

Magnetic properties of sediments from Sites 1109, 1115 and 1118, ODP Leg 180, Woodlark Basin (Papua New Guinea)

Naoto Ishikawa[1], Gina M. Frost[2]

[1] Graduate School of Human and Environmental Studies, Kyoto Univ., [2] Central Oregon Community College

Rock magnetic analyses were performed on Latest Miocene-Pleistocene synrift sediments of ODP Sites 1109, 1115 and 1118 (Leg 180), located on the hanging wall margin north of the Moresby low-angle normal fault in the western Woodlark Basin (Papua New Guinea). The principal magnetic mineral of the sediments was PSD magnetite and maghemite. The concentration of the ferrimagnetic minerals was found to control magnetic susceptibility of the sediments. In low susceptibility zone, large paramagnetic contribution to the magnetic signal was also recognized. The sediments showed variations in rock magnetic parameters related to sedimentation process in the basin. An abrupt decrease in concentration of the ferrimagnetic minerals occurred around 3.8 Ma at Site 1109 and 1115, which was coeval with increase in sedimentation rate. A change of the rifting process in the Woodlark Basin caused a change in the depositional environment around Sites 1109 and 1115 (i.e., source or supply route). An increase in the ferrimagnetic mineral concentration occurred between 3.4 Ma and 3.2 Ma at the three sites. The onset age of the change became younger with distance from the Moresby normal fault: 3.4 Ma at Site 1118, 3.3 Ma at Site 1109 and 3.2 Ma at Site 1115. The age difference at the three sites suggests a northward onlapping of sediments with high concentration of ferrimagnetic minerals. The northward onlapping of the sediments was probably related to subsidence at the area near the Moresby normal fault, accompanied by the subsidence at Sites 1109 and 1118. Deposition of sediments with fine-grained ferrimagnetic minerals occurred at 2.5-2.0 Ma at Sites 1109 and 1118 and since 3.1 Ma at Site 1115, which was coeval with sedimentation at low accumulation rate. The decrease of frequency and intensity of turbidity currents may have caused an increase in the concentration of fine-grained magnetic minerals. The upper parts at Sites 1109 and 1115, which deposited at low sedimentation, also showed diamagnetic contribution and decrease in the concentration of the ferrimagnetic minerals. The upper parts contain pelagic sediments and show high CaCO₃ concentration. Low frequency of turbidites supplying ferrimagnetic and paramagnetic minerals may have resulted in relative high concentration of pelagic diamagnetic materials.