REPUBLIC OF LEARNING

Imagining Climate Futures

What is the relationship between Coronavirus and climate futures?

In the light of this pandemic how to we deal with the urgency of climate change and the 'tipping points' that scientists tell us will speed up climate change and make permanent changes to our world.

What we can carry forward so that we don't just return to business as usual after this current crisis?

The science bit

New Infectious Diseases and Viruses

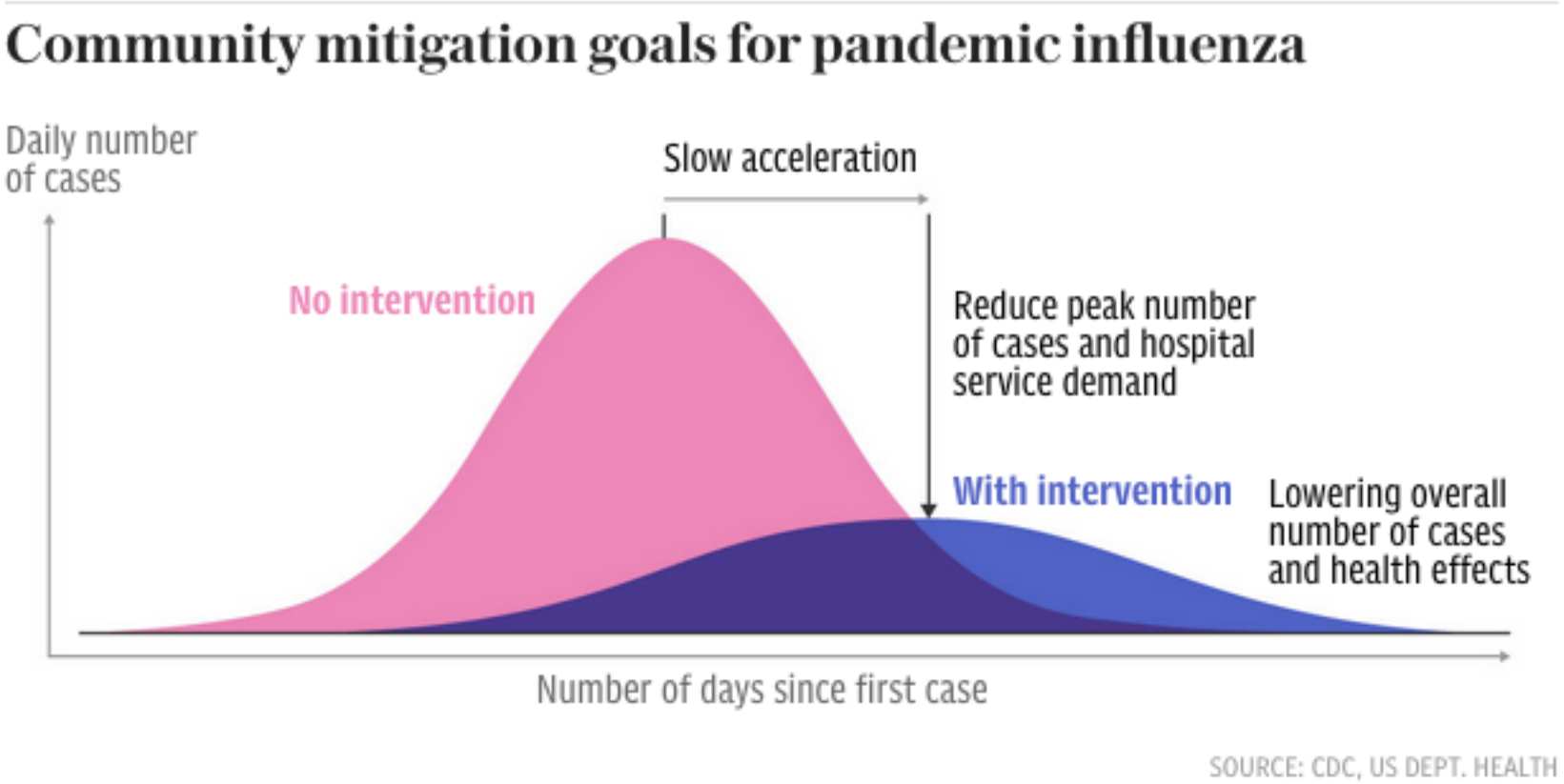
Table 6.1: Examples of how diverse environmental changes affect the occurrence of various infectious diseases in humans (Refernce 5)

