

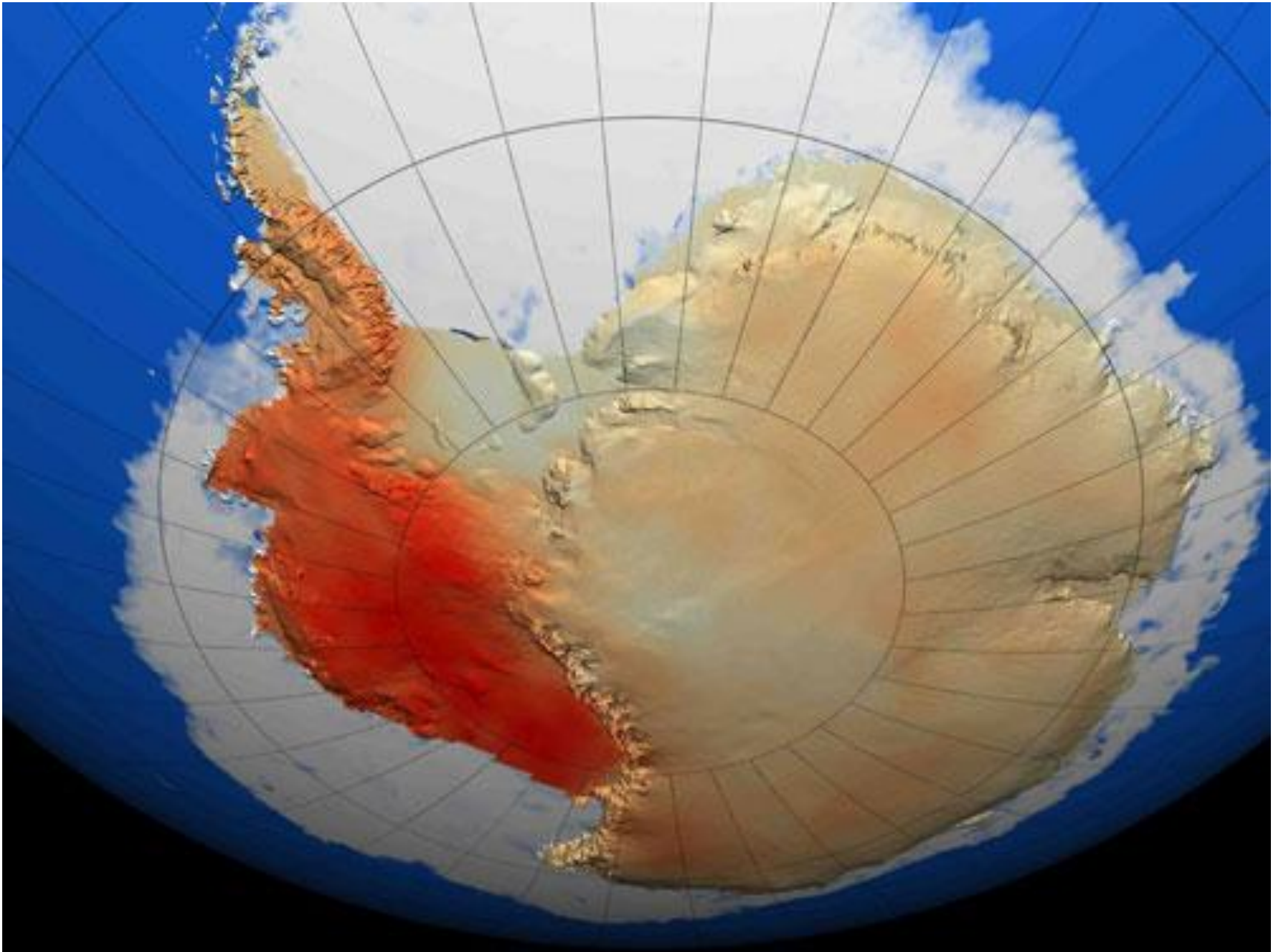
The Future of the West Antarctic Ice Sheet: observed and predicted changes, tipping points, and policy considerations



