

Preliminary report on depositional environment and relative paleomagnetic intensity of IODP Site U1490

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We report preliminary paleomagnetic results from between ~180-258 meters composite depth (mcd) of International Ocean Discovery Program (IODP) Site U1490 recovered during Expedition 363. The aims of Expedition 363 were to reveal the role of the Western Pacific Warm Pool (WPWP) in regional and global climate variability. The recovered cores span a broad spatial and temporal range from the middle Miocene to late Pleistocene. Pelagic sediments recovered from IODP Site U1490 (western equatorial Pacific, 2341 m water depth) are composed of calcareous and siliceous nannofossils with varying proportions of clay and ash. Seismic reflection data of Site U1490 revealed current-controlled mud waves that are prominent deeper than ~180 meters below sea floor but gradually decrease in amplitude up-section. Since deep water is enriched in dissolved oxygen due to downwelling in polar regions, the mud waves were probably formed in an oxic environment by deep water currents, inhibiting the dissolution of magnetic minerals in the sediments.

Shipboard analysis revealed that the paleomagnetic data is uninterpretable in terms of geomagnetic field behavior between ~25-180 mcd at Site U1490 because magnetic minerals have been dissolved by diagenetic alteration. However, in the upper ~25 mcd and below ~180 mcd sediments have a stable magnetization that span from the present to the early Pleistocene (0-1.9 Ma) and from the middle to late Miocene period (~9-19 Ma), respectively. The latter represents recovery of an exceptionally long, continuous, core sample that provides an opportunity to study long-range past variations of the paleomagnetic field.

We will report the measurement of natural remanent magnetization (NRM), anhysteretic remanent magnetization (ARM), and isothermal remanent magnetization (IRM) on U-channel samples from splice sections of Site U1490 and develop a preliminary estimate of relative paleomagnetic intensity (NRM_{20mT}/ARM_{20mT}). NRM was demagnetized with stepwise alternating-field (AF) demagnetization in peak fields of 20-80mT and reveals two additional geomagnetic reversals than the 34 identified on-board ship using a single peak AF demagnetization of 20 mT. The range of NRM_{20mT}/ARM_{20mT} is 0.002-0.36 with lowest values accompanying the reversal horizons. Future works include the periodic analysis of relative paleomagnetic intensity and its normalizer to check whether orbital modulation affects the paleomagnetic record of this site as has been previously reported in other Pleistocene age cores from the WPWP.