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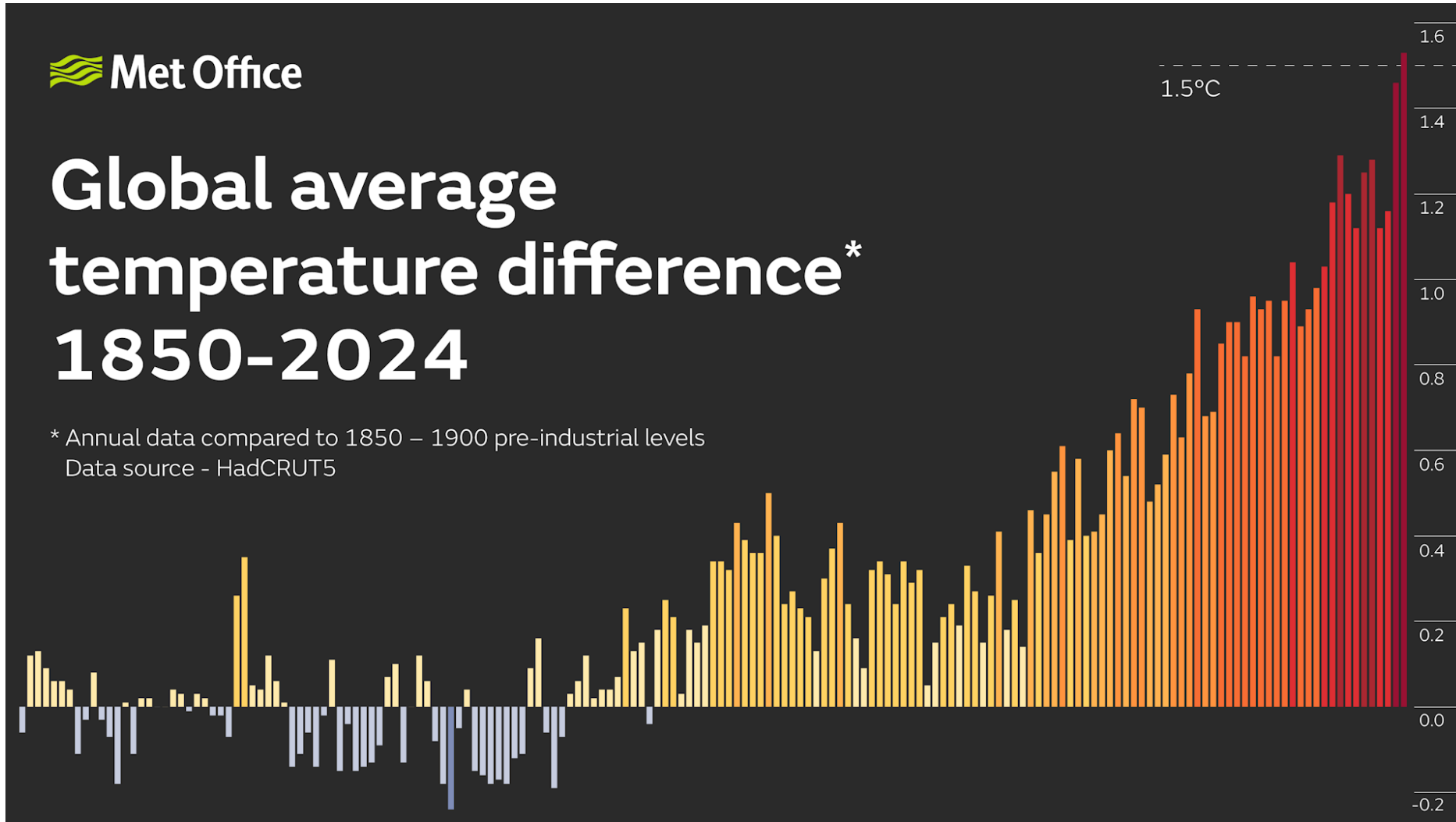
Emerging climate risks and tipping points

The consequences of ignoring
heavy tails in our models

13th May 2026

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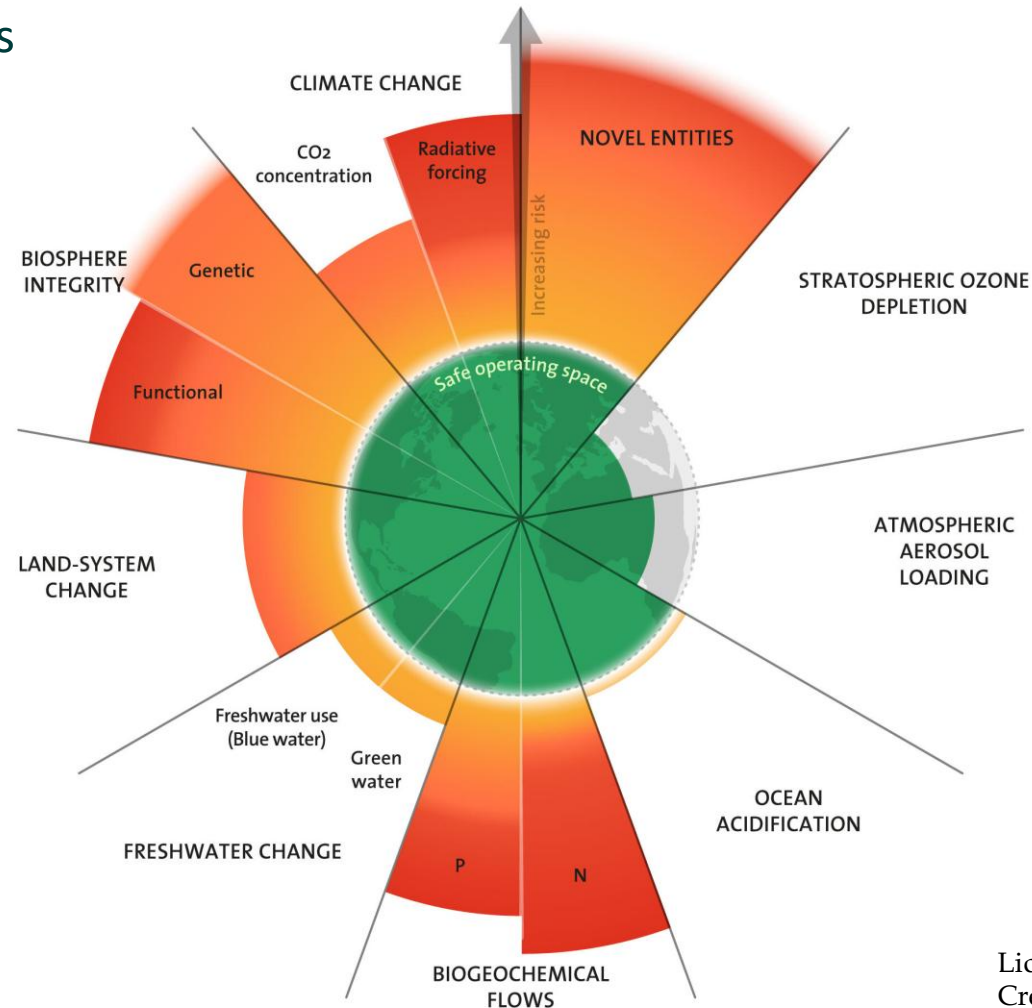
The last three years have been the warmest on record