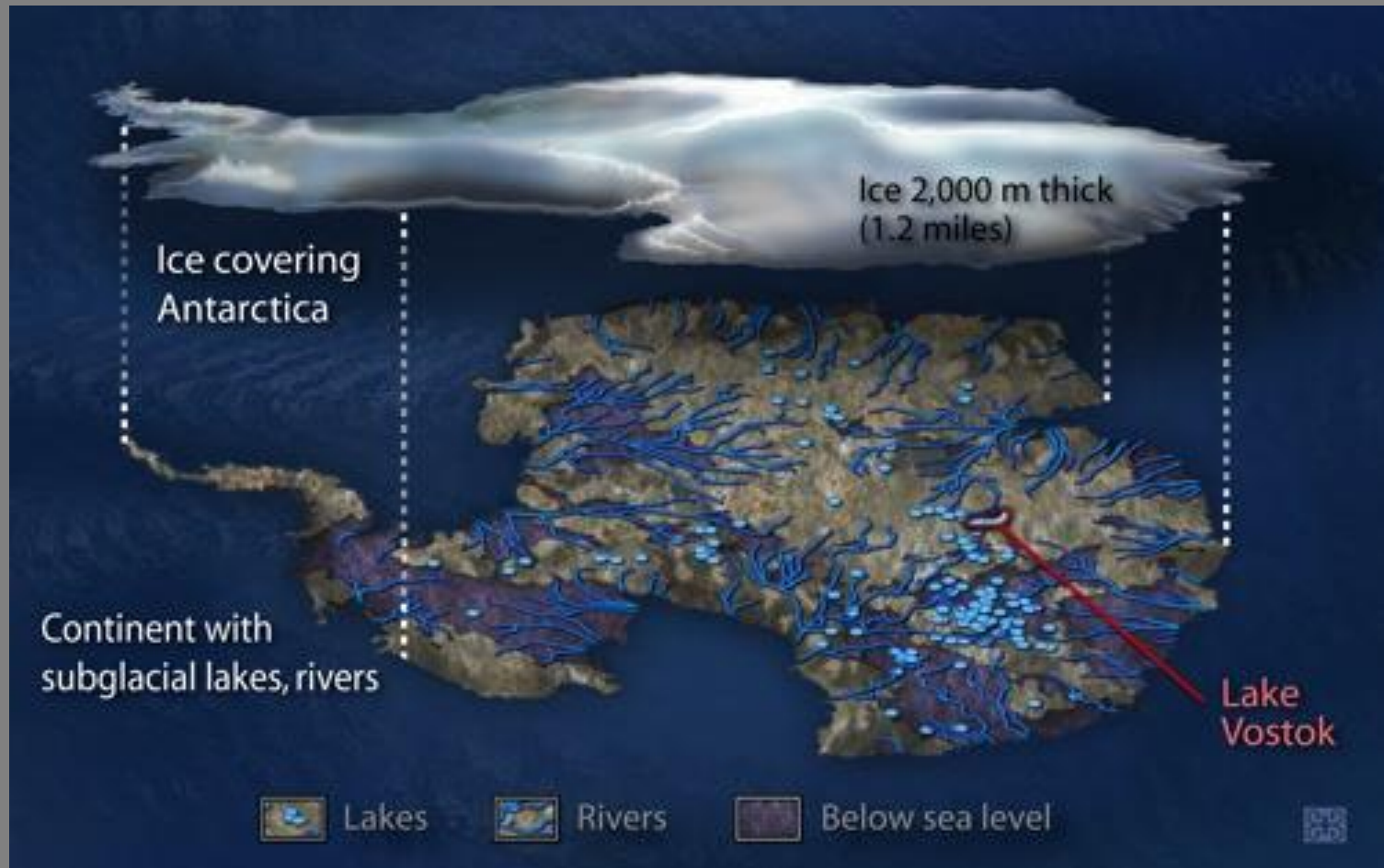
Overview

- WAIS orientation
- Key scientific findings
- Considerations and recommendations





