

Too close for comfort

Scientists say rapid and irreversible ecosystem changes, called tipping points, are a growing threat as the planet heats up and that urgent action on curbing the impact of climate change is needed. The greater the warming, the greater the risks of abrupt changes that could flood coastlines, trigger chaotic weather and disrupt economies.

1 Melting permafrost

! The vast frozen layer of soil in the Arctic is already melting. Faster melting could lead to a huge increase in CO₂ and methane emissions that would accelerate global warming.

Arctic ice loss

! Arctic sea ice is already shrinking rapidly. Scientists say at 2 deg C of warming, the region has a 10 per cent to 35 per cent chance of becoming largely ice-free in summer. The less ice, the warmer the Arctic becomes, leading to yet more melting of ice and permafrost.

2 Greenland ice sheet collapse

! Higher temperatures could trigger irreversible melting, raising sea levels 7m over centuries. The release of huge amounts of fresh water into the North Atlantic could also disrupt ocean circulation patterns.

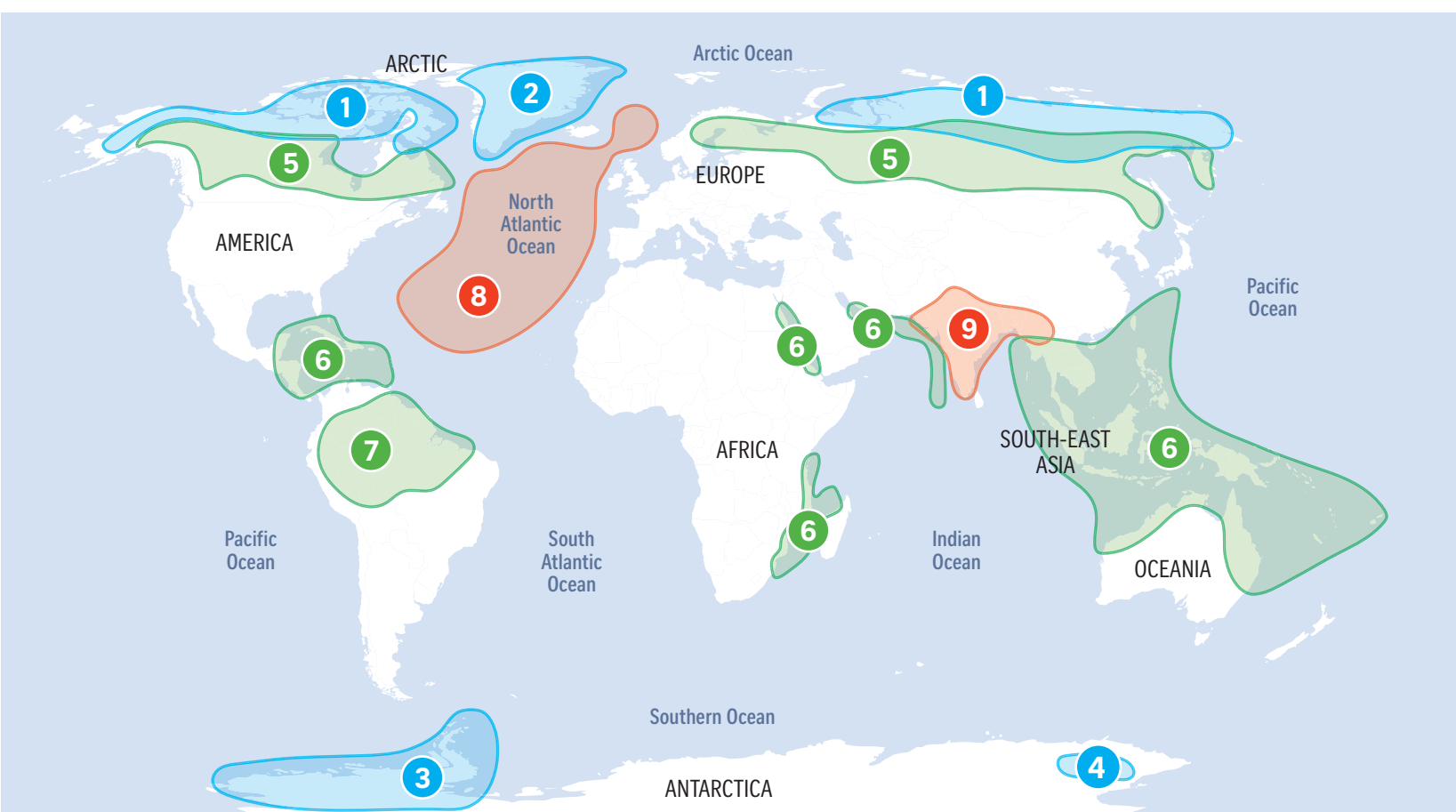
3 West Antarctic ice sheet disintegration

! Accelerating ice loss could lead to 3m of sea level rise

4 Wilkes Basin ice shelf collapse, East Antarctica

! Could add 3m to 4m of sea level rise.

■ Melting ■ Biome shift ■ Circulation change ! Impact



5 Boreal forest dieback

! The world's largest ecosystem is also a huge carbon store. Rising temperatures, drought, fires and pests could wipe out a large area of forest in the south, while warmer temperatures could trigger expansion into the Arctic.

6 Coral reef die-off

! Tropical corals are already damaged from warmer ocean temperatures. A mass die-off would represent a profound loss of marine biodiversity and source of income and food for millions of people.

7 Amazon rainforest loss

! Deforestation, drought and fires could dry out the forest, turning it into a vast savannah and huge source of CO₂.

8 Atlantic meridional overturning circulation

! A shutdown, possibly caused by a huge influx of freshwater into the North Atlantic, could disrupt global ocean circulation and trigger cooling in parts of Europe.

9 Disruption of Indian monsoon

! Still being debated. It could strengthen because of higher CO₂ levels or weaken because of severe air pollution causing a local cooling effect. It could lead to greater rainfall extremes and disruption to agriculture.