

Mesozoic Biosequence Stratigraphy of the Wessex Basin, UK

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Background: Sequence stratigraphic approaches have proven fundamentally important for understanding both the vertical (temporal) and lateral (geographic) evolution of sedimentary systems in the search for hydrocarbon reserves. Recently, (key studies by Armentrout, 1987; Jones et al., 1996; Simmons & Williams, 1992) biostratigraphic information has been integrated with sequence stratigraphic models to enhance understanding of basin fill models. The Wessex Basin of southern England includes Europe's largest onshore active hydrocarbon system and many of the key stratigraphic units are available for study at exposure along the Devon-Dorset-Hampshire coast. Exploration continues across the Wessex Basin both onshore and in the English Channel. Despite the importance of this region and the accessibility of the outcrop sections, relatively little of the micropalaeontology of this basin has been published in detail, particularly in recent years.

Research Material: Approximately 300 Jurassic-Cretaceous cuttings samples from two recent hydrocarbon exploration cores on the Isle of Wight (Sandhills, Bouldnor Copse) have been made available courtesy of the British Geological Survey (BGS) and Northern Petroleum together with wireline data and seismic sections. Taken together with the accessible surface outcrops, and additional core material from English Channel cores, these provide the opportunity to investigate detailed relationships between benthic and planktonic microfossils and sequence stratigraphic units and surfaces. The extensive thickness of Mesozoic sediments and distinct changes in lithology and depositional environment provides many periods of interest, the precise stratigraphic interval of study and microfossil group/s will depend on the particular expertise and interests of the student.



Approach: The project will centre on studies of microfossils from both core and outcrop sections and will initially establish a biostratigraphic correlation between the two Isle of Wight cores. The relationship between biostratigraphic (temporal) range information and environmental (spatial) ranges will be considered in detail. The project will particularly focus on (i) characterising the microfaunal assemblages of discrete systems tracts and (ii) undertaking detailed examination of microfossil assemblages associated with sequence stratigraphic boundaries. Detailed numerical analyses of biostratigraphic data will be undertaken in conjunction with staff from BG Group.

Training: The successful student will have a good first degree in earth sciences, and preferably a masters level qualification that includes elements of micropalaeontology and/or sequence stratigraphy. Advanced training in micropalaeontology is available via the MSc in Applied & Petroleum Micropalaeontology.

ARMENTROUT, J.M. 1987. Integration of Biostratigraphy and Seismic Stratigraphy: Pliocene-Pleistocene, Gulf of Mexico. 6-14. Innovative Biostratigraphic Approaches to Sequence Analysis: New Exploration Opportunities. *Gulf Coast Section SEPM*, Eighth Annual Research Conference. 159pp.

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JONES, G.D., GARY, A. & WATERS, V. 1996. Applying the Integrated Paleontological System: Interpreting Sequence Stratigraphic Architecture from Microfossil Signatures, Oligocene to Pleistocene section, Gulf of Mexico. 202. *in* REPETSKI, J.E. ed. *Eleventh North American Paleontological Convention, Abstracts of Papers, Smithsonian Institution*. The Paleontological Society Special Publication No. **8**.

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