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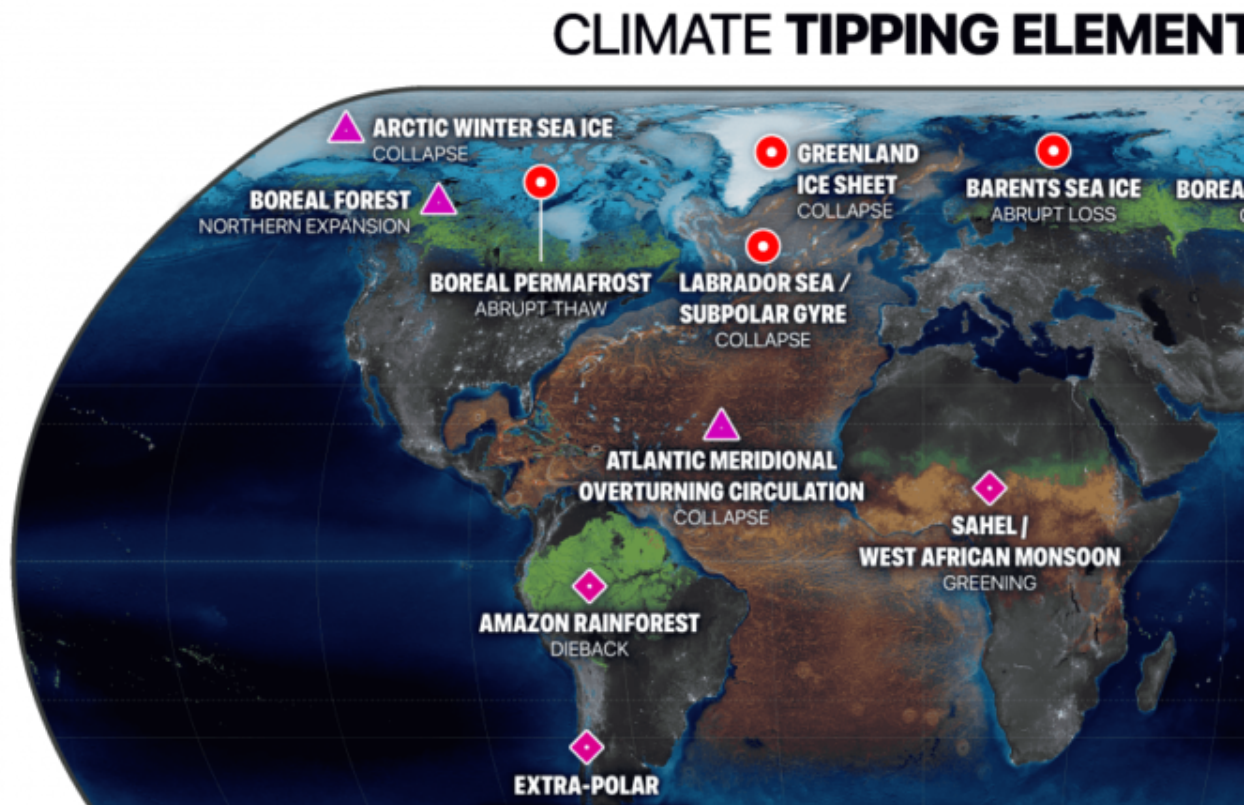
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**Earth is on track to reach several climate tipping points**



Sources: SINC Agency [Image: Location of climate inflection elements. / Earth Commission]

*Crossing important red lines of global warming such as the melting of Greenland, the loss of boreal permafrost and the massive disappearance of tropical coral reefs will have serious consequences for our planet, according to an international study.*

Multiple climate tipping points could be triggered if global temperature rises more than 1.5°C above pre-industrial levels, according to a new [Study](#) from *Science*. Even with current levels of global warming, the world is already at risk of passing **five dangerous climate tipping points**, and the risks increase with every tenth of a degree of warming.

