

ODP Leg 191 – An account as an undergraduate student trainee in the northwest Pacific Ocean: a summary of radiolarian biostratigraphy

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I participated in a deep-sea drilling project as an undergraduate student trainee in the northwest Pacific Ocean off the coast of Japan. The Ocean Drilling Program (ODP) cored Site 1179 on Leg 191. The objective of this leg was to perform a series of engineering tests and to install a seismic observatory on the sea floor. The borehole reached depths of 475 metres in water depths of about 5500 m. Approximately 249 meters of soft sediment were recovered using a hydraulic piston core barrel that reached a total depth of 292.9 meters below sea floor (mbsf). As a micropaleontologist, I examined sediments from the core catcher for radiolaria. The sediments were also examined for palynomorphs, planktonic foraminifera, and calcareous nannofossils, even though few were expected to be found. In this deep-sea environment the sediments examined were expected to contain only siliceous microfossils.

Lithological Unit I is composed of radiolaria- and ash-bearing diatomaceous oozes and zeolitic clays. Radiolaria are common through Unit I and show excellent preservation.

Lithological Unit II is composed of diatom- and ash-bearing radiolarian ooze. Radiolaria are abundant through Unit II and show good to excellent preservation. Units I and II make up approximately 100 mbsf and range in age from latest Miocene to Holocene. Lithological Unit III contains red to brown pelagic clays that are barren of microfossils. There are no age date on this unit. The sedimentation rate in this area is very high, with rates of 38-40 meters per million years as indicated by paleomagnetic and biostratigraphic data. Another interesting feature is the presence of sections of the sediment column with high carbonate contents. These areas contain calcareous nannofossil, planktonic foraminifera, and terrestrial pollen. At this time there is no explanation for the carbonate layers that were found at 1000 meters below the carbonate compensation depth. There is also a change in the radiolarian assemblages from mid-latitude to high-latitude species in the carbonate-rich areas. Several techniques using radiolaria are being pursued to explain the anomalous calcium carbonate layers.