Southern Ocean is less efficient at exporting carbon than thought

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The Southern Ocean is a major source of gas exchange between the atmosphere and the ocean, accounting for almost 20 percent of global ocean carbon dioxide (CO_2) uptake.

Phytoplankton fix CO_2, converting it to other carbon compounds, and some of this biogenic carbon sinks to the deeper ocean, where it is effectively removed from the atmosphere.

A better understanding of the rate of export of carbon particulate matter from the upper ocean is key to improving uncertainties in models that include the Southern Ocean's role in the carbon cycle.

While most studies of carbon transport in the Southern Ocean rely on models, Maiti et al. analyzed in situ carbon export data to reexamine the relationships used in models between primary production, export efficiency, and temperature. They find that no single model accurately estimated biological export of carbon in the Southern Ocean.

In particular, many models predict an increase in carbon flux with increasing primary productivity, but in fact, the observational data indicates that carbon flux decreases with increasing productivity. The authors suggest that the Southern Ocean may have a lower potential for biological export of carbon than models had indicated.

More information: "An inverse relationship between production and export efficiency in the Southern Ocean" *Geophysical Research Letters*,

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