EUTROPHICATION PROCESS IN THE PAPEETE LAGOON (TAHITI, FRENCH POLYNESIA): USING SEDIMENT GEOCHRONOLOGY TO RECONSTRUCT PHOSPHORUS CYCLING EVOLUTION DURING THE PAST CENTURY

HARRIS P., FICHEZ R., GOLTERMAN H.L. and BADIE C.

ORSTOM Papeete, French Polynesia

Sediment deposition rate during the past century was assessed by measuring ^{210}Pb activity in sediment cores from the Papeete lagoon (Tahiti, French Polynesia). Five fraction were separated using a sequential extraction method: loosely sorbed P, iron-bound P, $CaCO_3$-associated P, refractory inorganic P, and organic P. The total P accumulation rate was 500 µg cm^{-2} y^{-1} at the core bottom (age 1850) and increased to a maximum of 1400 µg cm^{-2} y^{-1} after 1960. During the past century there has been no significant evolution for loosely sorbed P, increase of iron-bound P from 30 to 300 µg cm^{-2} y^{-1}, moderate decrease of $CaCO_3$-associated P from 250 to 200 µg cm^{-2} y^{-1}, increase of refractory inorganic P from 100 to 500 µg cm^{-2} y^{-1}, and increase of organic P from 20-50 to 350-400 µg cm^{-2} y^{-1}. Significant modifications in the relative importancee of the five P reservoirs are observed after 1960. We observed no significant modification in the CNP ratio during the last century but organic carbon, nitrogen and phosphorus concentrations increased dramatically after 1960. In complements, present issolved and particulate phosphorus cycling was investigated in the Papeete lagoon and a budget of the phosphorus cycle is presented. In the lagoon ecosystem, terrestrial phosphorus contrib uted to more than 70% of the inputs. The average sedimentation rate of particulate P was close to 3000 µg cm^{-2} y^{-1}. Nearly 50% of this contribution is incorporated in the sediments, while desorption processes that mostly occurred under anoxia were of low significance in the considered system.

Harris P., Fichez Renaud, Golterman H.L., Badie C.

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