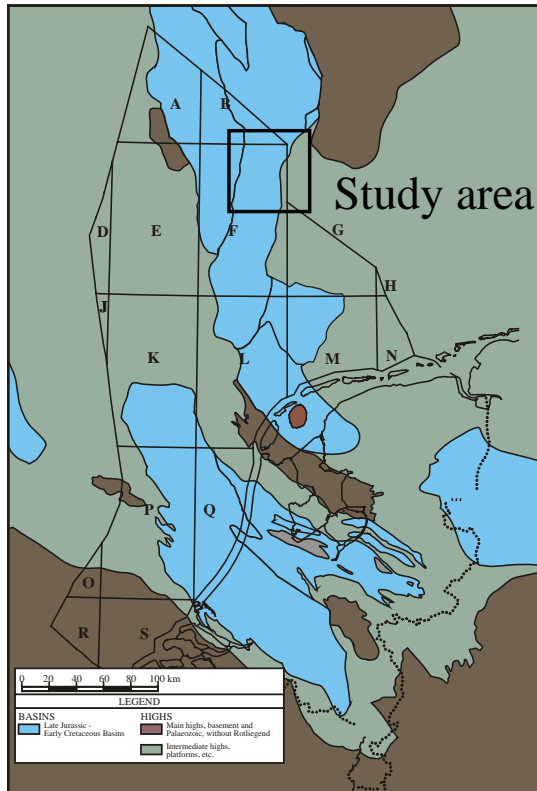


Upper Jurassic Deep Prospects;

A pilot study on a new Play Concept

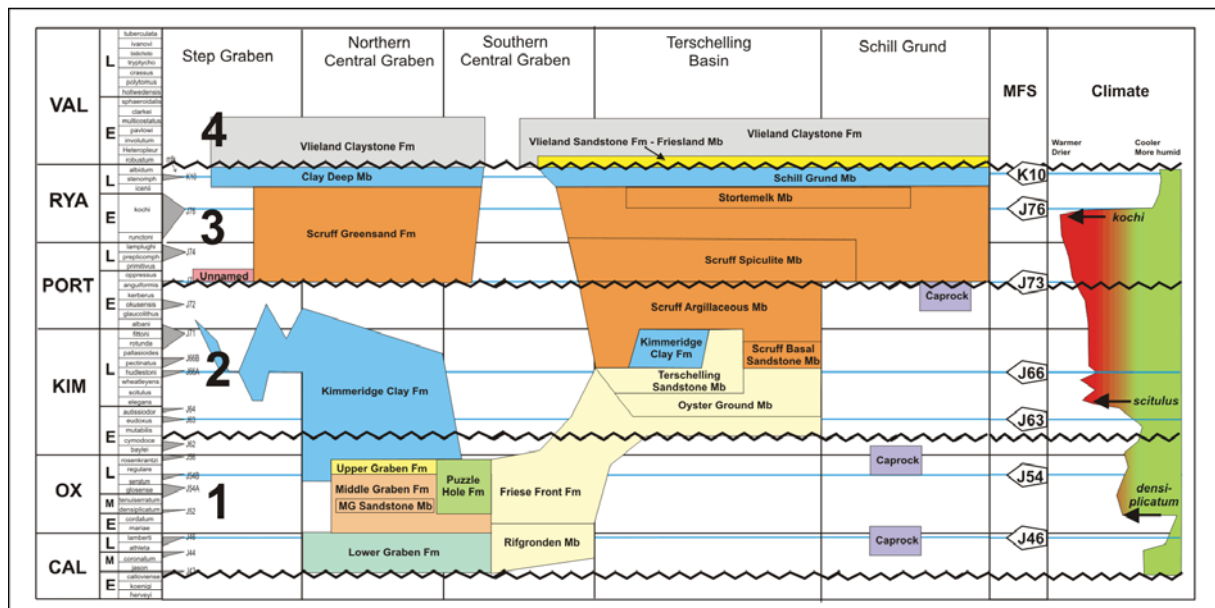
Report available at EURO 7,000.



Modified after Abbink et al. 2006

PanTerra has completed, in close cooperation with TNO, a pilot study on the prospectivity of the Upper Jurassic sands in the northern part of the Dutch Central graben.

Detailed palynological analyses by TNO has resulted in a new, tectono-stratigraphic framework for the Upper Jurassic sequence in the Central Graben area of the Dutch sector of the North Sea (Abbink et al, 2006). An important implication of this new stratigraphic model is that existing wells, usually located on a combination of a present-day structural high and a palaeo-high, have not penetrated much of the Upper Jurassic basin-fill sequences that occur in the palaeo-lows in between these high. The potential for better sand development in these palaeo-lows has been identified. Because of the presence of a number of Maximum Flooding Surfaces and the associated clay intervals that form top and bottom seals within these Jurassic sediments, the potential for stratigraphic trapping in this interval is considered to be significant.

