**
- Scale is critical in identifying threshold behavior: local thresholds are plentiful and often easy to define (e.g. complete loss of a small glacier), but scaling to regional scale is uncertain.



# Predictors

(Larry, Marika, Giff, Don, Bruce, Gavin, Neil)

- Deep water formation is necessary for an ice free summer because of the strong negative feedback between stratification and ice production
  - In an ice free state, a new balance will be achieved between wind forcing and halocline persistence
  - This new state is likely to be self sustaining
- Physical state constrains human activities in some broadly predictable ways



# Human-Environment Interactions

(Michelle, Clara, Gwenn, Henry, Jonathan, John, Rommel)

- Humans have potential for impact in the arctic and for amplification of climate effects
- Decision-making works as a knob that adjusts the gain (amplification or attenuation) on the biophysical outcome of the system
- There are thresholds and accelerations in future trajectories (of development, for example) whose timing can be affected by human agency
- Human activity may have biophysical repercussions at the circumarctic scale; more work is needed to quantify the magnitude of these effects and constrain the timing of possible thresholds
- Prevention of climate change impacts in the Arctic requires global action, in support of which activism by Arctic residents may be crucial (e.g., Inuit and POPs)
- In theory, the schematic diagrams in this paper can be quantified with data—i.e., human influences can and should be studied quantitatively



# Global

(Craig, Bette, Peter, Matthew, Charlie, Katey, Mike)

- Specific features of climate change, such as timing, seasonality and variability, that have important ecosystem and human impacts have not been a focus/consideration of the modeling community
- Changing role of humans in the Arctic System through time