2025 estimate (1.4°C)

7 planetary boundaries have been crossed

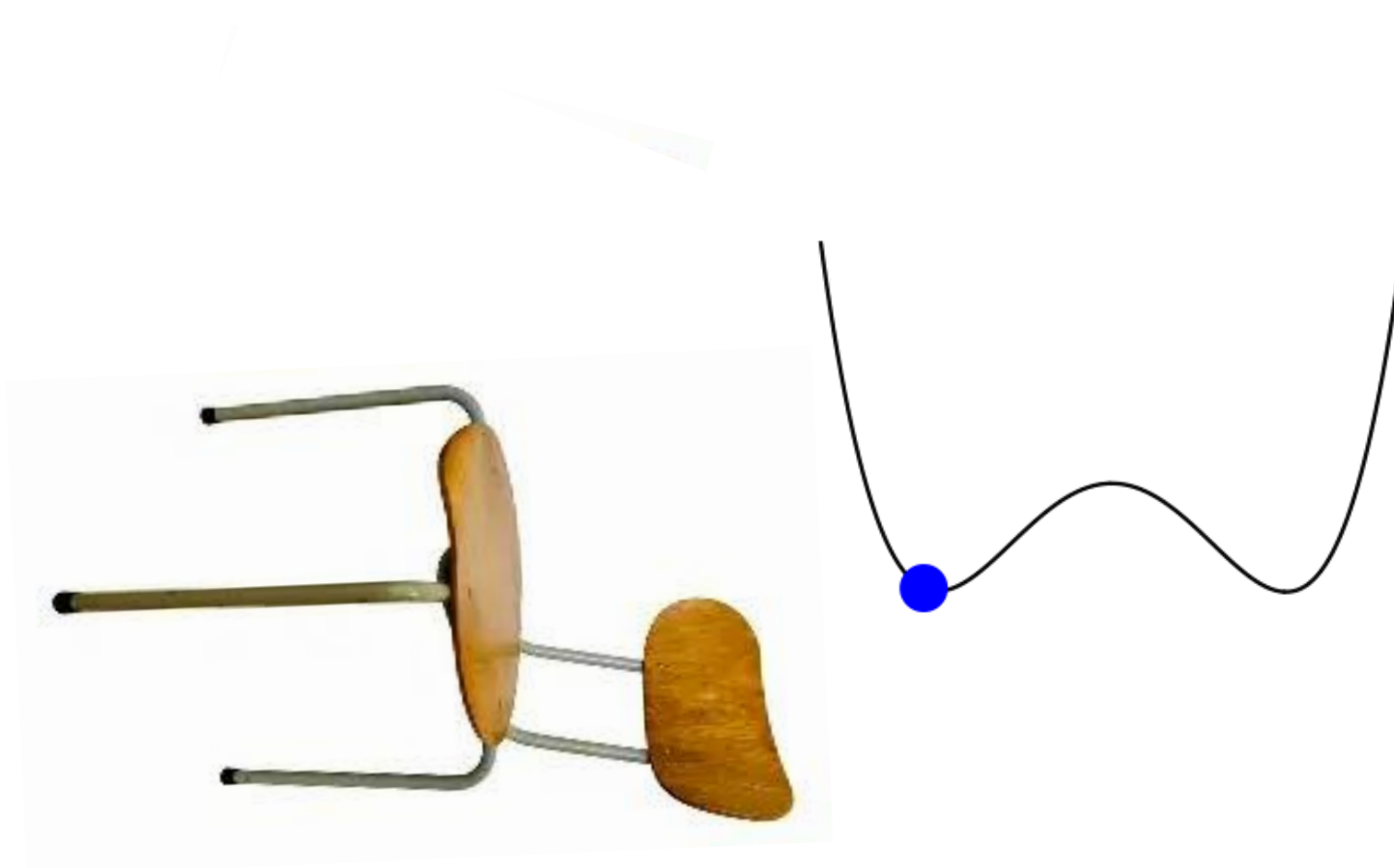
The Planetary Boundaries assessment indicates the safe operating space of the earth in green



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Credit: "Azote for Stockholm Resilience Centre, based on analysis in Sakschewski and Caesar et al. 2025"

