

Comparative studies of the Lower Cretaceous Woburn sands outcrops (UK) and the modern and subsurface field analogues for heterolithic tidal sandstone reservoir characterization

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Laporan (Report)

Shuji Yoshida, who should be now at the Institute for Energy Research, University of Wyoming, gave the above talk on 15 August 2001 at the Geology Department, University of Malaya.

He is an experienced sedimentologist with extensive knowledge and skills in multi-scale research of siliciclastic deposits, ranging from sedimentary basin down to laminae/pore-size, utilizing outcrop data, modern environment and subsurface data. He has broad multi-disciplinary knowledge and communication skills gained from a wide range of both industrial experience and education in geology, geomorphology, geophysics and engineering

Abstrak (Abstract)

Tidal sandstone reservoirs host major hydrocarbon accumulations in the northern North Sea, Venezuela, SE Asia and elsewhere. However, their characterization and modelling are difficult. This is because they contain a complex array of sedimentary heterogeneities at various lengthscales, and predicting their production behaviour has been hampered by a lack of quantitative data on the dimensions and geometries of these heterogeneities.



We have used the well-exposed outcrops of the Lower Cretaceous Woburn Sands (UK) to characterize the small- to intermediate- (millimetre- to metre-) scale heterogeneities of tidal deposits, utilizing architectural element and sedimentary facies analyses within a sequence stratigraphic framework. The unit contains a wide range of tidal sedimentary structures, and is interpreted as recording a transgressive change of depositional environments from a narrow, tide-dominated estuary to a broad, tide-dominated marine embayment, similar to the Holocene history of The Wash Embayment in Eastern England. Mud drapes occur along the set boundaries and foresets of cross-stratification and burrows in various sizes within the Woburn Sands. This unit also contains distinct, thin sub-horizontal, wavy, mud laminae (c. 1–2 mm thick or less) within the ripple cross-laminated part. Most mud drape types have log-normal length distributions within the outcrop, with periodic clustering in the vertical direction.

The Middle Jurassic Beryl Formation (Bruce and Beryl fields, northern North Sea) is interpreted to have been formed under the regional and depositional setting comparable to the Woburn Sands and The Wash Embayment. The Beryl Formation contains abundant thin wavy mud drapes analogous to those found within the Woburn Sands. A range of quantitative outcrop data, suitable for validating and/or populating objects for the stochastic modelling of tidal reservoirs, is presented for the various facies and sand body types, including shale layer and heterolithic facies dimensions.