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TITLE: Impact of Anthropogenic CO₂ on the CaCO₃ System in the Oceans

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ABSTRACT:

Rising atmospheric carbon dioxide (CO₂) concentrations over the past two centuries have led to greater CO₂ uptake by the oceans. This acidification process has changed the saturation state of the oceans with respect to calcium carbonate (CaCO₃) particles. Here we estimate the in situ CaCO₃ dissolution rates for the global oceans from total alkalinity and chlorofluorocarbon data, and we also discuss the future impacts of anthropogenic CO₂ on CaCO₃ shell-forming species. CaCO₃ dissolution rates, ranging from 0.003 to 1.2 micromoles per kilogram per year, are observed beginning near the aragonite saturation horizon. The total water column CaCO₃ dissolution rate for the global oceans is approximately 0.5 +/- 0.2 petagrams of CaCO₃-C per year, which is approximately 45 to 65% of the export production of CaCO₃.

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