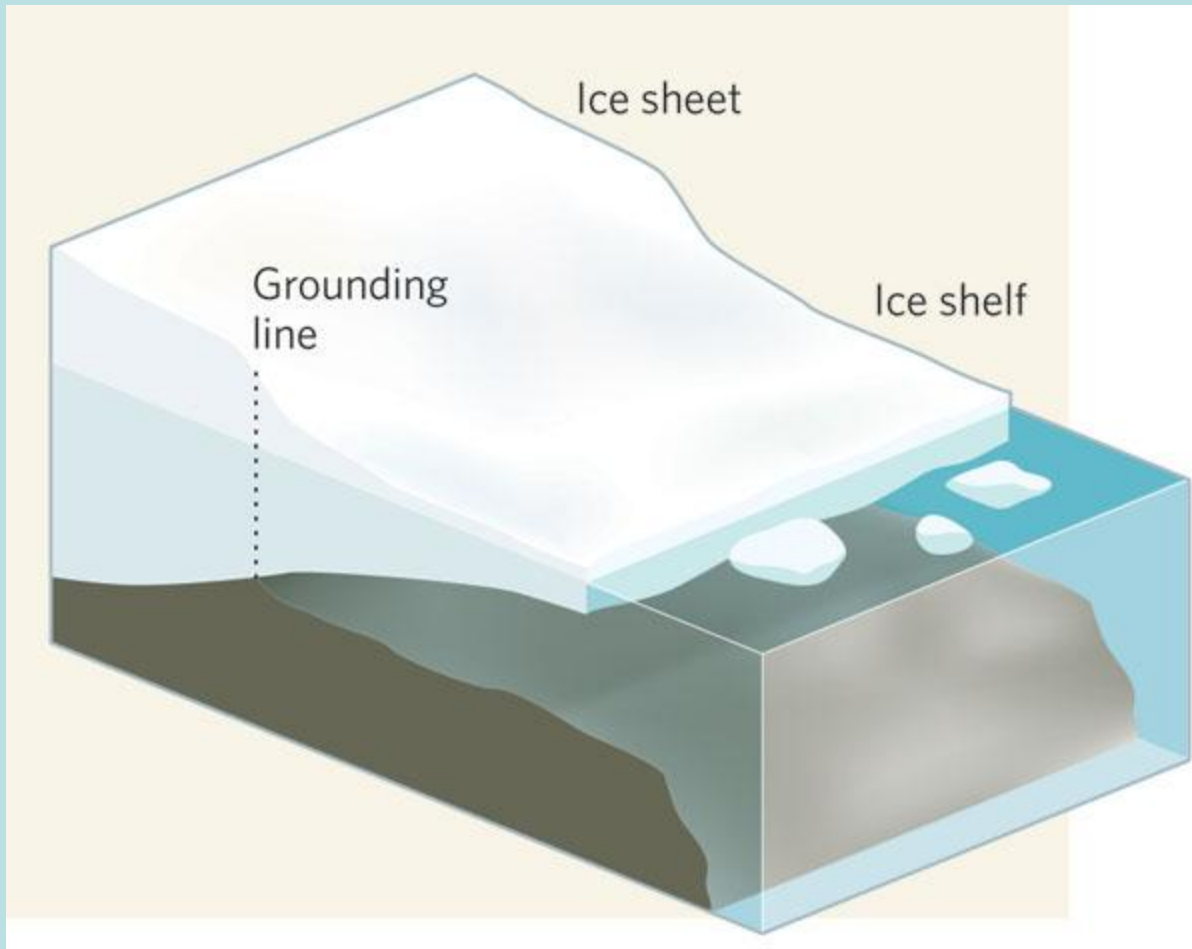
EJ Steig, NASA



Key concerns

- Stability vs instability
- Rate and type of change
 - Gradual (3.3cm/ yr)
 - Rapid disintegration (3.3-6m, rate unknown)
- Lack of prediction in IPCC's AR4 (2007)





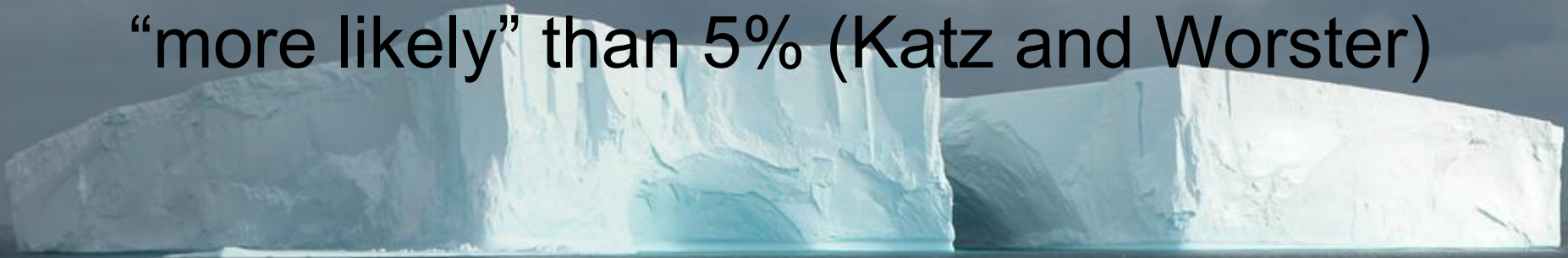
Future sea level rise projections

- 0.75-1.9m by 2100 (Vermeer and Rahmstorf 2009)
- 0.8 and 2.0m by 2100 (Pfeffer et al 2008)



Expert elicitation

- 2002: experts gave a 5% likelihood of a rapid disintegration of WAIS in the next 200 years (Vaughan and Spouge)
- 2010: experts judge a rapid disintegration “more likely” than 5% (Katz and Worster)



Tipping Points

- “tipping point” scenario not certain
- Range of estimates from 1-5 C above current global temperatures as a threshold for WAIS instability
- Rate for disintegration unknown



Observed Changes

- Ice shelf disintegrations (Wordie, Wilkins, Larsen A and B)
- Changes at Pine Island Bay glaciers: thinning, ungrounding, melting
- Other areas have ice stream acceleration and deceleration (Ross Sea/ Siple Coast) or no change



Summary of AIS changes

- the most recent measurements indicate that the Antarctic ice sheet is losing mass, and this loss, largely from the Antarctic Peninsula and West Antarctica, is accelerating.



Policy considerations

- Proceeding under uncertainty
 - Model and conflict uncertainty
 - Uncertainty will always exist
 - Subjective threshold for decision making under uncertainty
- Preparing for extreme outcomes/ worst-case scenarios



Recommendations

- Rapid response system for observing and recording changes as they occur
- “early detection” coordination to notify public of disintegrations
- Expansion and support of WAIS research, particularly research that contributes to improved modeling capabilities

Acknowledgements

- Science reviewers: Robert Bindschadler, Charles Bentley, David Vaughan, Michael Oppenheimer, Chris Little
- ASOC reviewers: Tina Tin, Jim Barnes, Ricardo Roura