Environmental changes	Example diseases	Pathway of effect
Dams, canals, irrigation	Schistosomiasis	▲ Snail host habitat, human contact
	Malaria	▲ Breeding sites for mosquitoes
	Helminthiasies	▲ Larval contact due to moist soil
	River blindness	▼ Blackfly breeding, ▼ disease
Agricultural intensification	Malaria	Crop insecticides and ▲ vector resistance
	Venezuelan haemorraghic fever	▲ rodent abundance, contact
Urbanization, urban crowding	Cholera	▼ sanitation, hygiene; ▲ water contamination
	Dengue	Water-collecting trash, ▲ *Aedes aegypti* mosquito breeding sites
	Cutaneous leishmaniasis	▲ proximity, sandfly vectors
Deforestation and new habitation	Malaria	▲ Breeding sites and vectors, immigration of susceptible people
	Oropouche	▲ contact, breeding of vectors
	Visceral leishmaniasis	▲ contact with sandfly vectors
Reforestation	Lyme disease	▲ tick hosts, outdoor exposure
Ocean warming	Red tide	▲ Toxic algal blooms
Elevated precipitation	Rift valley fever	▲ Pools for mosquito breeding
	Hantavirus pulmonary syndrome	▲ Rodent food, habitat, abundance

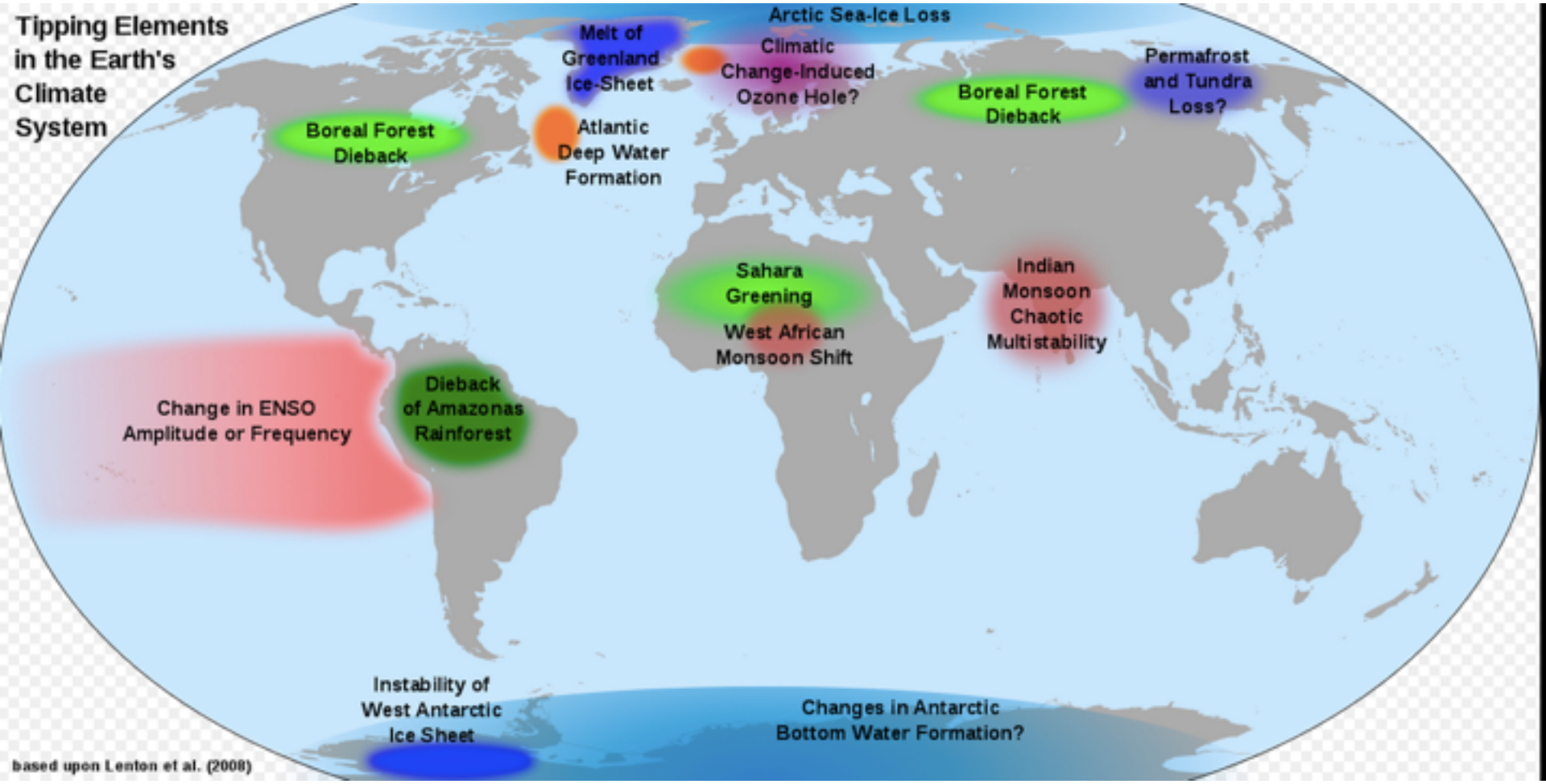
▲ increase ▼ reduction

https://www.who.int/globalchange/summary/en/index5.html

New Infectious Diseases and Viruses Tipping Points

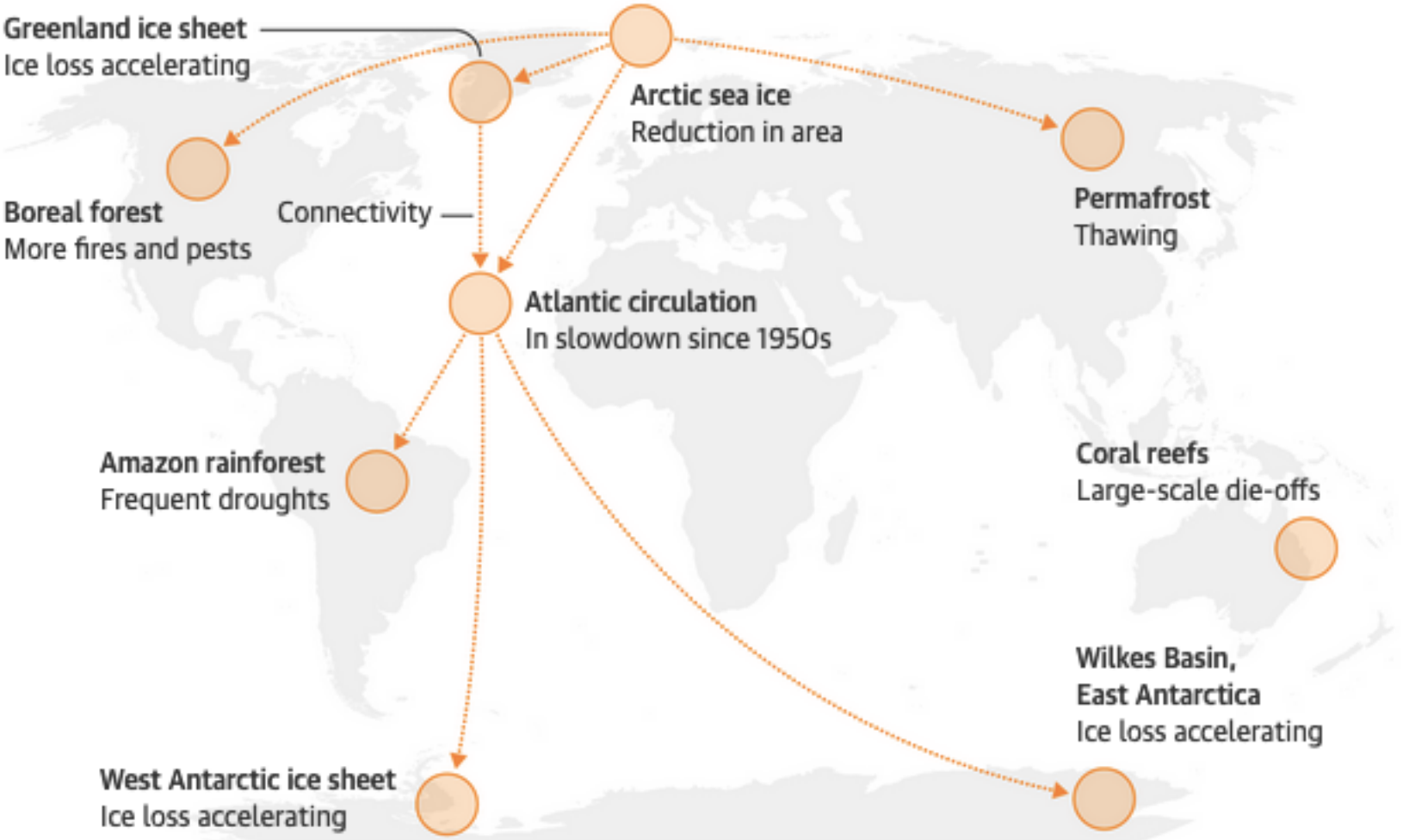


