PP53A-1102: Development of a high resolution chemostratigraphy for the Late Triassic-Early Jurassic Newark Basin

Friday, 15 December 2017
13:40 - 18:00
New Orleans Ernest N. Morial Convention Center - Poster Hall D-F

The 6.7 km of continuous core recovered from the paleo-tropical Triassic-Jurassic Newark rift basin during the Newark Basin Coring Project (NBCP) has provided a wealth of data since the conclusion of drilling ~25 years ago. These cores comprise the longest (~30 Myr) continuously-cored record of orbitally-paced environmental change and have informed our understanding in several different areas including tropical climate change, history of CO_2, mass extinctions, the geological time scale, and solar system dynamics. Despite the utility of NBCP cores for these endeavors, a critical missing dataset is a comprehensive characterization of their geochemical variations relevant to paleoenvironmental and paleoclimatic interests, largely a consequence of the cost of analyses at an appropriate resolution using conventional techniques. With the advent of new technology permitting the rapid acquisition of reliable geochemical data, such limitations may no longer be an obstacle for constructing a high-resolution chemostratigraphic record for the NBCP. We present the results of a proof-of-concept study using both ICP-MS-calibrated scanning ITRAX XRF and handheld Laser Induced Breakdown Spectroscopy (LIBS) using the SciAps Z-300. We will show elemental abundances at resolutions as high as 500 mm obtained using these methods from correlative sections of the Titusville and Nursery cores (Lockatong Fm.). These sections are sufficiently long to capture orbital variations and include the range of lithologies present throughout the entire section. Our preliminary results are consistent with previous, semi-quantitative means (e.g., depth ranks) of assessing Milankovitch-scale orbital variations and are also consistent with core and hole geophysical data, demonstrating that these methods can acquire meaningful geochemical data from the entire NBCP. With continued work, we aim to provide an objective characterization of orbitally-paced lake level cyclicity using geochemical proxy variations, leading to an improved basis for disentangling the links between basin evolution, the evolution of the CO_2-climate system, orbitally paced cyclicity, and solar system chaos.

Authors

Sean Kinney *
Lamont -Doherty Earth Observatory

Clara Chang
Lamont -Doherty Earth Observatory

Paul E Olsen
Lamont -Doherty Earth Observatory

Find Similar

View Related Events

Day: Friday, 15 December 2017