

Paleoenvironment of Eocene-Oligocene Transition on Mannar Basin, Sri Lanka

NETHMI M. WICKRAMARATHNE¹, DR. NUWAN SANJAYA, DSC¹, PRASANNA DHARMAPRIYA², B. R. GYAWALI³, J.M.C.K. JAYAWARDANA⁴, K.G.S.S. NAWARATHNE⁵, A.U. WIJENAYAKE⁵ AND E. K. C. W. KULARATHNA⁶

¹Sabaragamuwa University of Sri Lanka

²Department of Geology, Faculty of Science, University of Peradeniya

³Lumbini Engineering, Management & Science Campus, Pokhara University

⁴Department of Natural Resources, Faculty of Applied Science, Sabaragamuwa University of Sri Lanka

⁵Department of Geology, Faculty of Science, University of Peradeniya, Sri Lanka

⁶Petroleum Development Authority, Sri Lanka

Presenting Author: nethmimalshani03@gmail.com

The Eocene-Oligocene transition denotes the final significant greenhouse-icehouse climatic state, signifying the shift from a global warm climate devoid of ice during the early Paleogene period to the glaciated climate observed in the Oligocene epoch and lower atmospheric conditions [1]. Calcareous nannoplankton assemblages could be used to reconstruct the paleoenvironmental, paleoclimatic, and paleoeutrophication of the region. A comprehensive study of paleoenvironmental, paleoclimatic and paleoeutrophication reconstruction during the Eocene-Oligocene transition in Sri Lanka has been noted. Smear slide samples obtained from the Dorado-hydrocarbon exploration well in the Mannar Basin were observed in this study using the Axio polarized Microscope and Scanning Electron Microscope (EVO LS15). A total of 54 species, belonging to 17 genera and 7 families were identified. According to Bown and Young (1998) [3] criteria, good overall species diversity and productivity were recorded. The identified species were divided into distinct nannofossil zones (NP23 to NP16) [2] corresponding to the Bartonian to early Rupelian ages. The index nannofossil are *Coccolithus formosus*, *Coccolithus pelagicus*, *Cruciplacolithus neohelis*, *Discoaster deflandrei*, *Reticulofenestra dictyoda*, *Umbilicosphaera bramlettei*, and *Umbilicosphaera detecta*. The warm-water species such as *Coccolithus pelagicus* and *Umbilicosphaera bramlettei* implies the existence of increased sea surface temperatures, while the presence of species like *Reticulofenestra dictyoda* may indicate the presence of cooler water layers or upwelling zones. The rapid extinction of the warm water *Discoaster spp.* group, *Helicosphaera spp.* group, and *Sphenolithus spp.* group during the Eocene-Oligocene climate transition suggest a significant decrease in temperature. The complete extinction of certain warm water taxa, such as *Discoaster spp.*, was observed. The top portion of the research region is characterized by cool water conditions. The examined

materials are associated with the transition from the late Eocene to the early Oligocene epochs. The samples show a decline in K-mode taxa's abundance, including *Coccolithus*, *Discoaster* and *Ericsonia*. This suggests a shift in climate from a warm and eutrophic state to a cooler and oligotrophic state.

[1] Zachos et al. (2001) Science 292, 686–693, [2] Martini, Erlend (1971) In Second planktonic conference 2, 739-785, [3] Bown and Young (1998) British Micropaleontological Society Series, Chapman and Hall, London. P.16-28