



CaCO₃ dissolution imprint in CMIP5 models

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The marine CaCO₃ cycle is an important component of the oceanic carbon system and directly affects the cycling of natural and the uptake of anthropogenic carbon. In numerical models of the marine carbon cycle, the CaCO₃ cycle component is often evaluated against the observed distribution of alkalinity. Recently, we provided a comparative analysis of methods suitable to evaluate CaCO₃ cycle models (Koeve, et al., *Geosci. Model Dev. Discuss.*, 6, 1–39, 2013) against observations. There the TA*-approach was proposed to be most appropriate and superior compared with approaches based on bulk alkalinity. TA* is a measure of the time-integrated imprint of CaCO₃ dissolution in the ocean. TA* can be diagnosed from any data set, model or observation based, of total alkalinity, temperature, salinity, oxygen and phosphate. Here the TA* approach is applied to models used in the Coupled Model Intercomparison Project Phase 5 (CMIP5). CaCO₃ dissolution characteristics are discussed relative to the carbonate ion saturation distribution in the models. The latter being usually considered the dominant control of CaCO₃ dissolution. Strengths and weaknesses of the different models are compared as apparent from this analysis.