

Seasonal diatom and radiolarian fluxes in the central and western equatorial Pacific during the 1999 La Nina conditions

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Time-series sediment trap studies in the central and western equatorial Pacific at two water depths, about 1000 m and 3000 m, during January to November 1999 revealed seasonal changes of diatom and radiolarian fluxes. Two types of oceanographic conditions were investigated: and Sites MT1, MT2 and MT3 were located in the Western Pacific Warm Pool (WPWP); and Site MT5 was located in the Equatorial Upwelling Region (EUR).

Annual mean total diatom fluxes were high at Sites MT1 and MT5, and the lowest at Site MT2. The diatom species composition was different between the two regions: WPWP and EUR. Pennate diatoms dominated the assemblages at Sites MT1, MT2 and MT3 in the WPWP. However, at Site MT5 in the EUR, the average percent occurrence of pennate diatoms was lower than that in the WPWP and the contribution of centric diatoms increased. *Nitzschia bicapitata* was the dominant species in the WPWP, while *Rhizosolenia bergonii* was the dominant species in the EUR. Such a different species composition of the diatom is attributed to changes in environmental conditions, especially nutritional conditions between the WPWP and the EUR. At all sites, the fluxes of diatoms showed a distinct seasonal pattern, while the diatom species composition did not show it. Thus, the species composition of the equatorial diatom is considered to be stable with changes of source of nutrient supply. In the central and western equatorial Pacific, the seasonal changes of diatom fluxes reflect the seasonal change of nutrient concentrations, while the diatom species compositions reflect the hydrographic and nutritional conditions of the surface waters.

Total radiolarian fluxes showed higher values at Sites MT1, 2, 5 than that at Site MT3. It appears that radiolarian production in this region was mainly affected by the supply of nutrients. The radiolarian species composition at each site did not show as much seasonality as that of the temporal variation in total radiolarian flux. In this study, several species as useful environmental indicators were given. *Lithomelissa setosa* and *Pseudocubus obeliscus* are good eutrophic and oligotrophic indicators, respectively. They are important tracers of the present and past WPWP migration in the central and western equatorial Pacific. The flux pattern of *Lophophaena cylindrica* was nearly the same as that of total radiolarians, and this species could represent the whole radiolarian productivity in the central and western equatorial Pacific. Furthermore, in order to understand the vertical radiolarian transportation, the sediment trap samples were compared with the samples from plankton tows as well as core tops. The changes of *Nassellaria*-*Spumellaria* ratios between the suspended and sinking radiolarian populations were not significant, but there were significant differences between the sinking and core top populations. It suggested that in the central and western equatorial Pacific the significant dissolution of radiolarians took place in surface sediments. The radiolarian species were affected by selective dissolution. It appears that every species receives different levels of dissolution during their vertical transportation.

