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# Modeling Early Signs of Ocean Acidification Effects on Marine Calcification

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The flux of CaCO3 to the deep ocean is much smaller than total export production but is an important process for the marine carbon cycle. It influences the alkalinity of sea water which has an effect on the CO2 partial pressure. Although decreases in calcification rates of marine calcifiers have been documented in laboratory studies it is unknown whether this is happening in the real world. Predictions of future marine biogenic calcification and its impact on carbon fluxes and atmospheric CO2 require models that couple the climate system and the carbon cycle. In this study the global biogeochemical ocean model HAMOCC was used. The model integrations start at a pre-industrial steady-state in the year 1750 and run until the year 2250 forced with anthropogenic CO2 emissions. One focus is on detecting the first large scale features observable in the field that are caused by ocean acidification. By comparing changes in projected total alkalinity modeled under constant and changing CaCO3 production rate, the following question is posed. At what time do these changes exceed natural variability and where in the ocean should we look for these signs? We address the problem using HAMOCC and different future scenarios of changes in calcification. Our aim is to help guiding ocean carbon cycle observations in the near future in order to detect the large-scale response of marine calcifying organisms to the potential threat of ocean acidification.