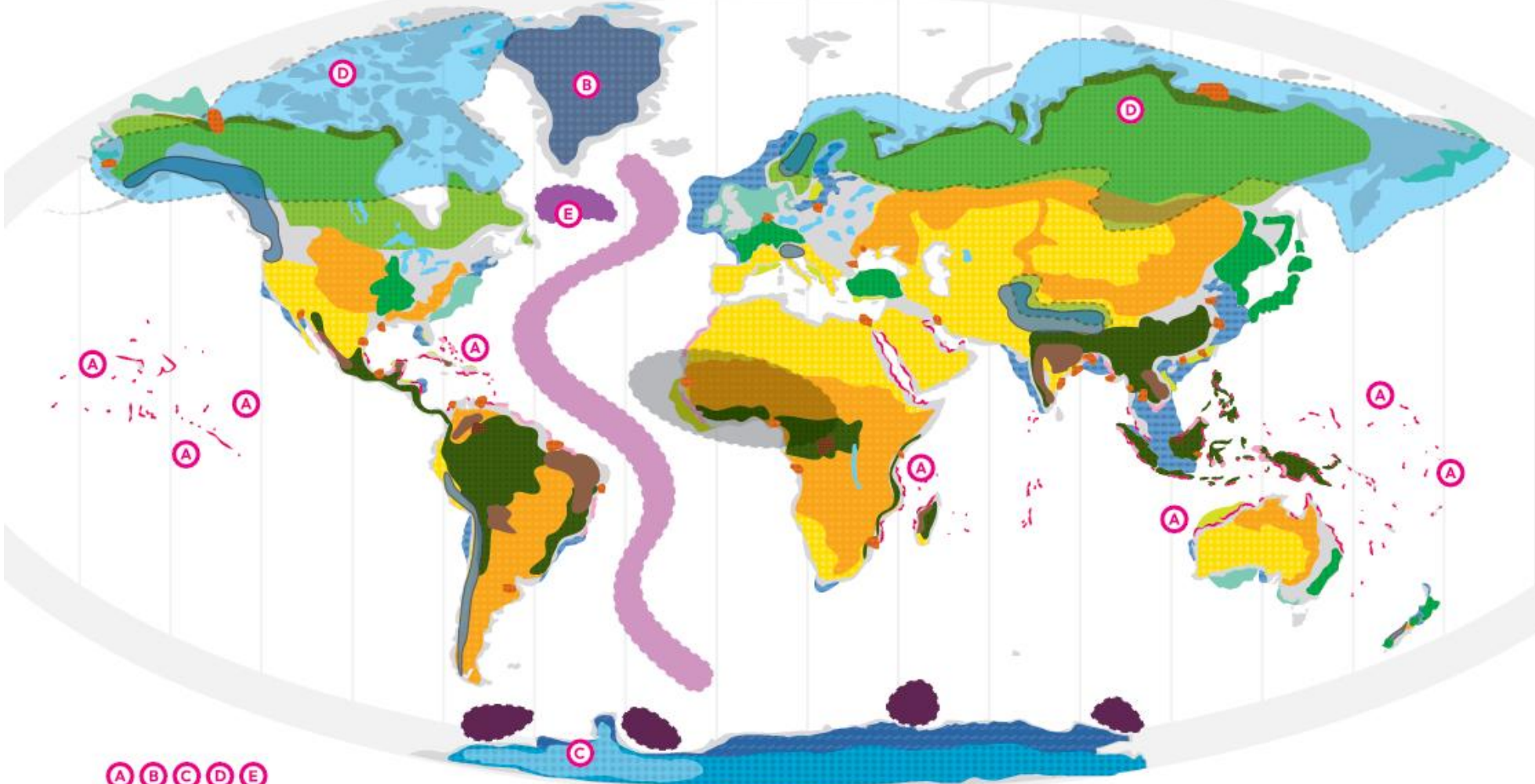
An analogy: Tipping points in complex systems



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CC BY 4.0 - Chris A. Boulton (UoE, UK)

Credit: Chris Boulton, University of Exeter
Additional source: [Abrams et al.](#) (2026) *Nature Communications*



A B C D E

Closest to tipping - due to global warming

BIOSPHERE

- Tropical dry forest
- Tropical rainforest
- Boreal forest
- Tundra
- Savannas & grasslands
- Drylands
- Temperate forests
- Peat bogs
- Lakes
- Coral reefs (A)
- Mangroves
- Fisheries
- Seagrass
- Kelp forest
- Delta

CRYOSPHERE

- Greenland Ice Sheet (B)
- West Antarctic Ice Sheet (C)
- Non-marine East Antarctica
- Marine basins East Antarctica
- Permafrost (D)
- Mountain glaciers

