An Assessment of Primary Productivity of a Coral Reef Lagoon in Palau, Western Caroline Islands, Based on the Data Obtained during 1935-37

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Abstract

Primary productivity by photosynthesis of phytoplankton population in the coral reef waters in Palau Islands, Western Caroline Islands, tropical Pacific Ocean, is calculated on the basis of data obtained during 1935–37. Light extinction coefficient in Iwayama Bay in the inner lagoon, and at the anchorage of Palau Port in the outer lagoon is calculated from the data observed on submarine illumination of 0.092 and 0.060 respectively. Light extinction coefficient in the open sea outside the reefs is calculated from data obtained on a recent cruise of the "Oshoro Maru" in waters of similar transparency with the result of 0.046. Data on phytoplankton standing crops at the depth of 0 m, 10 m and 20 m in Iwayama Bay are available. Mean amount of chlorophyll converted from observed diatom number is 0.000265 gChl/m^3. Chlorophyll at the anchorage and in the open sea is calculated as 0.000191 gChl/m^3 and 0.000074 gChl/m^3 respectively on the ratios of observed surface phytoplankton standing crops among Iwayama Bay, anchorage and open sea, taking the value of Iwayama Bay as a standard. Daily primary production calculated from these sources is 0.08 gC/m^2/day in Iwayama Bay, 0.09 gC/m^2/day at the anchorage and 0.04 gC/m^2/day in the open sea. Thus, primary productivity by phytoplankton population is shown to be higher in the lagoon water than in the open sea.

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