A “Kuhnian Read” of “The Discovery of Rapid Climate Change”
Board notes from October 13, 2005

Old paradigm
“uniformitarian … too slow for humans to notice”
1) Belief as the old paradigm
   a. “the experts held a traditional belief that the natural world is self regulating”
2) Lack of evidence
   a. “for hardly any accurate records went back more than a half or so”
3) ignorance, skepticism, misinterpretation of existing evidence
   a. “evidence was meaningless to them”
   b. “dismissed idea as preposterous”
   c. “Found such a rise barely plausible”
   d. “saw jumps as merely local noise”
4) still preliminary to new paradigm
   a. “new thinking is little known and scarcely appreciated”

Anomaly
• 1956 – “studying variations in the shells of plankton” (1 degree Celsius per 1,000 years
• 1960 – from deep sea and lake deposits (5-10 degree Celsius in less than 1,000 years)
• Ice cores from Greenland shifts seemed to take as little as a century
• Trish edit: don’t forget about role of modeling, computer experiments, “dishpan experiment” in theory building to explain anomalies.

Crisis
“The one thing that all scientists agreed on was that they were seriously ignorant about how the climate system worked.” 1975 NAS report

Extraordinary Science
• 1981 – hit bedrock and studied ice cores from 14,000 years ago which showed
  “A dramatic cooling of rather short duration, perhaps only a few hundred years.”
• 1993 – ice core data as a tipping point in acceptance of the new paradigm

Paradigm emerges and is accepted
• “Scientists could have dismissed those models as too crude to say anything reliable, but the historical data showed the notion of radical climate instability was not absurd after all.”
• Agreed that global climate change could have come at any time
Logic
- “In human experience, temperature did not rise or fall radically in less than a millennium, so such changes had never happened in the past.”
- “Common sense held that huge changes could only creep in over tens of thousands of years.”
- “evidence of a climate shift could only be accepted if it made sense, plausible theories”
- Illogical rejection of abrupt climate change evidence
- Only after an overwhelming amount of evidence of abrupt global climate change was presented was the logical step taken to abandon the old paradigm (self-regulation, slow climate changes)

Belief
- “firm belief that climate change is too slow for humans to notice”
- Belief that the experience of the recent past reliably described future conditions
- “…traditional belief that the natural world is self-regulating”
- Assumptions that significant changes only take place over thousands of years
- Earth is self-regulating (old paradigm)

Faith (made some association to religion here)
- “scientists found themselves insisting on this principle (of gradual climate change)
- Cranks and religious fundamentalists publicly proclaimed ideas about apocalyptic global cataclysms
- “stability was guaranteed if not by Divine Providence then by the suprahuman power of benevolent “balance of nature”
- “…scientists painfully gave up traditions that explained certain geological features invoking Noah’s flood”