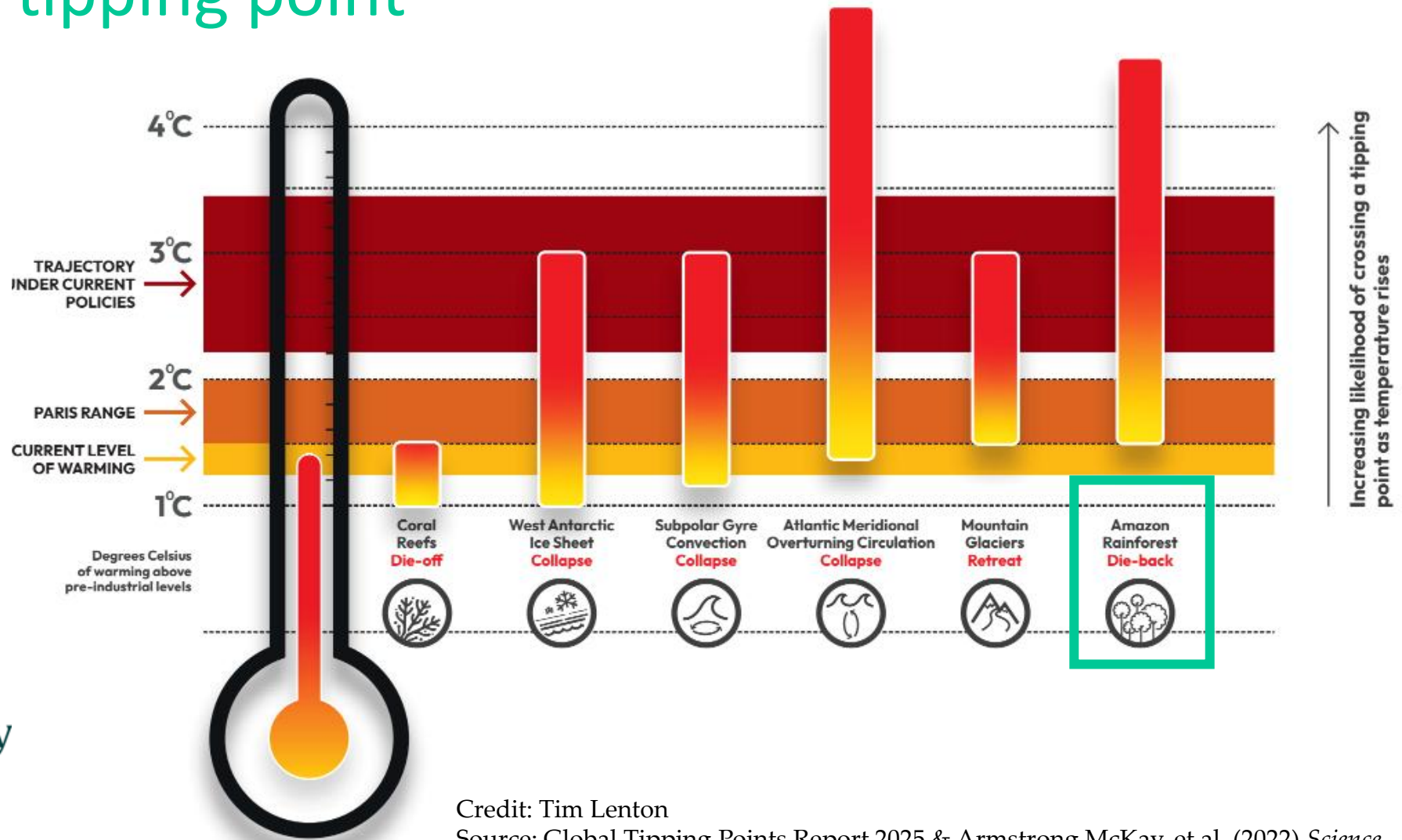
OCEAN & ATMOSPHERE CIRCULATIONS

- Atlantic Meridional Overturning Circulation (AMOC)
- Subpolar Gyre (SPG) (E)
- Southern Ocean Overturning
- West African monsoon



Source: Global Tipping Points Report 2025

Each fraction of a degree increases the likelihood of crossing a tipping point



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Credit: Tim Lenton

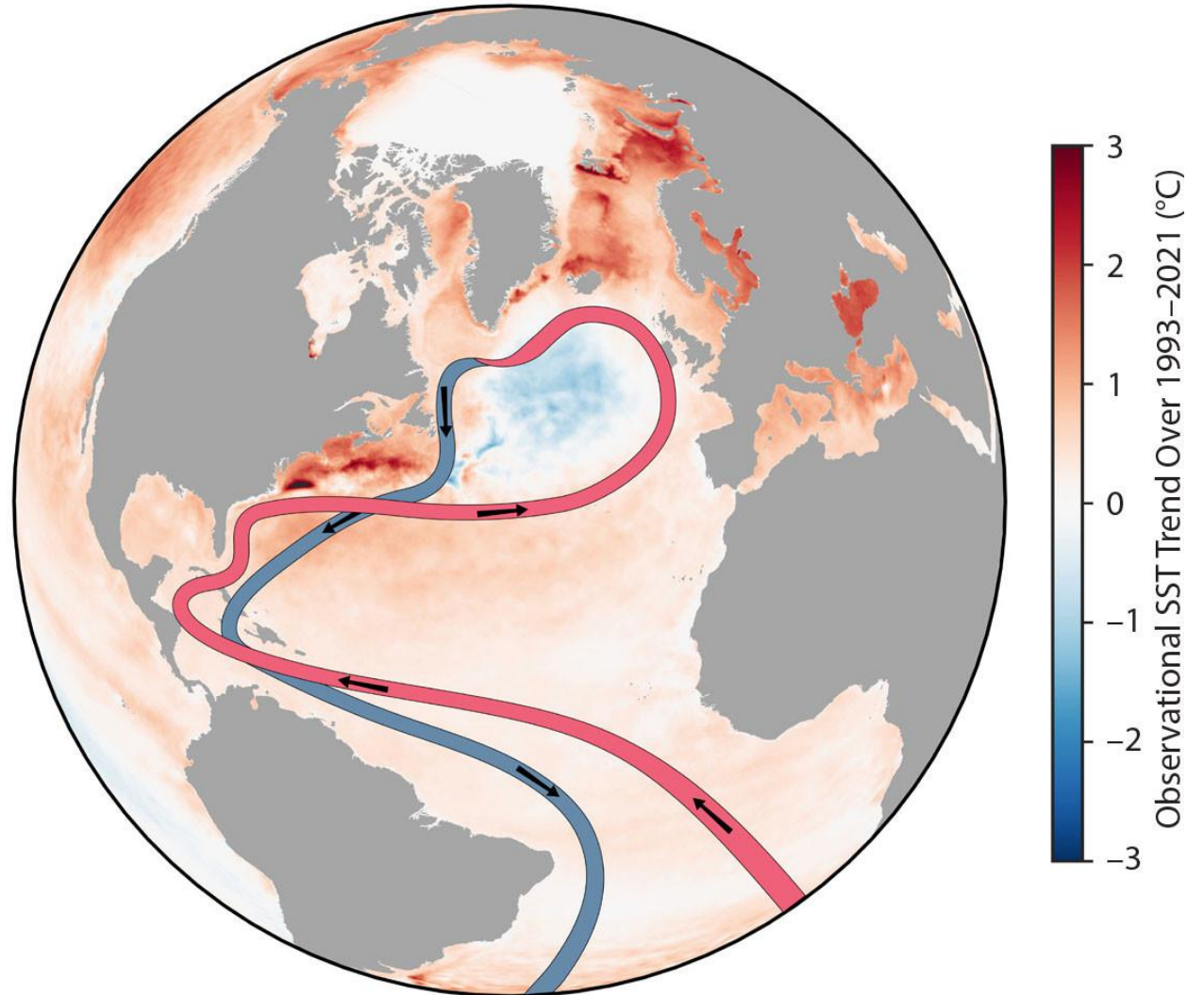
Source: Global Tipping Points Report 2025 & Armstrong McKay, et al. (2022) *Science*

The Atlantic Meridional Overturning Circulation is slowing...

