

Extreme future sea levels

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*How inappropriate to call this planet Earth
when it is quite clearly Ocean*

Arthur C. Clarke

Outline

- IPCC projection
- Observations
- Paleo-climate
- Storm Surges
- Methodology

Outline

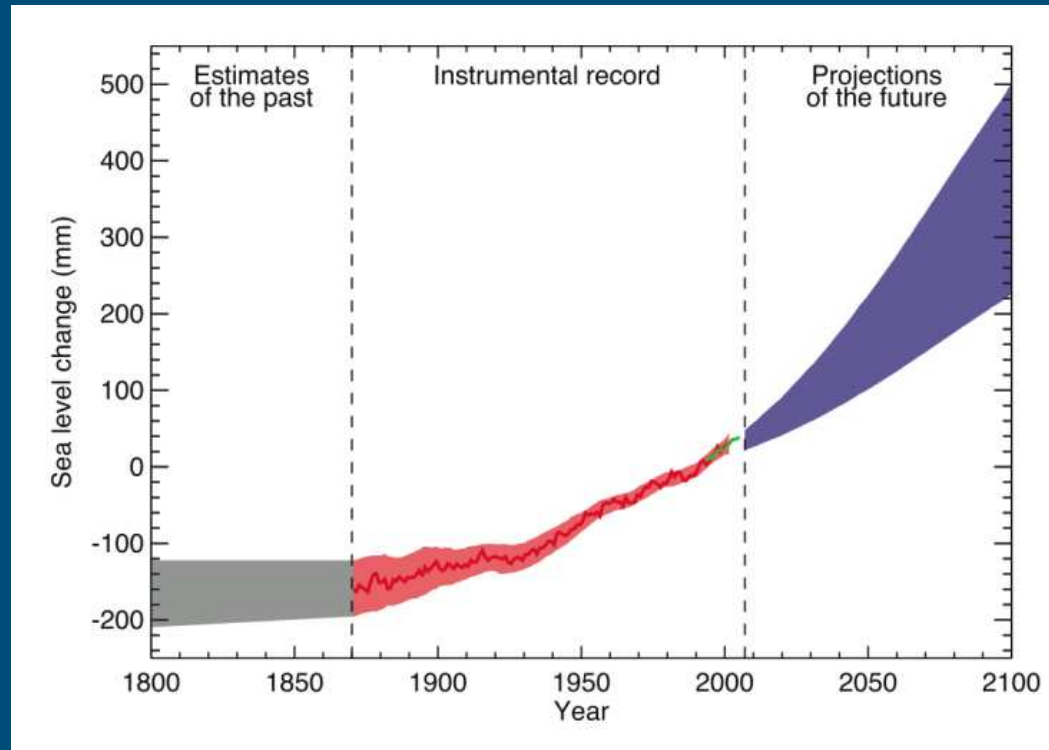
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IPCC projections

Table SPM.1. Projected global averaged surface warming and sea level rise at the end of the 21st century. {Table 3.1}

Case	Temperature change (°C at 2090-2099 relative to 1980-1999) ^{a, d}		Sea level rise (m at 2090-2099 relative to 1980-1999)
	Best estimate	Likely range	Model-based range excluding future rapid dynamical changes in ice flow
Constant year 2000 concentrations ^b	0.6	0.3 – 0.9	Not available
B1 scenario	1.8	1.1 – 2.9	0.18 – 0.38
A1T scenario	2.4	1.4 – 3.8	0.20 – 0.45
B2 scenario	2.4	1.4 – 3.8	0.20 – 0.43
A1B scenario	2.8	1.7 – 4.4	0.21 – 0.48
A2 scenario	3.4	2.0 – 5.4	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4	0.26 – 0.59

