

Ozone Depletion Reduces Ocean Carbon Uptake

ScienceDaily (Aug. 9, 2009) — The Southern Ocean plays an important role in mitigating climate change because it acts as a sink of atmospheric carbon dioxide. Most current models predict that the strength of the Southern Ocean carbon dioxide sink should increase as atmospheric carbon dioxide rises, but observations show that this has not been the case.

To help resolve this discrepancy, Lenton et al. consider the effects of stratospheric ozone depletion, which most previous studies had not included. They compare coupled carbon-climate models with and without ozone depletion and find that including ozone depletion produced a significant reduction in Southern Ocean carbon uptake, in good agreement with observed trends.

The simulations show that ozone depletion, combined with increased atmospheric greenhouse gas concentration, drives stronger winds above the Southern Ocean. These stronger winds bring more carbon-rich deep water to the surface, which reduces the ocean's ability to absorb more carbon dioxide from the atmosphere.

The authors also find that ozone depletion increases ocean acidification. They suggest that future climate models should take stratospheric ozone into account.

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Journal Reference:

1. Andrew Lenton, Nicolas Metzler, Francis Codron, Laurent Bopp, Patricia Cadule, Alessandro Tagliabue, Julien Le Sommer. **Stratospheric ozone depletion reduces ocean carbon uptake and enhances ocean acidification**. *Geophysical Research Letters*, (in press) DOI: [10.1029/2009GL038227](https://doi.org/10.1029/2009GL038227)

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