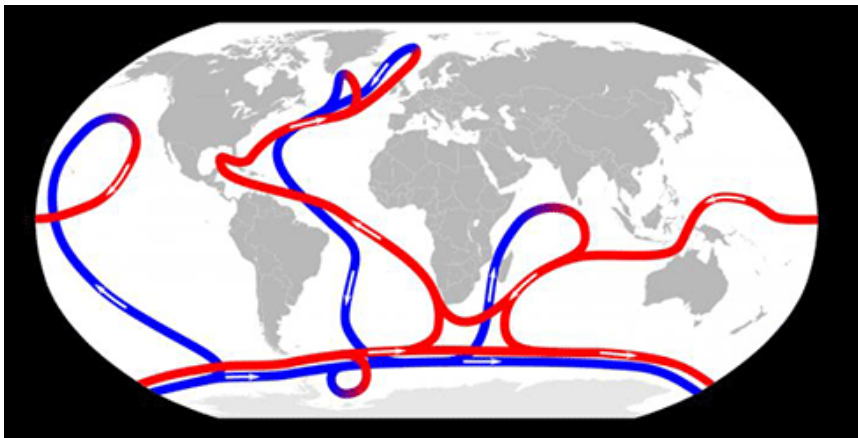


Climate change can be caused by ocean conveyor, not just CO₂ in the atmosphere

Ocean circulation can be as important as atmospheric carbon dioxide (CO₂) levels in regulating the earth's climate, as new research concludes.



Credit: NASA

In the study, published in *Science*, from Rutgers University in the US found that the major cooling of Earth and continental ice build-up in the northern hemisphere 2.7 million years ago coincided with a shift in the ocean's circulation.

Oceanic circulation in the Atlantic pulls in heat and CO₂ and moves them through the deep ocean, from north to south, until they are released in the Pacific.

This ocean conveyor system, say the scientists, changed at the same time as a major expansion of glaciers in the northern hemisphere as well as a substantial fall in sea levels.

It was the Antarctic ice, they say, that cut off heat exchange at the ocean's surface and forced it into deep water. They believe this caused global climate change at that time, not carbon dioxide in the atmosphere.

'We argue that it was the establishment of the modern deep ocean circulation – the ocean conveyor – about 2.7 million years ago, and not a major change in carbon dioxide concentration in the atmosphere that triggered an expansion of the ice sheets in the northern hemisphere,' says Stella Woodard, the paper's lead author.

The findings show that changes in heat distribution between the ocean basins are important for understanding future climate change.

The scientists say they can't predict precisely what effect the CO₂ currently being pulled into the ocean from the atmosphere will have on climate. But they believe that, since more CO₂ has been released in the past 200 years than any recent period in geological history, interactions between CO₂, temperature changes, precipitation and ocean circulation will result in profound changes.

According to the study, a different pattern of deep ocean circulation was responsible for the elevated temperatures 3 million years ago when the CO₂ level in the atmosphere was similar to today's and the temperature was 4°F (2°C) higher. The authors say the formation of the ocean conveyor cooled the earth and created the climate we live in now.

'Our study suggests that changes in the storage of heat in the deep ocean could be as important to climate change as other hypotheses – tectonic activity or a drop in the carbon dioxide level – and likely led to one of the major climate transitions of the past 30 million years,' concludes co-author Yair Rosenthal from Rutgers.

Source: Rutgers University

From ECOS online <http://www.ecosmagazine.com/?paper=EC14264>