Earth's Climate Systems Tipping Points



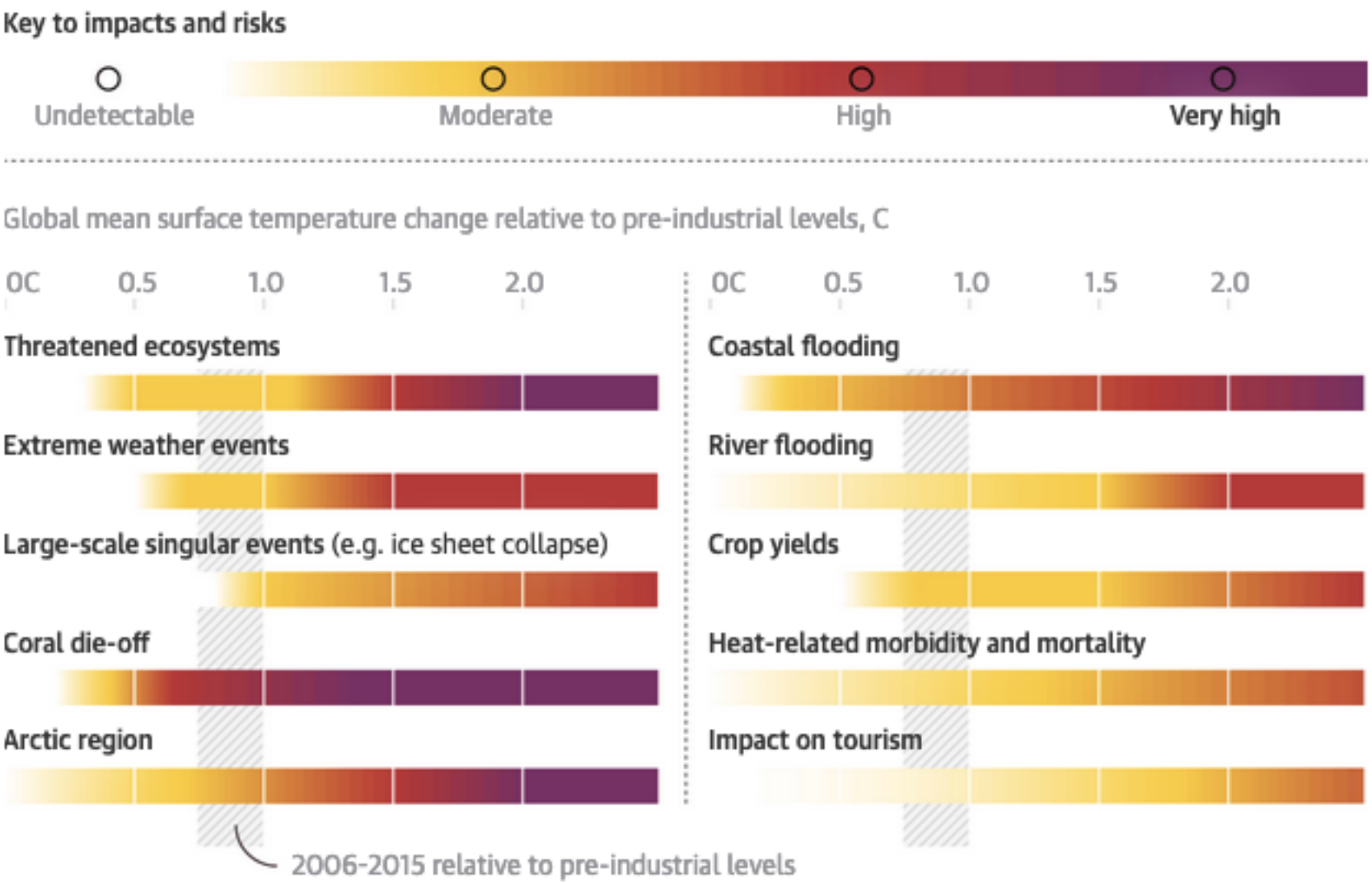
Earth’s Climate Systems Tipping Points

Scientists' warning: a cascade of climate tipping points is possible

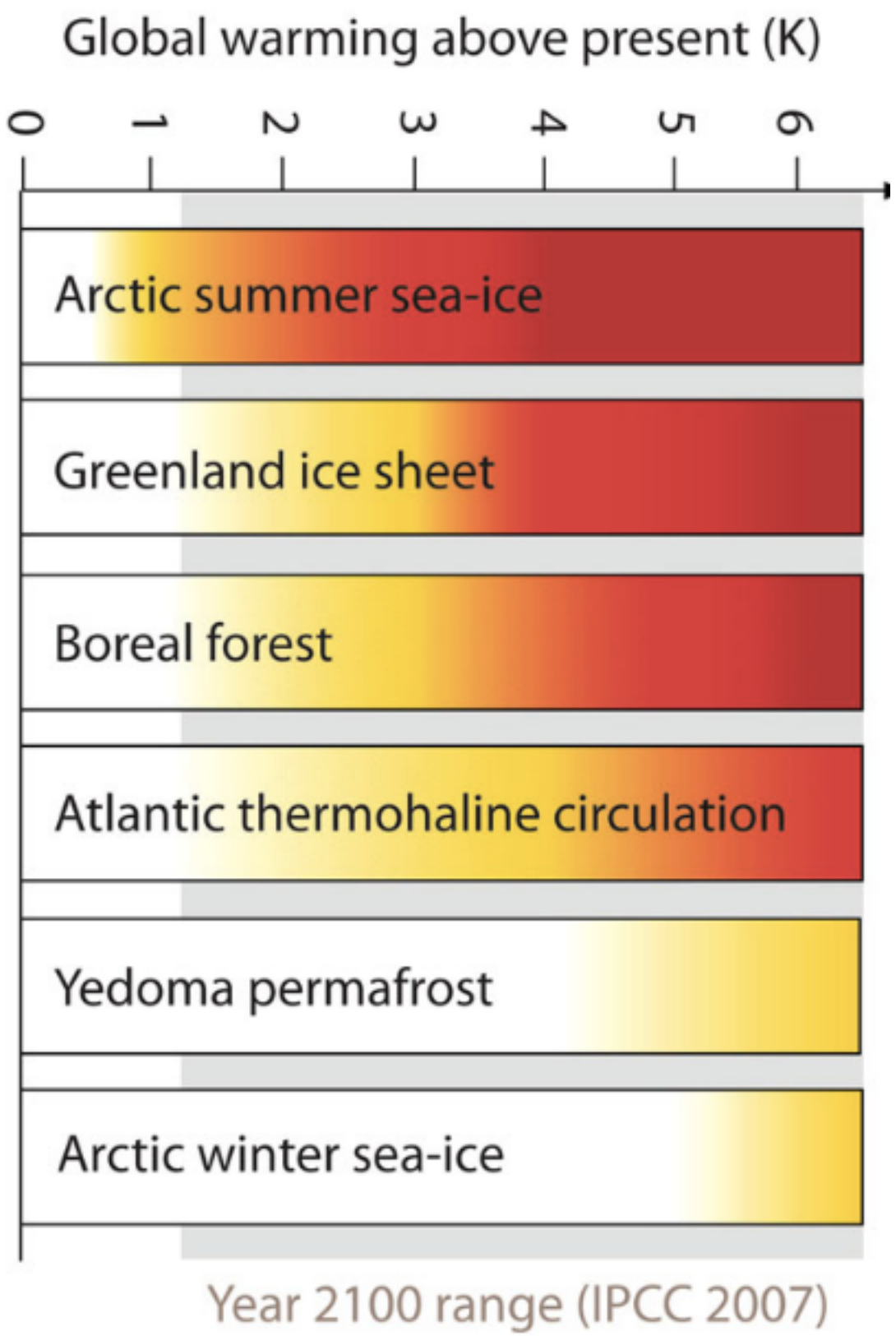


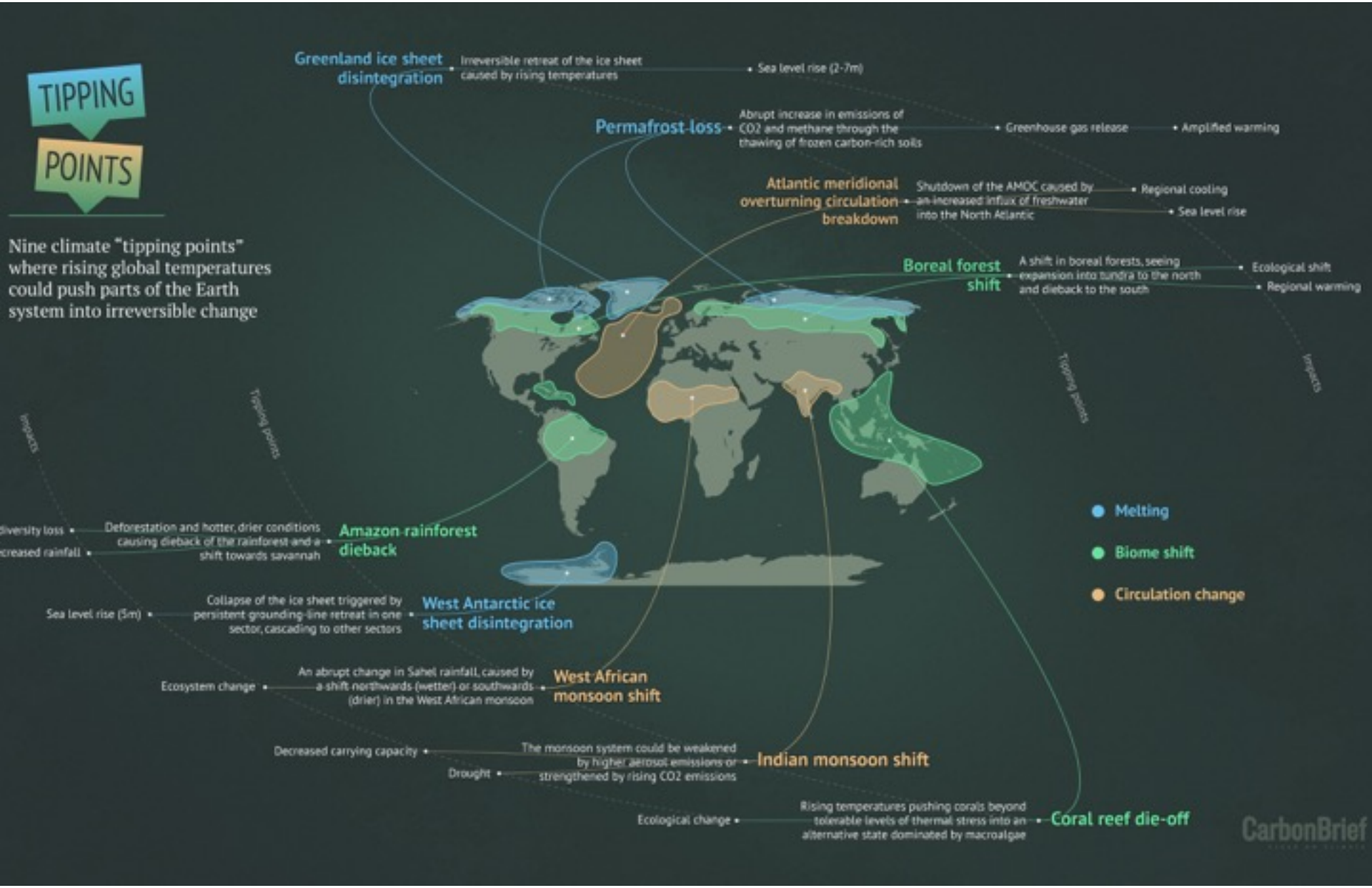
Guardian graphic. Source: Lenton et al, Nature, 2019