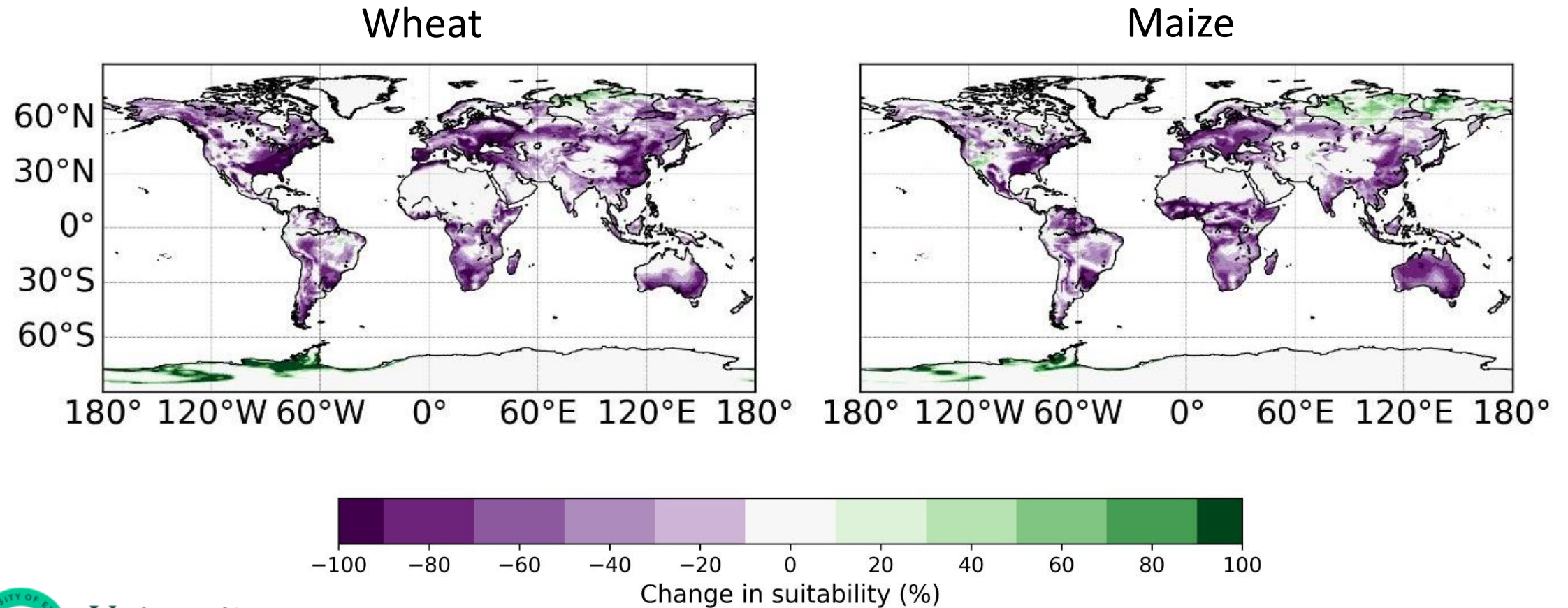
Shutdown of northern Atlantic overturning after 2100 following deep mixing collapse in CMIP6 projections (Drijfhout et al., 2025)

- High emissions: ~70%
- Intermediate: ~37%
- Low emissions: ~25%

Observational constraints project a ~50% AMOC weakening by the end of this century (Portman et al., 2026)



