

# Press Release

Climate change affects Southern Ocean carbon sink  
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The first evidence that recent climate change has weakened one the Earth's natural carbon 'sinks' is published this week in the journal *Science*.

A four-year study by scientists from the University of East Anglia (UEA), British Antarctic Survey (BAS) and the Max-Planck Institute for Biogeochemistry reveals that an increase in winds over the Southern Ocean, caused by greenhouse gases and ozone depletion, has led to a release of stored CO<sub>2</sub> into the atmosphere and is preventing further absorption of the greenhouse gas.

Lead author Dr Corinne Le Quéré of UEA and BAS said,

"This is the first time that we've been able to say that climate change itself is responsible for the saturation of the Southern Ocean sink. This is serious. All climate models predict that this kind of 'feedback' will continue and intensify during this century. The Earth's carbon sinks – of which the Southern Ocean accounts for 15% – absorb about half of all human carbon emissions. With the Southern Ocean reaching its saturation point more CO<sub>2</sub> will stay in our atmosphere."

This new research suggests that stabilisation of atmospheric CO<sub>2</sub> is even more difficult to achieve than previously thought. Additionally, acidification in the Southern Ocean is likely to reach dangerous levels earlier than the projected date of 2050.

Professor Chris Rapley, Director of British Antarctic Survey said,

"Since the beginning of the industrial revolution the world's oceans have absorbed about a quarter of the 500 gigatons of carbon emitted into the atmosphere by

humans. The possibility that in a warmer world the Southern Ocean – the strongest ocean sink - is weakening is a cause for concern.”

The saturation of the Southern Ocean was revealed by scrutinising observations of atmospheric CO<sub>2</sub> from 40 stations around the world. Since 1981 the Southern Ocean sink ceased to increase, whereas CO<sub>2</sub> emissions increased by 40%.

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### Notes for editors

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**The paper**, ‘Saturation of the Southern Ocean CO<sub>2</sub> sink due to recent climate change’ is published this week in *Science*. Authors: Corinne Le Quéré, Christian Rödenbeck, Erik T Buitenhuis, Thomas J Conway, Ray Langensfelds, Antony Gomez, Casper Labuschangne, Michel Ramonet, Takakiyo Nakazawa, Nicolas Metz, Nathan P Gillett and Martin Heimann.

The stabilisation of atmospheric CO<sub>2</sub> is also at risk. The target stabilisation of 450 parts per million for a 2°C warming is less than 70 parts per million above the current concentration of 382 parts per million (rising by 2 parts per million each year). If the Southern Ocean outgases its natural CO<sub>2</sub>, it could lead to a further increase in atmospheric CO<sub>2</sub> by a few tens of part per million, making stabilisation targets more difficult to reach.

**British Antarctic Survey** is a world leader in research into global issues in an Antarctic context. It is the UK’s national operator and is a component of the Natural Environment Research Council. It has an annual budget of around £40 million, runs nine research programmes and operates five research stations, two Royal Research Ships and five aircraft in and around Antarctica. More information about the work of the Survey can be found at: [www.antarctica.ac.uk](http://www.antarctica.ac.uk)

**The University of East Anglia** is a world-leader in environmental research and home to the climatic Research Unit, the Tyndall Centre for Climate Change Research, and the Zuckerman Institute for Connective Environmental Research.

**The Max Planck Institute for Biogeochemistry**, Jena, Germany, is dedicated to the study of long-term interactions among the biosphere, the atmosphere, the geosphere and the oceans. By analysing the numerous biogeochemical conversions involved in the global element cycles of carbon, hydrogen, nitrogen and oxygen, the Institute addresses questions like how ecosystems and biogeochemical cycles interact with changes in climate, land use and diversity.