

Tipping Points

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Outline

- ▶ Introduction to Tipping Points
- ▶ AMOC: A case study
- ▶ Climate adaptation

Introduction

else... although how a man who spent all his time at the resort beaches of Antarctica or in German E Therapy clinics could find time to devise dogma on every topic eluded him.

Someday, he said to himself, I'll live like Leo Bulero; instead of being stuck in New York City in 180 degree heat—

Beneath him now a throbbing began; the floor shook. The building's cooling system had come on. Day had begun.

RAISING THE ALARM

Evidence that tipping points are under way has mounted in the past decade. Domino effects have also been proposed.



A. Amazon rainforest
Frequent droughts

B. Arctic sea ice
Reduction in area

C. Atlantic circulation
In slowdown since 1950s

D. Boreal forest
Fires and pests changing

F. Coral reefs
Large-scale die-offs

G. Greenland ice sheet
Ice loss accelerating

H. Permafrost
Thawing

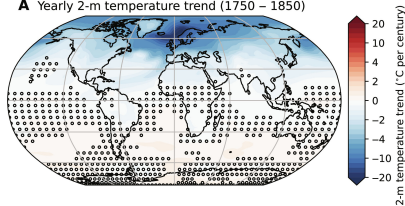
I. West Antarctic ice sheet
Ice loss accelerating

J. Wilkes Basin, East Antarctica
Ice loss accelerating

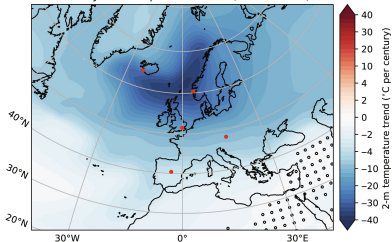
Begin 00:00 , stop 438, resume 645, End 11:03

Weather changes in Europe [2]

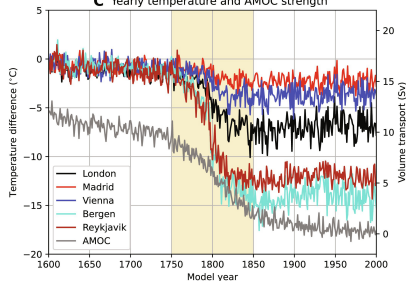
A Yearly 2-m temperature trend (1750 – 1850)



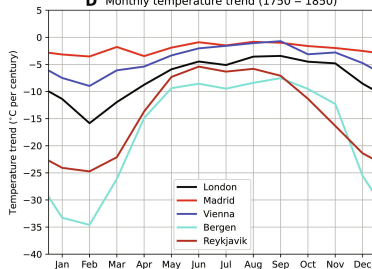
B February 2-m temperature trend (1750 – 1850)



C Yearly temperature and AMOC strength



D Monthly temperature trend (1750 – 1850)



Why this temperature change is nontrivial

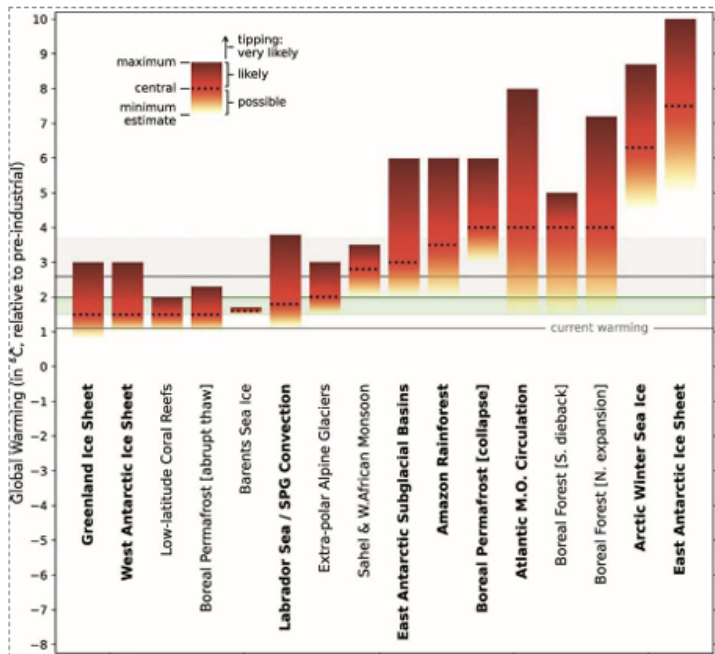
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2. The model predicts a collapse of AMOC could cause the Europe to experience a decrease of 3 degree Celsius over a decade

Mitigation is the best adaptation [1]



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 - ▶ Early warning systems
 - ▶ Solar geoengineering

Thank you!

Questions?

References I

- [1] OECD. *Climate Tipping Points: Insights for Effective Policy Action*. 2022.
- [2] René M Van Westen, Michael Kliphuis, and Henk A Dijkstra. “Physics-based early warning signal shows that AMOC is on tipping course”. In: *Science advances* 10.6 (2024), eadk1189.