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Abstract

Alkalinity pump is one of the principal physicochemical pumping processes that drive the ocean carbon cycle. Although there have been several models to date that take alkalinity pump into account, they failed to reproduce relatively high biomass of coccolithophorids as well as to estimate quantitatively the CaCO_3 sinking flux. We carried out a sensitivity analysis of biomass of coccolithophorids and CaCO_3 sinking flux using a new ocean carbon model which includes refined functional groups of plankton and alkalinity pump. It turned out that the model with our choice for the physiological parameters result in good agreement with observations on high biomass of coccolithophorids and CaCO_3 sinking flux in southern ocean. There are many studies on coccolithophorids blooming in southern ocean, and our model reproduced it satisfactory.