

Tipping point

By Lennart Kiil



Coral bleaching. If the sea is too warm for too long, the corals expel the algae they live on. It is an example of a threshold.

Ryan Goehrung. [CC BY-SA 4.0. Wikimedia Commons](#).

A point where even a small additional [temperature](#) increase will lead to dramatic changes in the environment. Changes that cannot be undone.

Humans primarily influence the climate by increased emissions of [greenhouse gases](#), causing the [temperature](#) to rise. The temperature increase has a number of effects on the environment that by themselves could further enhance climate change beyond human control. Crossing these tipping points starts so-called [positive feedbacks](#) that increase temperature even more.

It is difficult to identify tipping points, and to determine which of these will set off a positive feedback loop. Scientists discuss whether or not some tipping points have already been passed. Some suggest that not all tipping points are irreversible on a long enough time scale.

Some possible tipping points:

The arctic tundra has been in a state of [permafrost](#) for thousands of years. It is the largest peat bog in the world. If the temperature rises enough to melt the permafrost, the decomposition of organic matter in these peat bogs could release significant amounts of [methane](#). This is a potent greenhouse gas, which would add significantly to the temperature increase.

A decrease in the Earth's [albedo](#) as arctic ice melts. Ice reflects more sunlight than open water. The melting would then enhance the [greenhouse effect](#), and cause even more ice to melt. At some point the melting reaches a point, where all the ice will eventually melt, regardless of any reduction in human-made greenhouse gases.

The coral organisms in coral reefs are sensitive to temperature changes, and an increase in ocean temperature could result in widespread permanent coral bleaching. This occurs when the algae within the corals are lost, for example, due to temperature stress. Without the algae the corals eventually dies. Coral reefs are the basis of a large variety of other animal and plant life.

Another potential tipping point includes the disruption of the [Gulf stream](#) and the release of methane from the seafloor.

How to cite this entry

Lennart Kiil: "Tipping point". Climate Encyclopedia, climate-encyclopedia.com/tipping-point, retrieved 23 October 2026.

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