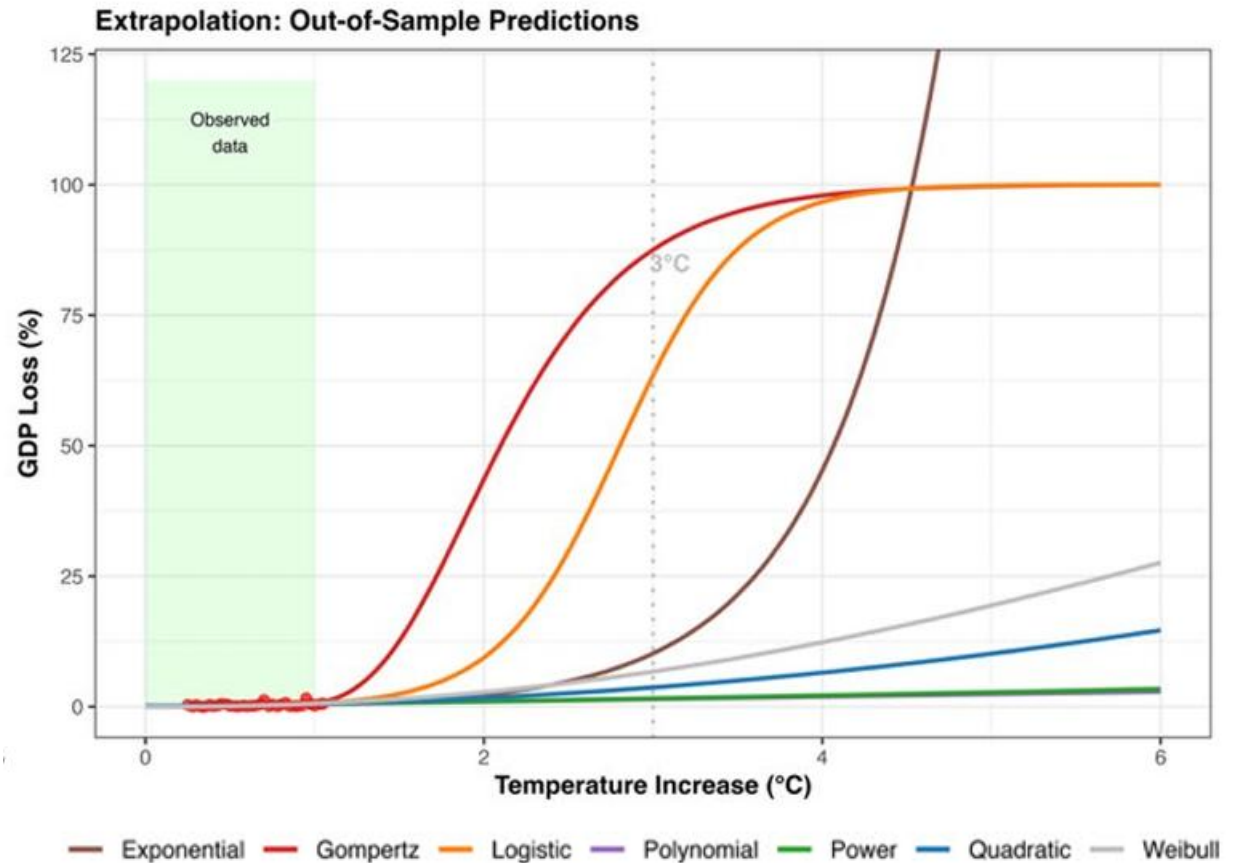
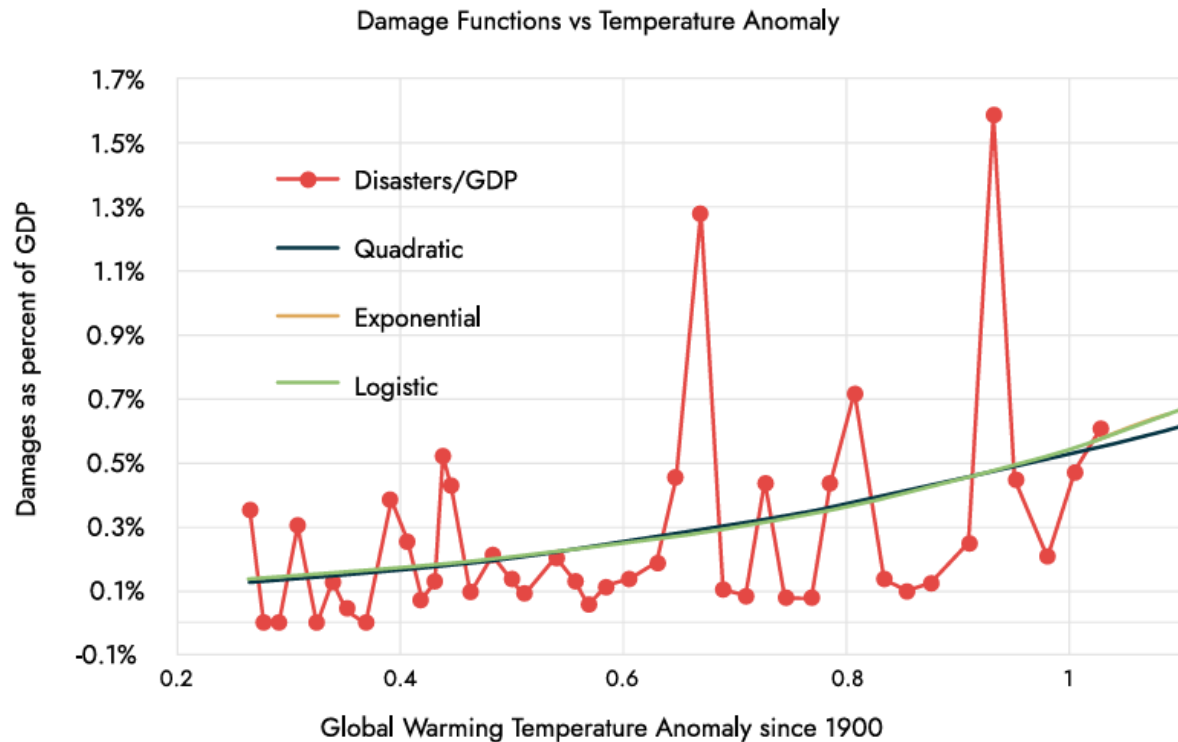
... with long term consequences for global food production



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Image source: Lenton et al. (contribution to OECD report 2022)
Additional source: [Ritchie et al. \(2020\) Nature Food](#)

Non-linearity in economic models offers a bridge between the science and economics



Mapping of tipping points to investment time horizons increases relevance to investors