Rising temperatures, rising risks



Guardian graphic. Source: IPCC Special Report on Global Warming of 1.5C


Global warming above present (K)
0
1
2
3
4
5
6
Arctic summer sea-ice
Greenland ice sheet
Boreal forest
Atlantic thermohaline circulation
Yedoma permafrost
Arctic winter sea-ice
Year 2100 range (IPCC 2007)


TIPPING POINTS
Nine climate "tipping points" where rising global temperatures could push parts of the Earth system into irreversible change
Greenland ice sheet disintegration
Irreversible retreat of the ice sheet caused by rising temperatures
Sea level rise (2-7m)
Permafrost-loss
Abrupt increase in emissions of CO2 and methane through the thawing of frozen carbon-rich soils
Greenhouse gas release
Amplified warming
Atlantic meridional overturning circulation breakdown
Shutdown of the AMOC caused by an increased influx of freshwater into the North Atlantic
Regional cooling
Sea level rise
Boreal forest shift
A shift in boreal forests, seeing expansion into tundra to the north and dieback to the south
Ecological shift
Regional warming
Tipping points
Impacts
Tipping points
Impacts
diversity loss
creased rainfall
Deforestation and hotter, drier conditions causing dieback of the rainforest and a shift towards savannah
Amazon rainforest dieback
Sea level rise (5m)
Collapse of the ice sheet triggered by persistent grounding-line retreat in one sector, cascading to other sectors
West Antarctic ice sheet disintegration
Ecosystem change
An abrupt change in Sahel rainfall, caused by a shift northwards (wetter) or southwards (drier) in the West African monsoon
West African monsoon shift
Decreased carrying capacity
Drought
The monsoon system could be weakened by higher aerosol emissions or strengthened by rising CO2 emissions
Indian monsoon shift
Ecological change
Rising temperatures pushing corals beyond tolerable levels of thermal stress into an alternative state dominated by macroalgae
Coral reef die-off
Melting
Biome shift
Circulation change
CarbonBrief