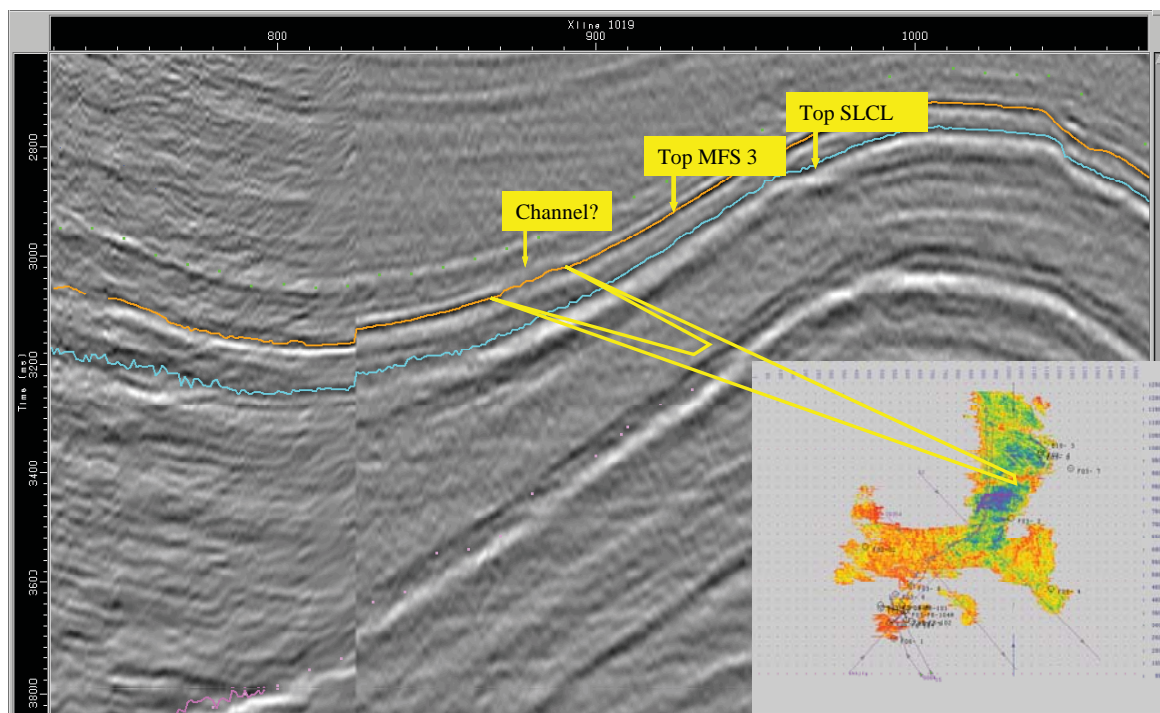


Stratigraphic framework for the Northern sector of the Dutch offshore. The relationships between the various basins has been constrained through the detailed palynological studies by TNO (modified after Abbink et al. 2006)

Summary and conclusions:

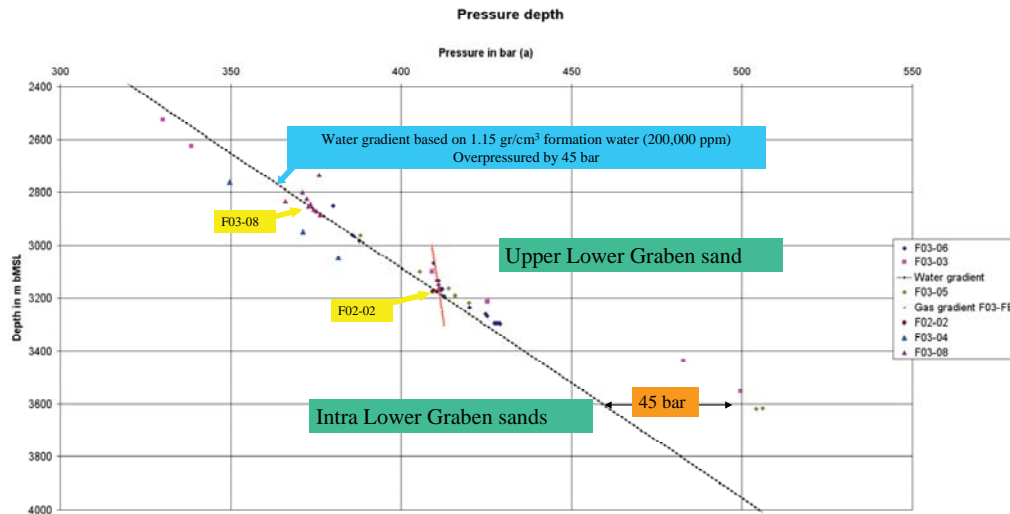
1. Within the study area the Lower Graben Formation of the Central Graben Group (Sequence 1 of Abbink et al, 2006) is the most attractive in terms of reservoir potential. The Middle Graben Formation is very shaly. Locally some channels have been identified. Better reservoir development in the Middle Graben Fm. is expected further south (fluvial) or further north (coastal marine).