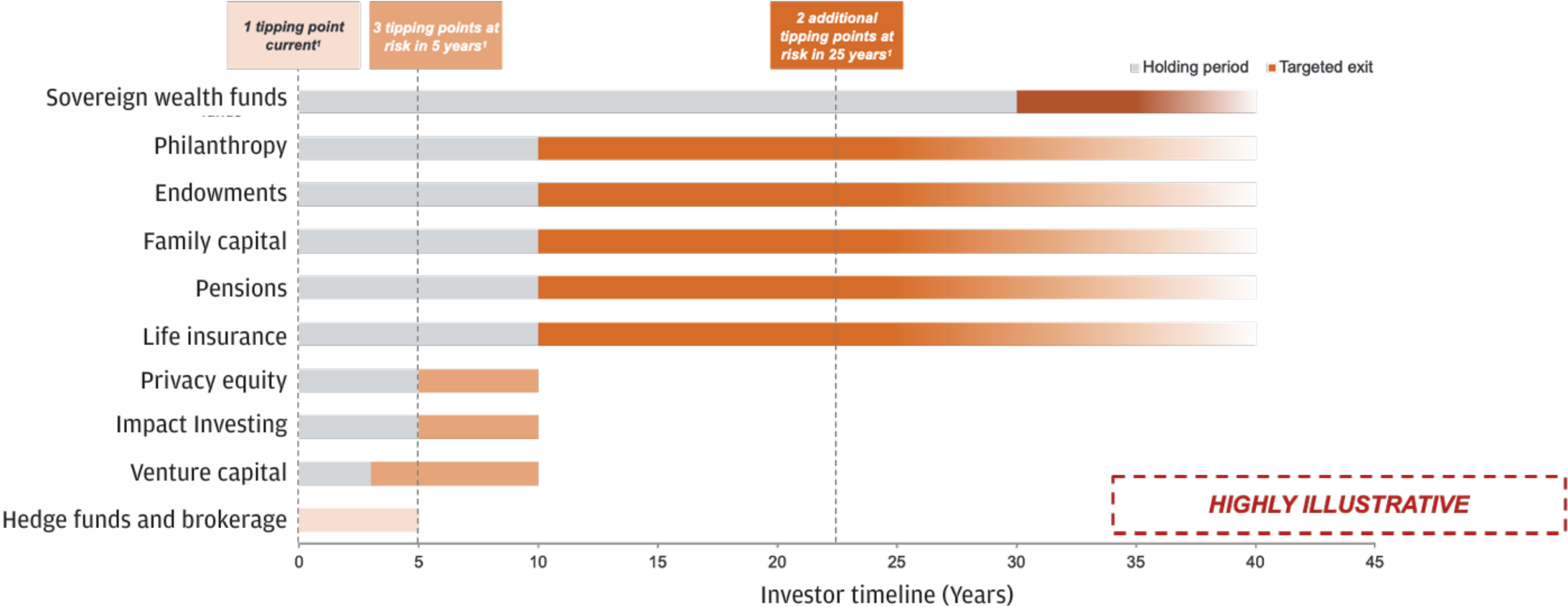
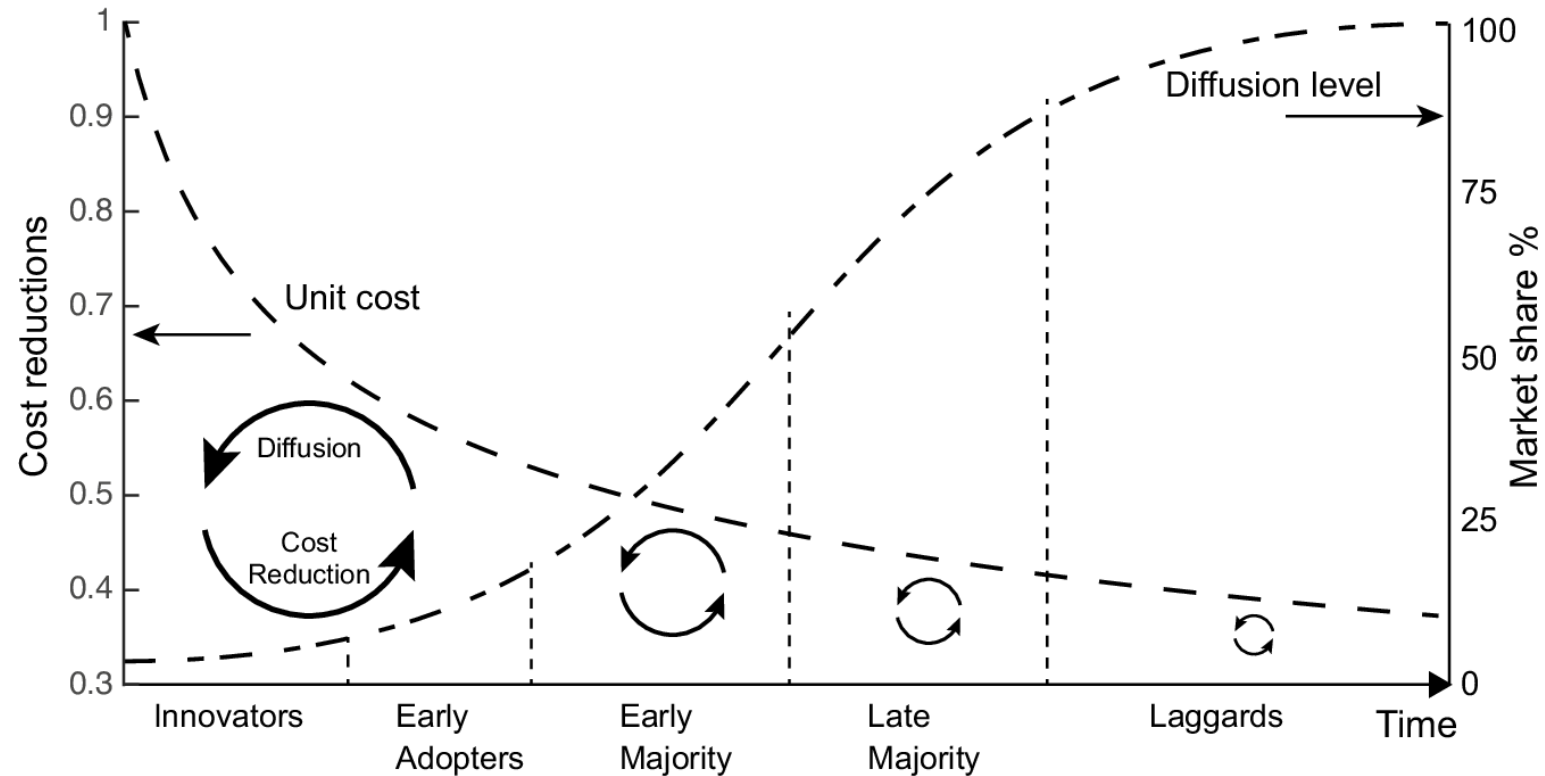


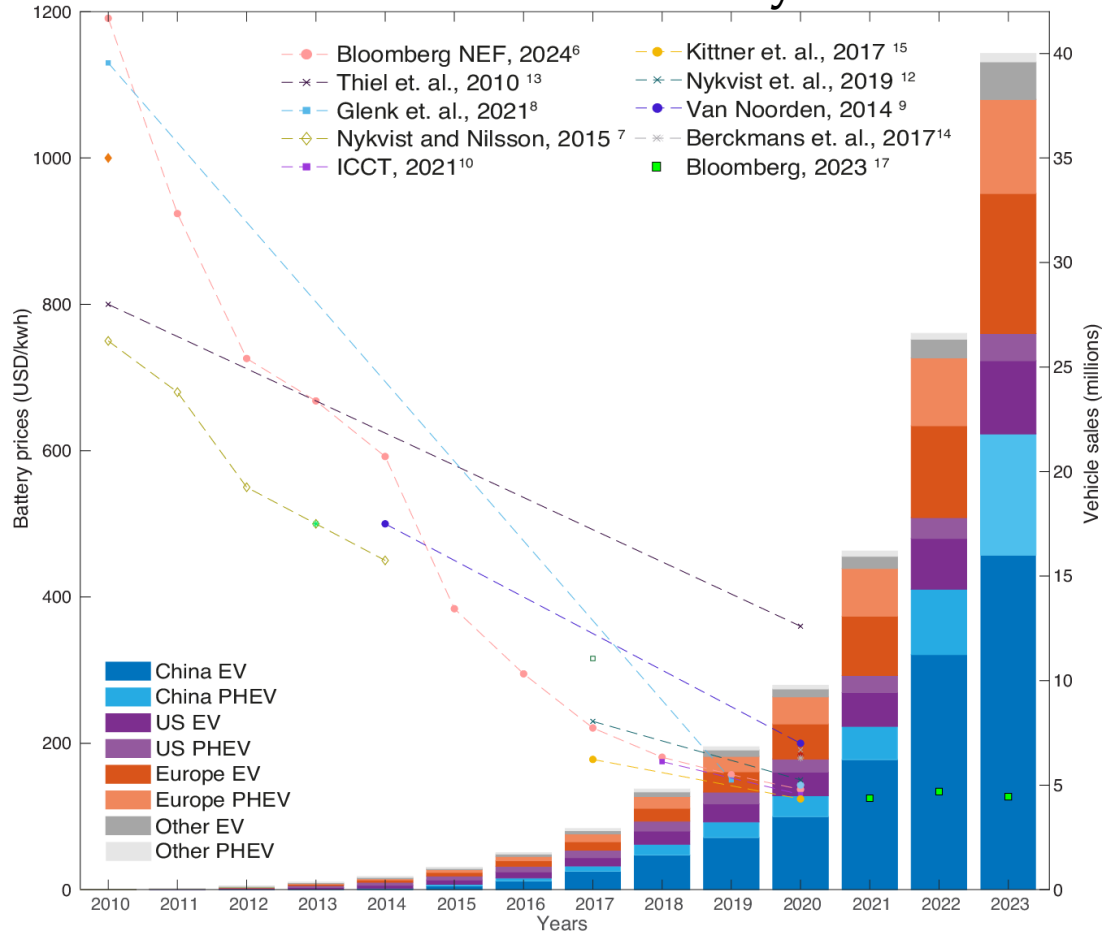
Image source: J.P. Morgan (2026)
 Additional source: [Banking on Climate Chaos \(2025\)](#)

