Development of one dimensional marine biogeochemical cycle model for reconstruction of paleoenvironmental changes

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In ocean anoxic events and other geological boundary events, physical and biogeochemical conditions of ocean, such as upwelling rate of deep water, production and dissolution of organic matter and carbonate, and concentration and distribution of dissolved components could have been quite different from those of today. In order to understand the marine condition at such events, we have developed a one-dimensional advective-diffusive marine biogeochemical cycle model which explicitly includes production and dissolution of particulate organic matters and biogenic carbonates as functions of time and seawater chemistry. Using this model, we can investigate how the marine biogeochemical cycle system responds to variations of ocean mixing rate, riverine input and so on. We will show some examples for the ocean behaviors which could have happened in the past.