



Decadal trends and variability in the Southern Ocean sink of CO₂

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The Southern Ocean sink of CO₂ plays a critical role for the global carbon cycle and climate change through its influence on atmospheric CO₂. Yet it is sensitive to changing environmental conditions, particularly increasing winds and surface warming and freshening. Conflicting evidence on how the Southern Ocean CO₂ sink is changing exists among at least: (1) different data-based flux products, (2) flux products and models, and (3) models and theory. Data-based flux products suggest the largest decadal variability in the Southern Ocean CO₂ sink, while models and theory suggest variability that is consistent with that inferred from flux products but of much smaller amplitude. This presentation will review the state of understanding on trends and variability in the Southern Ocean CO₂ sink, show updated and new results from a range of models and observations, and propose ways research can move forward to keep track of the evolution of the Southern Ocean CO₂ sink in the future.