Integrated biostratigraphy and depositional environment of the Patala and Nammal Formations, Western Salt Range, Pakistan

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Abstract

The biostratigraphy and depositional environment of the Patala and Nammal formations are reported from the western Salt Range. The identified age diagnostic planktic foraminiferal species include *G. pseudomenardii, A. sibaiyaensis, P. wilcoxensis. M. acuta, M. subbotinae, G. luxorensis, Parasubbotina varianta, A. velascoensis* and *Subbotinae* sp.. The larger benthic foraminiferal assemblage include *M. miscella, M. dukhani, M. meandrinus, R. sindensis, Glomalveolina* sp., *Operculina heberti, Orthophragmina* sp., *Assilina yvettae, Lockhartia* sp., *Ranikothalia sindensis, A. dandotica, D. dispansa, D. sella, D. ranikotensis, Orbitoclypeus* sp. and *Nummulites* sp.. The biostratigraphic range of the planktic forminifera is from P4-E2 and the larger foraminifera is from SBZ4-SBZ8. These biostratigraphic zones suggests that the deposition of the Patala and Nammal formations took place during the time period of 54.5 to 56 Ma which is equivalent to the latest Thanetian-earliest Ypresian ages. The following microfacies are encountered in Patala and Nammal formations of the western Salt Range; 1. Nummulitids- grainstone microfacies, 2. Nummulitids-orthophragminids packstone microfacies), 3. Wackestone microfacies (Pelagic foraminiferal wackestone submicrofacies and Bioclastic-molluscs wackestone submicrofacies), 4. Mudstone microfacies (Partially dolomatized mudstone submicrofacies and bioclastic- pelagic foraminiferal mudstone submicrofacies) and 5. Wacke-packstone microfacies (nummulitids-orthophragminids wacke-packstone submicrofacies, Pelagic foraminiferal wacke-packstone submicrofacies and Foraminiferal bioclastic wacke-packstone submicorfacies). Based on these microfacies the depositional environments of the Patala and Nammal formations are interpreted to represent the inner, middle and outer shelf marine environments. According to Haq et al. (1987), the global sea level curve represent rising on a long term scale however, on a short term scale a sea level fall followed by a rise is documented during the time period of the deposition of Patala and Nammal formations. This short term sea level fluctuations is also observed in the Patala and Nammal formations of the western Salt Range, Pakistan.