Sequence Stratigraphy of North America and the Arctic: Global Comparisons

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Sharland et al., (2001; 2004) demonstrated the occurrence of 65 synchronous late Precambrian – Phanerozoic Maximum Flooding Surfaces (MFS) across the Arabian Plate. Ongoing work, incorporating the stratigraphy of North Africa, the western former Soviet Union, South-East Asia, South and Central America and North America and the Arctic now demonstrates the occurrence of further 1st, 2nd and 3rd order surfaces and intervening sequence boundaries. These surfaces may be correlated across all the different regions and sedimentary basins.

Each MFS and its associated sequence boundary (SB) are defined in a reference section. This is a location with good sedimentological and/or wireline log evidence for an MFS or SB that is biostratigraphically supported. The biostratigraphy also provides constraints on the correlation of these surfaces to occurrences in other locations.

Given the clear synchronous nature of these surfaces throughout basins of differing subsidence and sedimentation rates, they must be eustatic in origin. It can be demonstrated that the Neftex sequence stratigraphic model, originally developed in the Middle East, can be successfully applied to the stratigraphy of the North America and Arctic region.

For example, chronostratigraphic data from the Sverdrup Basin and Arctic Platform (Harrison, 1995) exhibits good correspondence to the major transgressive and regressive events recognized in the Arabian Plate model of Sharland et al., (2001, 2004). Similar correlations to the Arabian Plate model can be made with chronostratigraphic information for the Lower Palaeozoic in the Quebec Lowlands (Dykstra and Longman, 1995).

In a more detailed example, the correlative conformity of the O20 SB, seen in the Ghudun Formation of Oman (Sharland et al., 2001) and at the base of the Upper Fezouata Shales in Morocco (Destombes et al., 1985) can be identified within the *T. approximatus* zone of the Factory Cove Member, Shallow Bay Formation, western Newfoundland (Zhang and Barnes, 2004). The overlying O20 MFS recorded in the Barakat Member of Oman (Sharland et al., 2001) can also be correlated with the *T. akzharensis* zone in the Factory Cove Member.

There are profound hydrocarbon exploration and production implications for the application of the sequence stratigraphic model that we have developed. The model provides a precise and reliable framework for correlation and mapping and the subsequent identification of petroleum system elements such as lowstand reservoirs and transgressive source rocks.

References

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