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A study of glacial–interglacial variations of the marine stable carbon isotope record using a non-Redfield biogeochemical model

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We investigate glacial–interglacial variations in the marine stable carbon-isotope record applying the marine ecosystem and biogeochemistry model RECOM, which is forced with model output from fully coupled climate simulations. Different to most other marine biogeochemistry models, RECOM does not rely on fixed stoichiometric ratios of phytoplankton organic matter. Instead, the composition of phytoplankton organic matter is calculated as a response to light, temperature and nutrient supply, which allows for assessing potential stoichiometric shifts between the past and present. We consider carbon-isotopic fractionation of marine phytoplankton during photosynthesis, studying different biogenic fractionation parametrisations and their influence on model–data comparisons for the Last Glacial Maximum and the Holocene.