# Marine phytoplankton biogeography before the recent global ocean warming

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Global ocean warming has accelerated since the 1990s, resulting in the modification of marine phytoplankton habitats. However, the evidence of such an environmental impact on marine phytoplankton is limited. During the 1960s-1970s, a huge collection of filter samples was obtained throughout the world's oceans by Profs. Andrew McIntyre of the Lamont-Doherty Earth Observatory and Hisatake Okada of Hokkaido University. Their filter collection provides us with a unique opportunity to reconstruct the photic biosphere before the acceleration of ocean warming. Okada & McIntyre obtained over 5000 filtered seawater samples from which they revealed floral zones and seasonal changes of coccolithophores in the Atlantic and Pacific Oceans based on electron microscope studies of ca. 1500 filter samples (e.g. McIntyre & Bé, 1967; Okada & Honjo, 1973; Okada & McIntyre, 1979). In this study, we assess the diversity of coccolithophores and parmales through morphological and eDNA metabarcoding studies. Our comprehensive survey employing morphological-molecular approaches will provide important information on the phytoplankton community structure in the 1960s–1970s, and will enable us to make a comparison with that found in the modern ocean. In this talk, we will introduce our ongoing project, report on its current progress, and show some of our preliminary results based on microscope observations and metabarcoding analyses.

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