Climate change impacts on the marine and coastal environment

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Implications for marine governance

- Climate and global change are a given
- Large uncertainty regarding impacts
- Management needs to change from a year to year to a decade to decade horizon (a huge political problem)
- Full scale advocacy for emission reductions
- But by itself not enough, need to adapt and mitigate
- Mitigation strategies need to be carefully evaluated

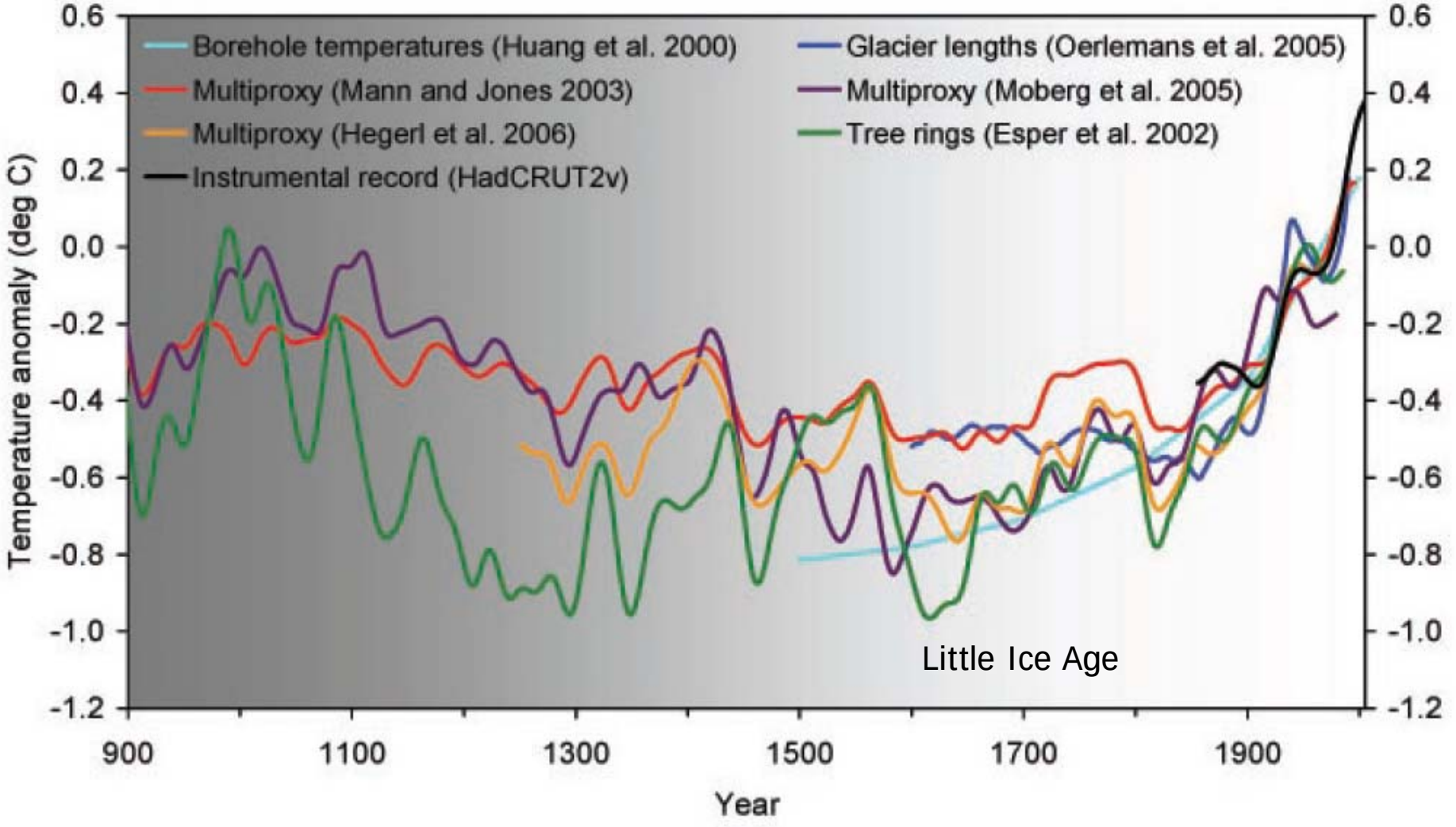
Continued

- Ocean information severely lacking (a few long term sites in ocean, hundreds on land)
- Leads to decisions made out of fear or ignorance, not very satisfying for a scientist
- Urgent need to improve observations and build support systems for long-term decisions

What is Climate Change?

- Scientists typically define it to include any change in climate, be it due to nature or man, on any scale (e.g. interannual to centennial or longer)

US National Academies Report 2006



What about Global Change?

- Here defined as any environmental change associated with human activity
- The most debated is global warming but there are many others such as ocean acidification, pollution (nutrients, metals, etc.), overfishing, etc.

Ocean Acidification

The role of the ocean in moderating the atmospheric CO_2 increase has been recognized (by scientists) for a very long time. Revelle and Suess (1957) first explicitly calculated the partitioning of CO_2 released to the atmosphere between air and sea and estimated that ~ 40% of the gas would quickly be absorbed by the surface ocean, with the remainder building up in the atmosphere and changing climate.

While the climate impacts of increasing atmospheric CO_2 levels have received great attention, the direct effects of the enormous CO_2 enrichment of the upper ocean have had little discussion. That is about to change, for ocean chemistry is being altered on a scale not seen for millions of years, and there are very basic questions on the impact on ecosystems and biogeochemical cycles to which we simply do not yet have answers. **The oceanic invasion rate of fossil fuel CO_2 is now over 1 million tons CO_2 per hour.**

the 3 days of the meeting
ocean will have absorbed
st 100 million tons of CO_2