An international research team has synthesized the evidence for tipping points, their temperature thresholds, timescales and impacts from a comprehensive review of **more than 200 papers published** since 2008, when climate tipping points were first defined. In addition, they have increased the list of possible turning points from nine to sixteen.

Even with current levels of global warming, the world is already at risk of passing five dangerous climate tipping points, and the risks increase with every tenth of a degree of warming.

The research concludes that human emissions have already pushed Earth into the danger zone of tipping points and that **five of the sixteen may be triggered at current temperatures**: the Greenland and West Antarctic ice sheets, the widespread abrupt melting of permafrost, the collapse of convection in the Labrador Sea, and the mass death of tropical coral reefs. Four of these go from possible events to probable events with global warming of 1.5°C, and five more become possible around this temperature level.

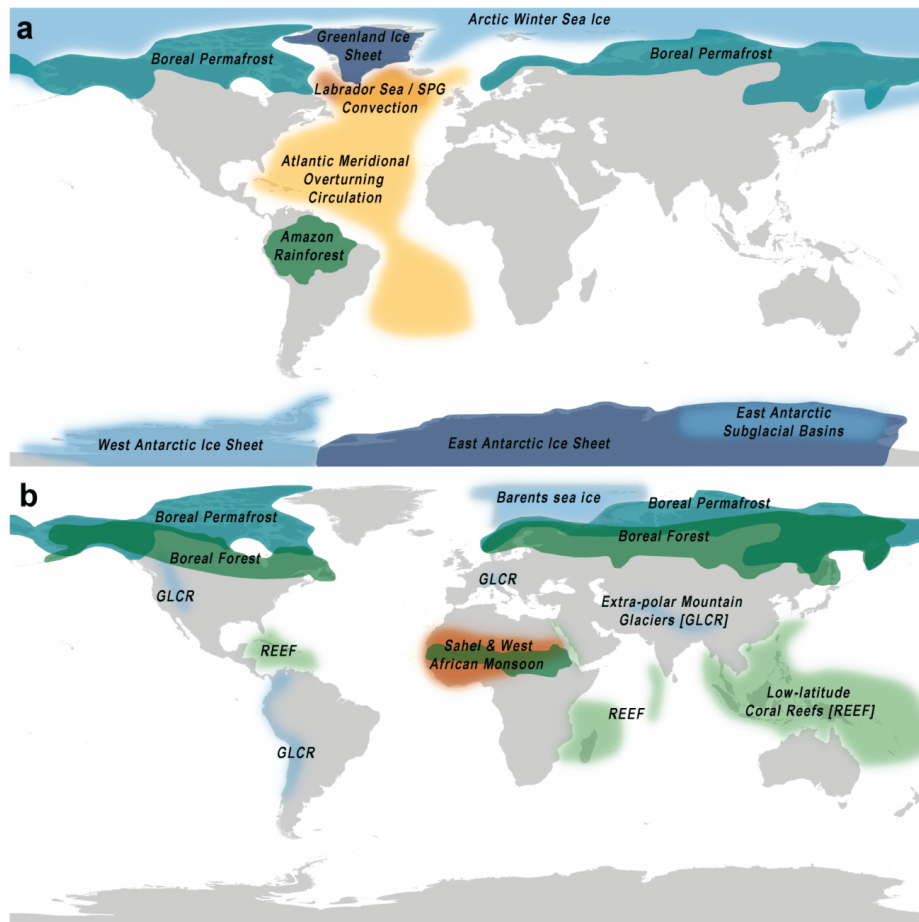
### **Signs of destabilization**

"We can already see signs of destabilisation in parts of the West Antarctic and Greenland ice sheets, in the permafrost regions, the Amazon rainforest and potentially the Atlantic is also reversing circulation," said **David Armstrong McKay**, lead author of the paper and a researcher at the University of Exeter.

