



# SCIENCE & IMPACTS

350

The Basics of Climate Change Science and Our Changing Planet

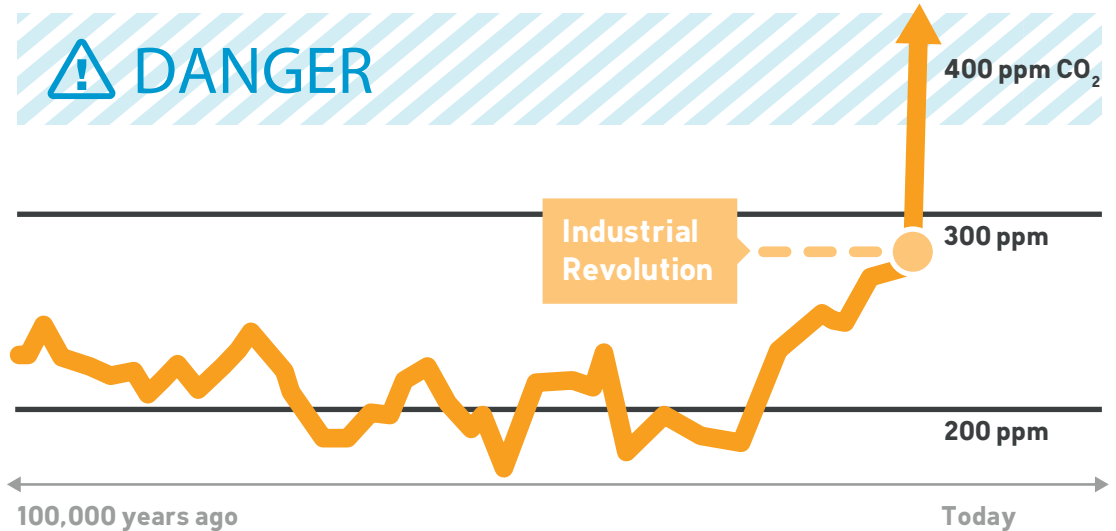
For most of Earth's history, our atmosphere has had an average of **275 parts per million\* (ppm) of carbon dioxide (CO<sub>2</sub>).**

CO<sub>2</sub> is a greenhouse gas, which means it acts like a blanket that traps heat from the Sun. The more CO<sub>2</sub> in the air, the thicker the blanket.

Three hundreds years ago humans started burning coal and oil, and the amount of CO<sub>2</sub> in the atmosphere started going up.<sup>1</sup> Now we're at **400ppm** and rising by about 2ppm every year.

**350ppm** is the safety limit for life on Earth.<sup>2</sup> Over 350, we risk hitting dangerous "tipping points" (see next page). At 392 ppm and rising we're far beyond anything human civilization has ever seen before.

\* Carbon dioxide in the atmosphere is measured in parts per million, or how many molecules in CO<sub>2</sub> there are out of every 1,000,000 total molecules of air. 400 or 275 may not seem like much compared to a million, but even these small changes can radically disrupt the way our planet works.



"If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, CO<sub>2</sub> will need to be reduced from its current [levels] to **at most 350ppm.**"

NASA Climate Scientist James Hansen

## Current Climate Change Impacts



### Rising Sea Levels

Scientists warn they could go up several meters this century, threatening billions of people in coastal cities around the world.



### More Extreme Weather

Hurricanes, typhoons, droughts and winter storms are becoming harsher, more frequent and more unpredictable.



### Glaciers Are Melting

They're disappearing fast—and for hundreds of millions of people glaciers are the only available source of drinking water.



### Oceans Are Acidifying

Warmer and more acidic oceans are hurting sea life and killing a vast amount of coral reefs.



### Mosquitoes Are Spreading

They're Thriving in new places and are bringing malaria and dengue fever with them.

## Tipping Points

A period of fast, extreme change that is difficult or impossible to reverse once it starts. For example, imagine a glass of water slowly tipping over: At first, as it starts tipping, nothing happens. But once it passes its tipping point, the glass suddenly falls over and all the water spills out. Once that happens, there's no way to get the water back in the glass.

Climate tipping points are major events. For example, in the summer of 2012 almost half of the sea ice in the Arctic melted, an event that shocked climate scientists. **Just a few years ago, scientists estimated it would take 80 years before the Arctic sea ice would melt completely – now they say it could happen this year.**

1 Other human activities also release CO<sub>2</sub> into the atmosphere in other ways, including cutting down trees and tilling soil.

2 According to NASA climate scientist Jim Hansen and others.

