

# 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”