Sea level rise



Source: IPCC

Thermal expansion

+

Glaciers, ice caps

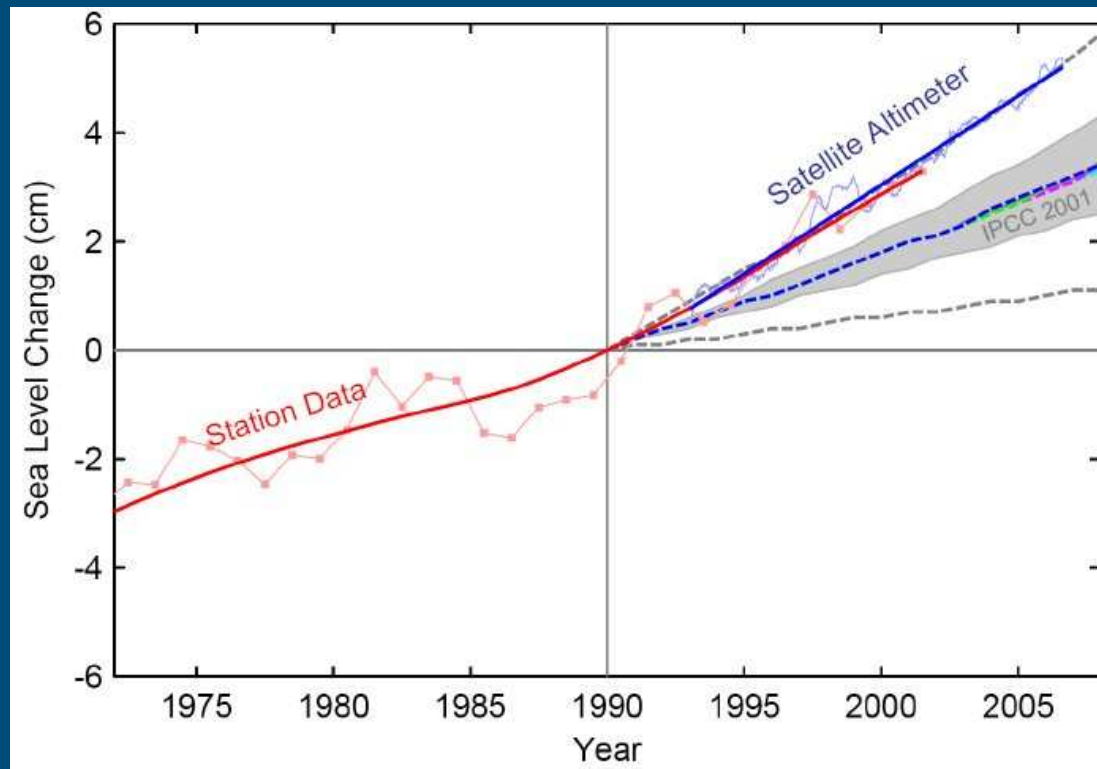
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Ice sheets?

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Sea level rise



Source: Rahmstorf et al, 2007

Thermal expansion

+

Glaciers, ice caps

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Ice sheets

Ice Sheets: Greenland

- 7 m sea level rise
- Ridley and colleagues (2005) - 4x pre-industrial CO₂ results in 50 cm SLR per century, with 5 mm/year over the first 850 years
- 93 % disappears within 3000.



Ice sheets: Antarctica

- 6 m sea level rise from WAIS
- Expert panel (Vaughan and Spouge, 2002) : 5% chance for melting of WAIS and 10 mm/year sea level rise



