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Particulate organic matter fluxes in a Tuamotu atoll lagoon (French Polynesia)

Loïc Charpy, Claude J. Charpy-Roubaud

ORSTOM, PO Box 529, Papeete, French Polynesia

ABSTRACT: The standing stock and chemical composition of suspended particles (< 35 μm) were monitored in the lagoon of Tikehau Atoll from 1983 to 1987 and in surrounding oceanic waters (upper 250 m) during 4 cruises. Trapping rate of particulate material was measured between 1986 and 1987 and net export of particulate organic matter (POM) was roughly estimated using monthly average lagoon POM concentration and monthly average flow of water measured in the passage and the reef-flat spillways. Results showed that deep chlorophyll maxima in oceanic waters could reach 0.24 mg m^{-3} and were observed between 100 and 200 m even when ATP, POC, PON and POP concentrations were higher in the upper 100 m. POM concentration was homogeneous in the lagoon but varied considerably with time especially following 2 hurricanes in 1983. POM concentration was 30 to 40 % higher in samples taken close to the bottom than in the water column. An oceanic station near the atoll was strongly influenced by the lagoonal discharge but POC export from the lagoon to the ocean represents only 6 % of phytoplankton production. The POM content of Tikehau lagoon lies within the range recorded for coral reef areas and is made up of suspended particles 50 % of which are smaller than 5 μm. Their sedimentation (350 mg C m^{-2} d^{-1}) represents 80 % of phytoplankton production.