Sandstone intrusions in the Danish North Sea – where, how and why?

North Sea sandstone intrusions have been a hot topic in the scientific environment for at least two decades with abundant examples of Paleogene sand remobilization and sandstone intrusions from the British and Norwegian sector. In the Danish sector of the North Sea sand remobilization and intrusions have so far only been described on seismic scale in relation to the Siri Canyon which represents one of the most prolific regions of oil and gas exploration in Denmark and an area where remobilization is crucial for the production of oil and gas.

In this talk, I will present the newest findings of sandstone intrusions in the Danish sector of the North Sea. The large sandstone intrusions are found above the Ringkøbing-Fyn High in the area south of the Siri Canyon and east of the Central Graben which by many are thought of as a non-interesting area concerning oil and gas exploration. The reason for this perception is mainly due to the apparent lack of a mature hydrocarbon generating source rock. However, the finding of the large sandstone intrusions in this area opens up for a re-evaluation of our perception of this area since the formation of the intrusions, which is related to overpressure build-up, may be linked with a deeper possible thermogenically sourced fluid migration system. The sandstone intrusions are described and their generation is explained in this talk, which also focusses on the implications of this finding and the challenges of Denmark's North Sea oil and gas exploration in unconventional settings outside the Central Graben. The talk targets both students and staff.
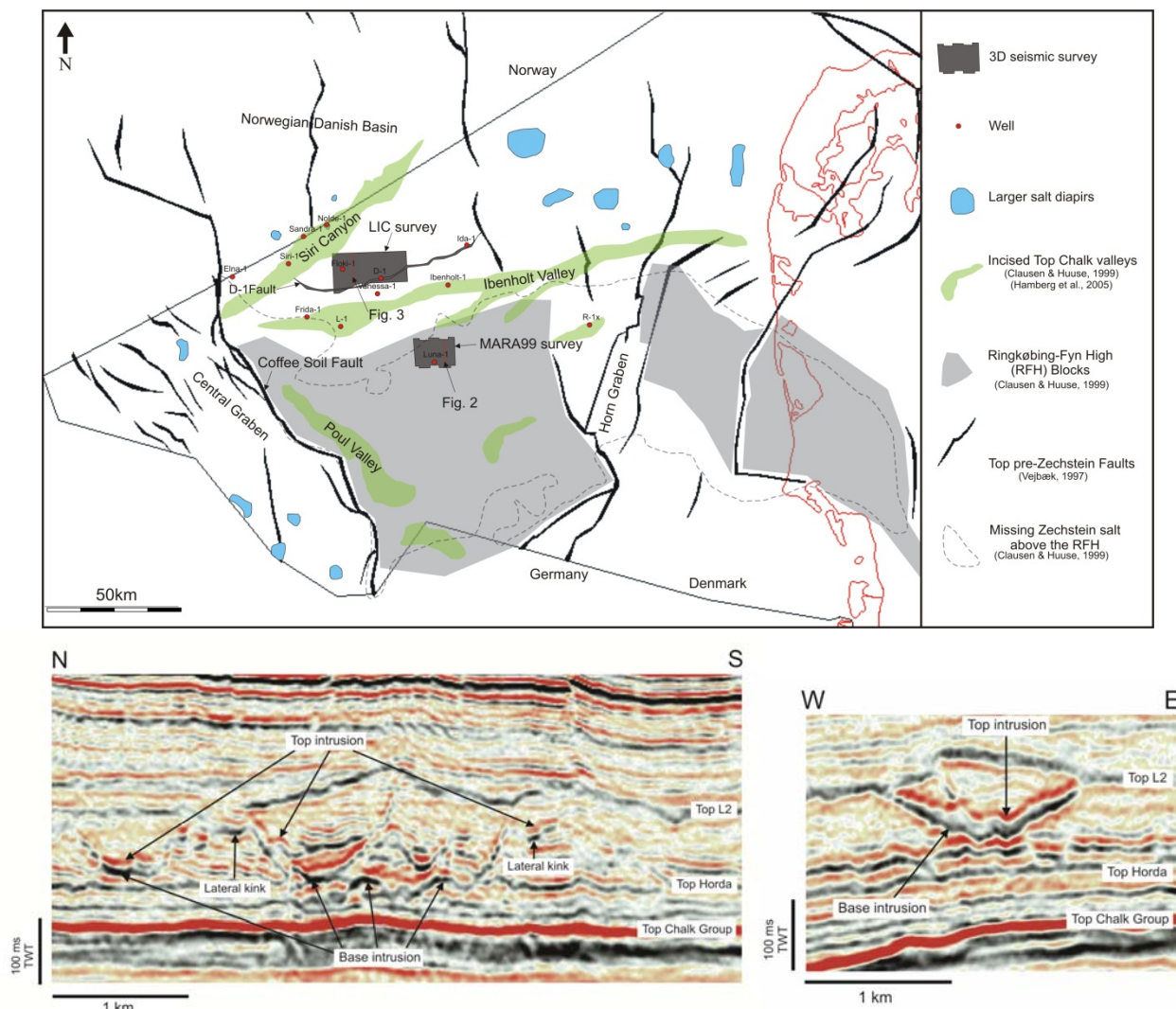
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Fig. 1: At the top a map of the Danish sector of the North Sea. The intrusions are found at the location of the 3D seismic surveys. At the base two examples of the sandstone intrusions which are recognized as cross-cutting high-amplitude reflections. Also note the associated jack-up of the Top L2 horizon above the intrusions.