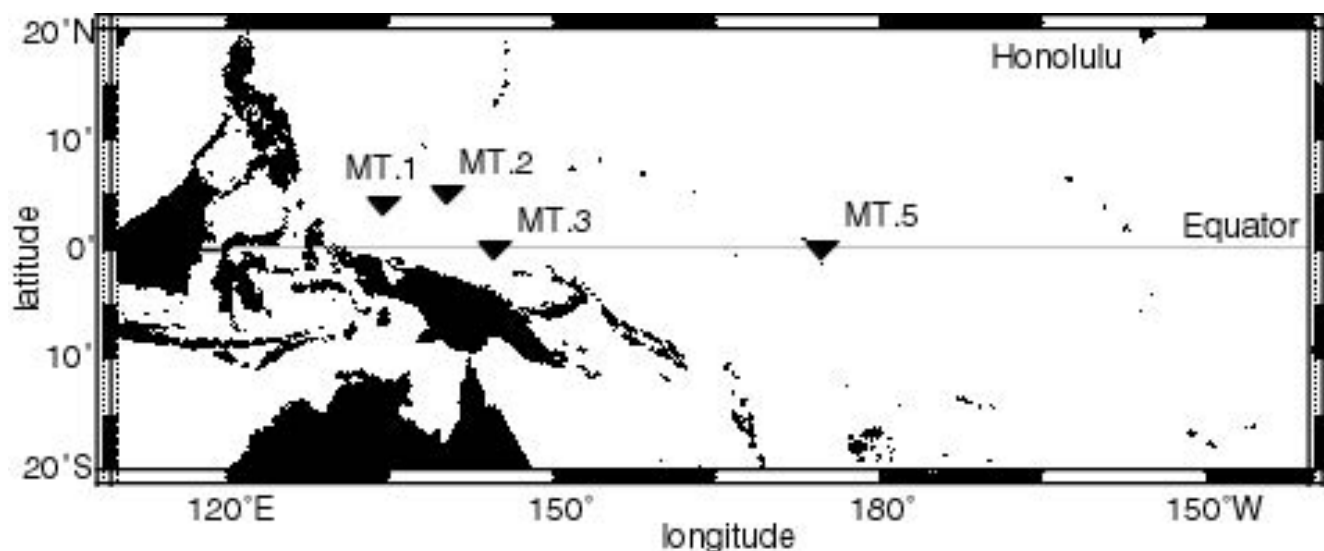


Fig. 1. Location of sediment trap deployments.

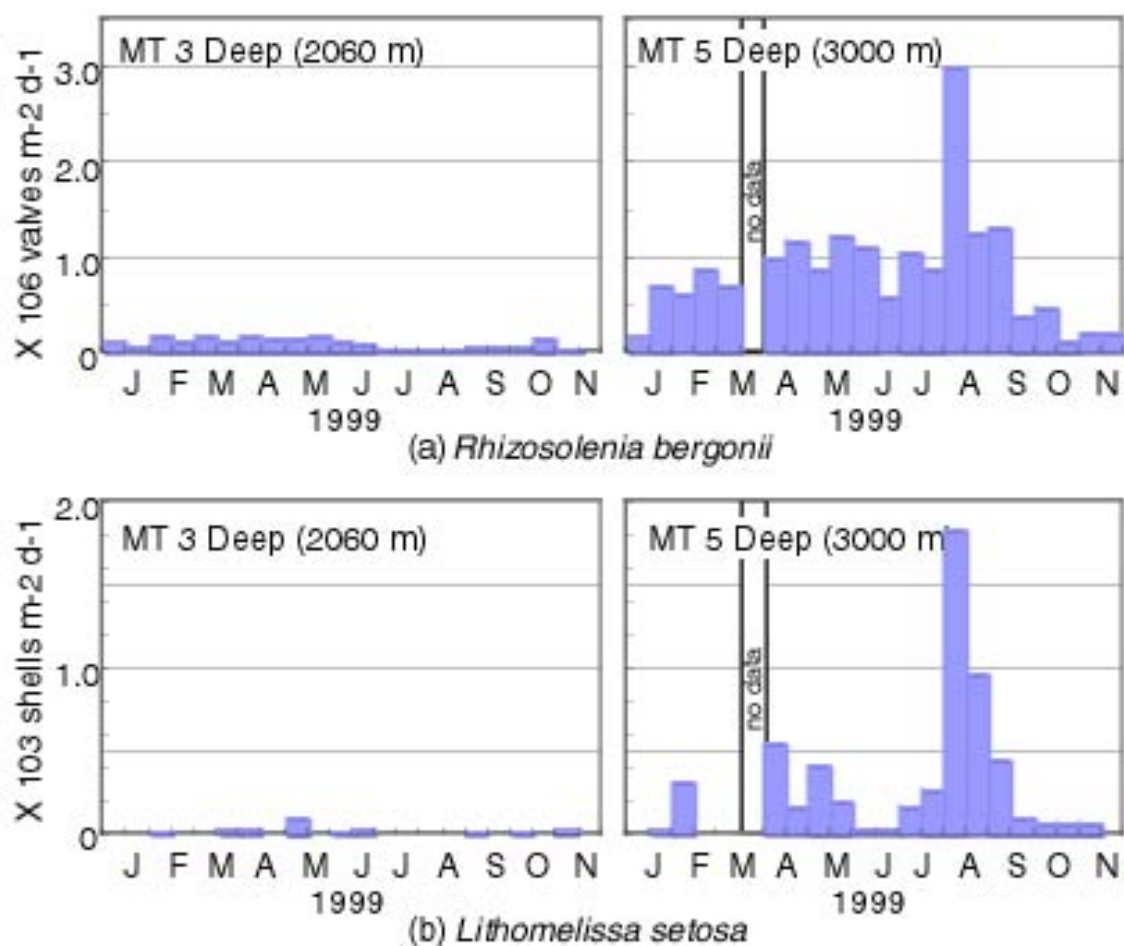


Fig. 2. Fluxes of (a) *Rhizosolenia bergonii* and (b) *Lithomelissa setosa* at the deep traps of the Sites MT3 and MT5.