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Determination of carbon fluxes by a joint inverse of oceanic and atmospheric observations

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We have combined oceanic dissolved inorganic carbon and atmospheric CO_2 observations together with oceanic and atmospheric circulation models in an inverse model analysis of the land and ocean carbon sources and sinks. The oceanic flux estimates are similar to other estimates except that they suggest a strong sink in the southern temperate latitudes where previous estimates suggest only a modest sink. Together with the atmospheric constraints, which require a large northern hemisphere land sink, our results suggest that there is a large land source in the tropics and southern hemisphere comparable to estimates of deforestation in this region. Within the uncertainty, these results imply that there is at best a modest CO_2 fertilization sink in the tropics.