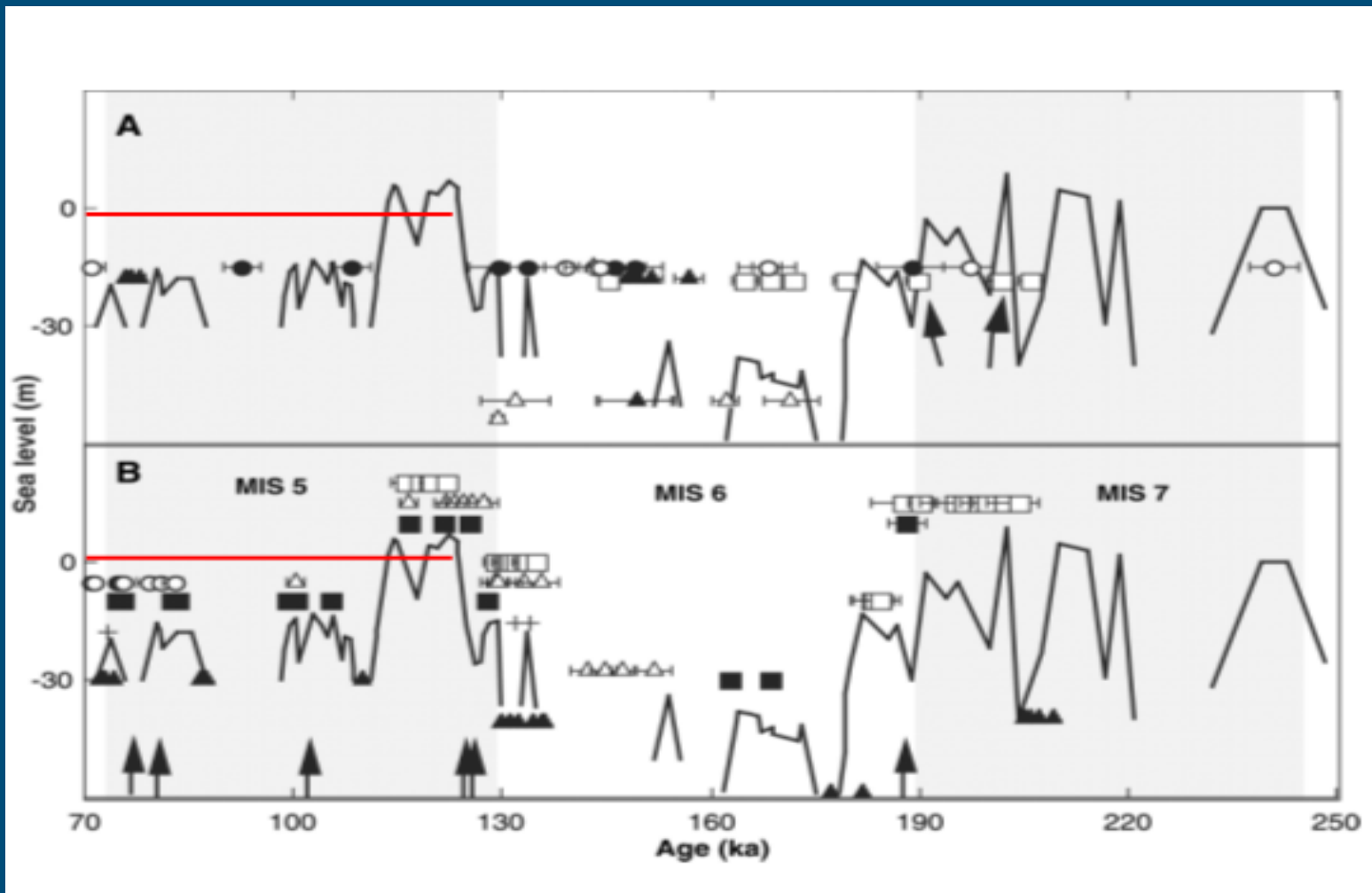
The Larsen B ice shelf off the Antarctic Peninsula in satellite photographs on 31 January (a) and 5 March 2002 (b).

Source: NSIDC, 2002

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Paleo-climate

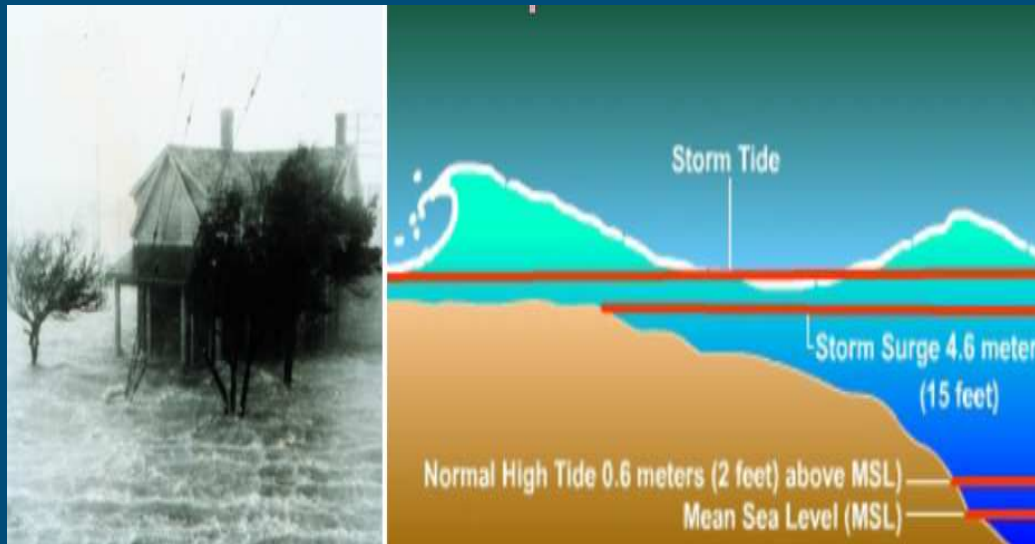


Source: Thompson and Goldstein, 2005

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Storm Surges



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Methodology

Constructing Probability distribution functions

- Literature study
- Expert judgment

Partners

- KNMI
- Utrecht University
- Delft University
- Vrije University
- Princeton University
- CSIRO
- British Antarctic Survey
- University of Hamburg
- University of Edinburg
- UK Met Office
- University of Nevada
- Potsdam Institute for Climate Impact Research

7-9 April – International workshop

The output: an assessment

Thank you

Questions?

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