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The Norwegian Danish Basin: A key to understanding the Cenozoic in the eastern North Sea

Thomas L Rasmussen (1), Ole R Clausen (1), Katrine J Andresen (1), and Bartosz Goledowski (2)

(1) Aarhus University, Department of Geoscience, Aarhus, Denmark, (2) DONG E&P Norge AS - Veritasveien 25 - 4007 Stavanger

The Danish part of Norwegian-Danish Basin, which constitutes the eastern part of the North Sea Basin, has been the key area for sequence stratigraphic subdivision and analysis of the Cenozoic succession since the mid 1990's. Widespread 3D seismic data, in the central parts of the North Sea Basin, as well as more scattered 3D seismic data in the Danish part of the Norwegian-Danish Basin, have given a more detailed understanding of the sequences and indicate that climate is tenable for the origin of Cenozoic sequence boundaries. The previous sequence stratigraphic interpretations have been an integrated part of an ongoing debate concerning vertical movements of the Fennoscandian shield versus the impact of climate and erosion. A newly accessed coherent regional 2D and reprocessed 3D seismic data set, in the Norwegian part of the Norwegian-Danish Basin, constitute the database for a new sequence stratigraphic analysis of the entire area. The objective of the new study is to test previous subdivisions and introduce a coherent 3D sequence stratigraphic analysis and depositional model for the entire Norwegian-Danish Basin. This analysis is necessary to get out of the stalemate with the uplift discussion.
The study shows that the original subdivision by Michelsen et al. (1995, 1998) stands. However, revision of few a sequence boundaries may have to be adjusted due to new biostratigraphic information published. Furthermore, high-angle clinoforms and geomorphological transport complexes observed in the Danish North Sea Basin can be traced into the Norwegian sector. This together with the recognition of several other high-angle clinoform complexes, and their associated seismic facies distribution maps and thickness-maps, enhances the level of detail and constrains the previous published paleogeographic reconstructions of the Cenozoic. The geometry of the Cenozoic infill, in the Norwegian part of the Norwegian-Danish Basin, is here interpreted to be controlled by relative sea-level changes and sourced from the Scandinavian hinterland. 3D-Wheeler diagrams have been used for recognizing spatial elements with periods of deposition and non-deposition. Overall, this study thus contributes significantly to a better understanding of the Cenozoic evolution, the position of potential reservoirs and the debate of climate versus tectonics.

References:

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