The Lower Graben Formation has been fully penetrated by 5 wells in the F03 area: F02-02, F03-03, F03-04, F03-05 and F03-01.

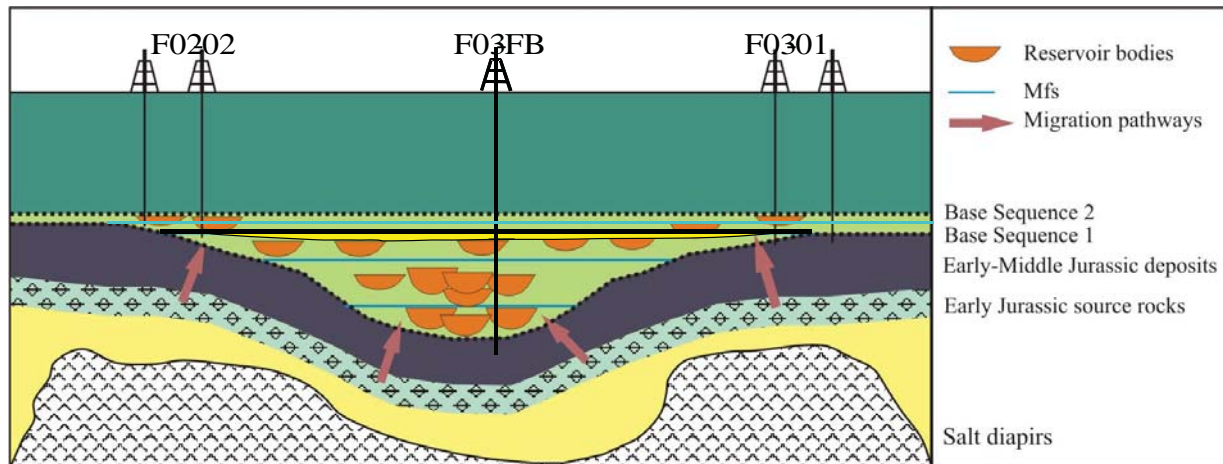


3. Over the F03 area several reservoir intervals occur within the Lower Graben Formation (lower part of Sequence 1):
 - An upper sand (up to 100 m thick), regionally developed; environment of deposition: tidally influenced deltaic/foreshore. This is the main hydrocarbon bearing interval of the F3-FB field. In communication over most of the area.
 - A middle sand, the stacked fining upward sands suggest a channel type of development. Usually tight, fine to very fine sands, dolomite cemented. The few pressure measurements obtained in this interval (most indicated tight formation) show that this interval is in a different pressure regime than the main gas bearing upper sand. Oil and gas shows have been observed within this section. Time equivalent gas bearing sands might occur in the eastern most well F03-01. No pressure measurements are available in F03-01 to further address the communication between the gas bearing sand in F03-01 and the reservoirs deeper in the graben.
 - A lower sand, coarsening upwards, possible a small offshore bar. On test some oil has been produced.

4. The pressures indicate that the upper sand of the Lower Graben Formation is in pressure communication over the study area (a possible exception is F03-04). The deeper sands of the Lower Graben formation are over-pressured with respect of the shallower sands. This indicates that the sands do represent a separate objective but that they are most likely only locally developed.



5. The well data, in particular the pressure data do support TNO's model of the possible presence of channels in the central part of the graben. In the F03 block these have been tested on the F03-FB structure on a doubtful structural position (no structure at top Altena). Unfortunately no significant attribute could be derived allowing mapping of the extent of the stacked channel sequence and consequently no prospects or leads could be identified.



Schematic cross section (modified after Abbink et al. 2006), showing the approximate relation between the F02-02 on the western flank, the F03-FB in the central part and the F03-01 well (or F03-04) on the eastern flank of the central graben. It is suspected that the uppermost sand of the Lower Graben Formation (yellow) is regionally developed (tidally influenced deltaic/foreshore sands) whereas the deeper channelised sands occur more locally. The MFS are more easily mappable in the Middle Graben Fm than in the Lower Graben Fm.

The complete report can be ordered from PanTerra Geoconsultants B.V. and a presentation can be given at the offices of interested companies. Please contact us for further details:

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