Spatio-temporal variability of alkenone and calcareous nannofossil abundance records across the southeastern Philippines: Insights on alkenone production and paleoceanographic reconstructions

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Southeastern Philippines is located near the center of the Western Pacific Warm Pool (WPWP), a large, oceanic warm-water mass located in the tropical western Pacific with a characteristic mean sea surface temperature of >28˚C. Several water masses meet in this area as part of the global thermohaline circulation that distributes mass and heat throughout the world. Study of the oceanographic variability in this area has aided understanding of the role that the tropics play in heat and mass transfer and subsequent climate change. Recent studies have proposed the use of coastal basin areas with high sedimentation rates as potential sites of high-resolution records that can be used to reconstruct centennial, decadal, and interannual scales of climate variability over the recent past.

Alkenones are long-chain organic compounds produced by haptophytes in the Order Isochrysidales that are primarily produced in the marine realm by the coccolithophorid species *Emiliania huxleyi* and *Gephyrocapsa oceanica*. The degree of unsaturation of these compounds, based on the ratio of di- and tri-unsaturated alkenone compounds as expressed by the alkenone unsaturation index ($U^{K'}_{37}$), provides a correlation to mean annual sea surface temperature, whereas alkenone concentrations have been considered to correlate with surface productivity. There is a large potential for correlating alkenone concentration with calcareous nannofossil abundance proxy records to provide a broader, multiproxy approach in reconstructing past oceanographic conditions, particularly in sites of high sedimentation rates.

Here, we present downcore results from three multicore sites across the southeastern Philippines (eastern Mindanao and the Davao Gulf) that were used to explore the potential of determining sea surface temperature and productivity reconstructions during the Holocene using alkenone and calcareous nannofossil abundance proxy records. Preliminary results show that *Florisphaera profunda* dominates the assemblage, followed by *Gephyrocapsa oceanica* and *Emiliania huxleyi*. Coccolith abundance, species diversity, and net primary productivity indices decrease across all sites, coinciding with an alkenone-derived decrease in sea surface temperature. In terms of alkenone production and dominant haptophyte assemblages, there is a higher positive correlation between *G. oceanica* abundances and $U^{K'}_{37}$ values than *E. huxleyi*. Due to constraints with age dating results, we can only provide age-dated variability for one site, which faces the Philippine Sea. The overall variation shows a slight warming trend over the last 2000 years, accompanied by a decreasing trend of net surface primary productivity.