Technological and social systems can have tipping points



Evidence of a positive tipping point towards electric vehicles

Global EV sales and battery costs



Resilience of incumbent system

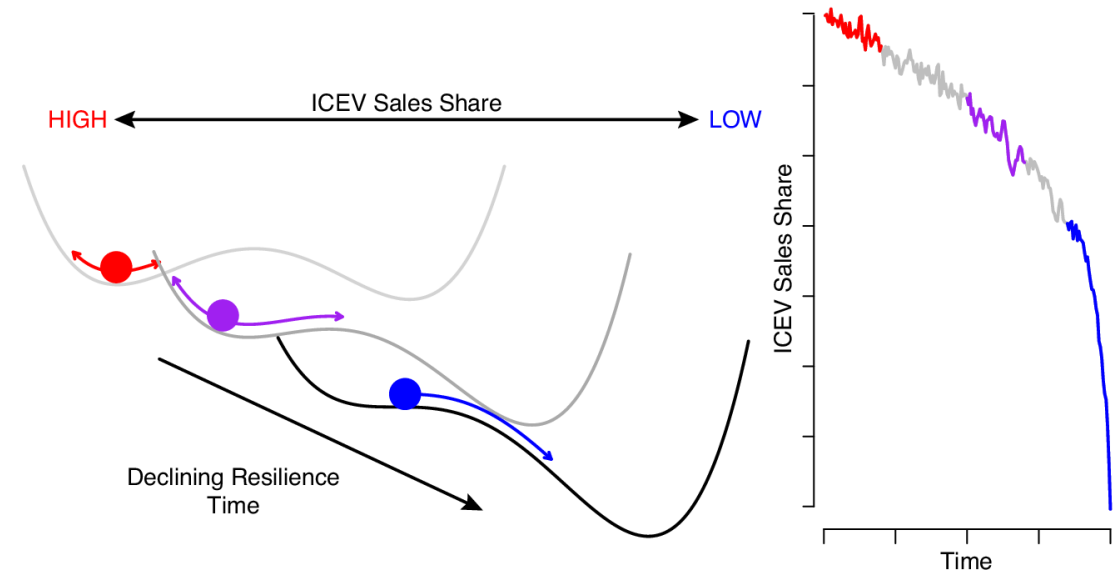
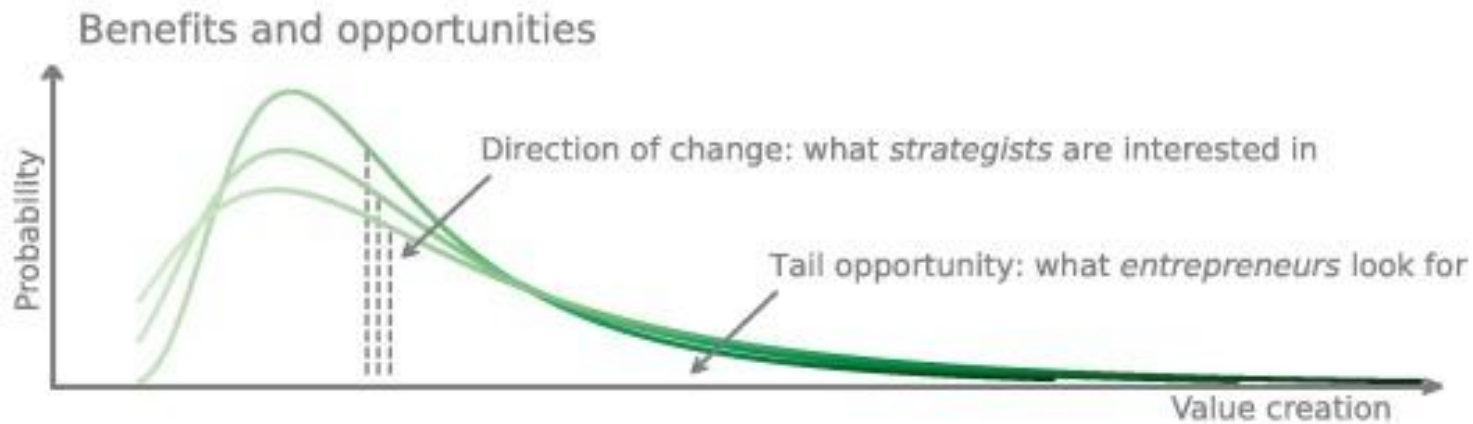


Image source: [Mercure et al., \(2025\) Nature Communications](#)
 Additional source: [Electric Cars Report \(2026\)](#)



We need to update our models to integrate the risks and opportunities of heavy-tails



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Thank you
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