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Coccolith morphologic and carbon isotope evolution during the last 1 Myr

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Coccolithophores are some of the most important primary producers in photic ocean layers, which participate in both organic pump and inorganic pump and affect the carbon cycle among atmosphere, ocean and marine sediment. During the Pleistocene, small Noelaerhabdaceae (a coccolithophore family) acme occurred in a quasi-period of 400-500 kyr, such as the Emiliania huxleyi acme centered around 170 ka, the Gephyrocapsa caribbeanica acmes centered around 400 ka and 900 ka. These cycles occurred after the periods of global ocean carbon isotope shift (Wang et al., 2003). Previous studies suggested that duration of daylight controlled by earth orbital parameters caused the small coccolithophores bloom (Rickaby et al., 2007). However, the cause of coevolution between sea water carbon isotope and coccolithophore assemblages is still unclear. In this study, we measured the carbon isotope and morphologic data of Geophyrocapsa from the west Pacific. We found the coccolith isotope evolution in the last 1 Myr can not be all explained by the atmospheric CO_2 variation but varied with the coccolith size and eccentricity changes. However, it's still necessary to check the relationship between coccolithophore evolution and the changes of ocean alkalinity.