Geophysical Research Abstracts
Vol. 19, EGU2017-8130, 2017
EGU General Assembly 2017

Gamma radiation-based astronomical timescale for the Maldives: Preliminary results from IODP Expedition 359, Maldives Monsoon and Sea Level

Angela Slagle (1), James Wright (2), Dick Kroon (3), Luca Lanci (4), Christian Betzler (5), Gregor Eberli (6), Carlos Alvarez Zarikian (7), and Expedition 359 Scientists (8)

(1) Columbia University, Lamont-Doherty Earth Observatory, Palisades, United States (aslagle@ldeo.columbia.edu), (2) Rutgers, The State University of New Jersey, Piscataway, United States, (3) University of Edinburgh, Edinburgh, United Kingdom, (4) Universita di Urbino, Urbino, Italy, (5) University of Hamburg, Hamburg, Germany, (6) University of Miami, Miami, United States, (7) Texas A&M University, College Station, United States, (8) IODP, Texas A&M University, College Station, United States

Many of the attributes that characterize the modern ocean-atmosphere system developed during the Neogene. In the Indian Ocean, strengthening of the monsoon, development of the oxygen minimum zone, and spin up of the equatorial currents occurred during this interval. International Ocean Discovery Program (IODP) Expedition 359 drilled a series of eight sites across two transects in the Maldives archipelago, capturing records of carbonate platform and drift sedimentation through this critical time period. Sites U1467 (middle Miocene to present) and U1468 (Oligocene/Miocene boundary to middle Miocene) provide the opportunity to construct a complete Neogene record of sedimentation in the depositional center of the region, the Maldives Inner Sea.

Downhole logging data provide continuous, in situ measurements of physical properties but are limited to the logged interval (typically only deeper than ∼100 meters below seafloor) and by borehole conditions; core data are higher resolution but limited by core recovery and quality. Integration of these two data sets is a powerful tool for interpreting the complete drilled interval collected during Expedition 359. Natural gamma radiation measured both in boreholes and on recovered sediments is the primary measurement used for core-log data integration. Spectral gamma radiation data from downhole logging reveals that the gamma radiation signal is dominated by uranium at all Expedition 359 sites, indicating that its variations and cycles are likely controlled by changes in organic matter.

This study of gamma radiation cycles will contribute to expedition efforts to assemble an integrated cyclo-magneto-biostratigraphic age model, allowing for further refinement of the age assignments for the Maldivian events. Ultimately, a final age model for the Maldives drift sites can be integrated with the regional seismic stratigraphic framework to establish ages for a series of critical sequence boundaries, allowing for a detailed interpretation of the timing of Neogene changes in sea level and currents in the Maldives and Indian Ocean system.