

IODP Expeditions 320 and 321: Onboard preliminary results of paleomagnetism

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Integrated Ocean Drilling Program (IODP) Expeditions 320 and 321, 'Pacific Equatorial Age Transect (PEAT)', were conducted from March to June in 2009. These were the first two expeditions after the conversion of JOIDES Resolution. The main objective of the expeditions was to recover a continuous sedimentary record of the paleoequatorial Pacific since the Eocene for studying evolution of the paleoequatorial climate system. Sites U1331-U1336 were occupied during Exp. 320, and Sites U1337 and U1338 were cored during Exp. 321. These sites align from WNW to ESE between ~142W and 118W in the East Equatorial Pacific along a Pacific Plate motion track (flow-line strategy). Pacific plate motion has had a north component throughout the Cenozoic, and thus a sediment bulge rich in biogenic components deposited in the narrow zone of equatorial upwelling in the past is not deeply buried, and can be recovered using an Advanced Piston Corer (APC). This gives us a unique opportunity for studying geomagnetic field variations since the Eocene.

We have conducted onboard paleomagnetic measurements using half-core sections. Magnetic polarity sequences of the middle Eocene to late Oligocene were well documented at Sites U1332 and U1333. At Site U1332, the average sedimentation rates in this interval range from 3 to 8 m/m.y., and at Site U1333, the mean sedimentation rates reach ~12 m/m.y. in the lower Oligocene. At Sites U1335 through U1338, Miocene to Quaternary magnetostratigraphy was recovered. In significant parts of Miocene sections, however, intensity of remanent magnetization was very weak due to magnetite dissolution during reductive diagenesis, and we could not resolve magnetic polarity in such intervals.