

Tracing coccolithophore growth rates by methyl- and ethyl-alkenone ratio

**HONGRUI ZHANG¹, HEATHER STOLL², ISMAEL
TORRES ROMERO³ AND RETI WIJCKER⁴**

¹Tongji Univeristy

²ETH Zürich

³ETH

⁴ETH Zurich

Using carbon isotope fractionation of alkenone to reconstruct atmospheric CO₂ has been developed for 30 years, there are still many unclear points in this method. How to quantify the growth rate of coccolithophore is the most challenging one among these puzzles. Here, to fill this gap, we carried out lab culture of multi-stain coccolithophores and measure the alkenone assemblage, including both methyl- and ethyl- alkenone with carbon chain length between 37 and 39. We find that the ratio of methyl- and ethyl-alkenone could provide new constrains on the growth of coccolithophores, with a higher methyl/ethyl ratio appears in higher growth rate conditions. Though there is still a temperature effect on the methyl/ethyl ratio, we believe that the new alkenone methyl/ethyl ratio proxy can improve the alkenone carbon isotope method fundamentally after a more careful calibration.