*The world is already at risk of reaching some tipping points. The possibility of overcoming them can be reduced by rapidly reducing greenhouse gas emissions, starting immediately* (David Armstrong, Univ. of Exeter)

"The world is already at risk of reaching some tipping points. The possibility of exceeding them can be reduced by rapidly reducing greenhouse gas emissions, starting immediately."

The Sixth Assessment [Report](#) of the **Intergovernmental Panel on Climate Change** (IPCC) indicated that the risks of triggering climate tipping points become high at around 2°C above pre-industrial temperatures and very high between 2.5 and 4°C.



Maps showing the climate inflection elements of the global core (a) and regional impact (b) identified in this study

### The Paris Agreement is not enough

This new analysis indicates that **the Earth may have already abandoned a "safe" climate state** when temperatures exceeded about 1°C of warming. It is therefore determined that even the United Nations Paris Agreement target of limiting warming to well below 2°C and preferably 1.5°C is not enough to completely avoid dangerous climate change.

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The study provides strong scientific support for the Paris Agreement and associated efforts to limit global warming to 1.5°C, because it shows that the risk of tipping points increases beyond this level. To have a 50% chance of reaching 1.5°C and thus limiting the risks of the tipping point, global greenhouse gas emissions must be halved by 2030, reaching **net zero by 2050**.

### **A growing risk**

Co-author **Johan Rockström**, director of the Potsdam Institute for Climate Impact Research states that "the world is heading towards 2°C and 3°C of global warming. This puts Earth on the path to crossing multiple dangerous tipping points that will be disastrous for people around the world. To maintain habitable conditions on the planet, protect people from rising extremes, and allow for stable societies, we must do everything we can to avoid crossing tipping points. Every tenth of a degree counts."

**Tim Lenton**, director of the Institute of Global Systems at the University of Exeter and also a co-author of the paper, laments that since he first assessed climate tipping points in 2008, "the list has grown and our assessment of the risk they pose has increased dramatically."

*We now need to trigger positive social tipping points that accelerate the transformation towards a clean energy future* (Tim Lenton, Univ. of Exeter)

"Our new work provides compelling evidence that the world must radically accelerate the decarbonization of the economy to limit the risk of crossing climate tipping points. To achieve that, we now need to **trigger positive social tipping points** that accelerate the transformation towards a clean energy future."

"We may also need to adapt to address climate tipping points that we fail to avoid, and support those who could suffer uninsurable loss and damage," Lenton adds.

## The elements of inflection

Analyzing paleoclimate data, current observations and climate models, the international team has concluded that 16 major biophysical systems involved in regulating Earth's climate have the potential to cross tipping points where changes will happen yes or yes, even if the temperature stops rising. **This transition varies from decades to thousands of years, depending** on the system.

The researchers classified the inflection elements into nine systems that affect the entire Earth system, such as Antarctica and the Amazon rainforest, and seven other systems that, if altered, would have profound regional consequences. The latter include the West African monsoon and the death of most coral reefs around the equator. Several **new elements have been** added, such as convection of the Labrador Sea and the subglacial basins of East Antarctica, compared to the 2008 assessment.

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"Importantly, many **inflection elements in the Earth system** are interrelated, making cascading tipping points a serious additional concern. In fact, interactions can reduce critical temperature thresholds beyond which individual inflection elements begin to destabilize in the long term," said co-author **Ricarda Winkelmann**, a researcher at the Potsdam Institute for Climate Impact Research.

"We have taken a first step to update the world on the risks of the tipping point. There is an urgent need for a **deeper international analysis**, especially on the interactions of the inflection elements, towards which the Earth Commission is initiating a Tipping Point Model Intercomparison Project (TIPMIP)," concludes Armstrong McKay.

## Reference:

McKay et al. "[Exceeding 1.5C global warming could trigger multiple climate tipping points](#)". *Science* (2022)

Source: <https://www.agenciasinc.es/Noticias/La-Tierra-va-camino-de-alcanzar-varios-puntos-de-inflexion-climatica>