



## PL 576 Relinquishment Report

January 2013

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## 1. Summary and Conclusion

The evaluation of PL 576 resulted in a prospect portfolio consisting of one Jurassic prospect and one Jurassic lead. The Yngling prospect is a 4-way dip closure with small volumes and the lead is a stratigraphic trap with larger volumes but with high risk. The decision to relinquish the license has been made by the partnership on the 25<sup>th</sup> January 2013.

## 2. Introduction

PL 576 comprises parts of block 30/9 and block 31/7. The license is located south of the Brage field (Fig. 1).

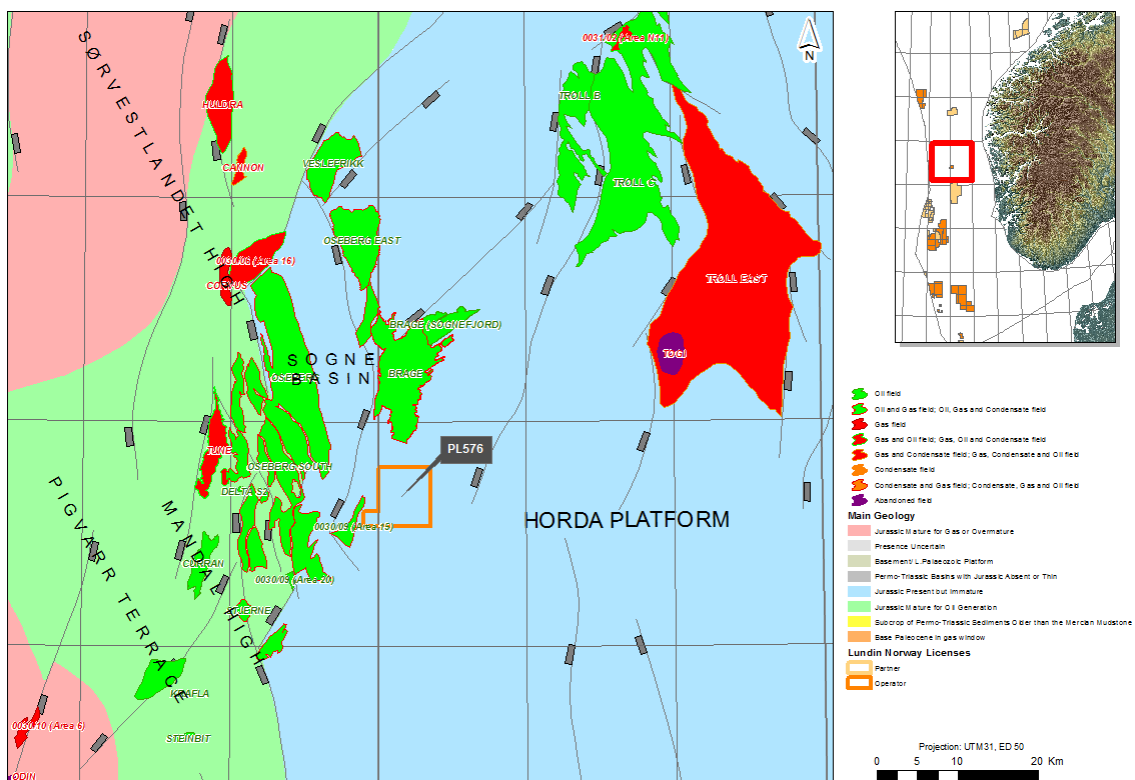


Figure 1: License location.

## 3. License award

PL576 was awarded to Lundin Norway AS as operator (60%) and Concedo ASA as partner with 40% interest on 4<sup>th</sup> February 2011, as part of APA 2010. The initial license period was 6 years, with two years deadline to decide on a drill or drop, hence within 4<sup>th</sup> of February 2013.

Lundin and Concedo applied jointly for the acreage in APA2010. The Yngling prospect was defined as a 4-way dip closure with reservoir in Draupne/Sognefjord Fm and additional secondary targets at Ness and Fensfjord fm levels (Fig. 2).

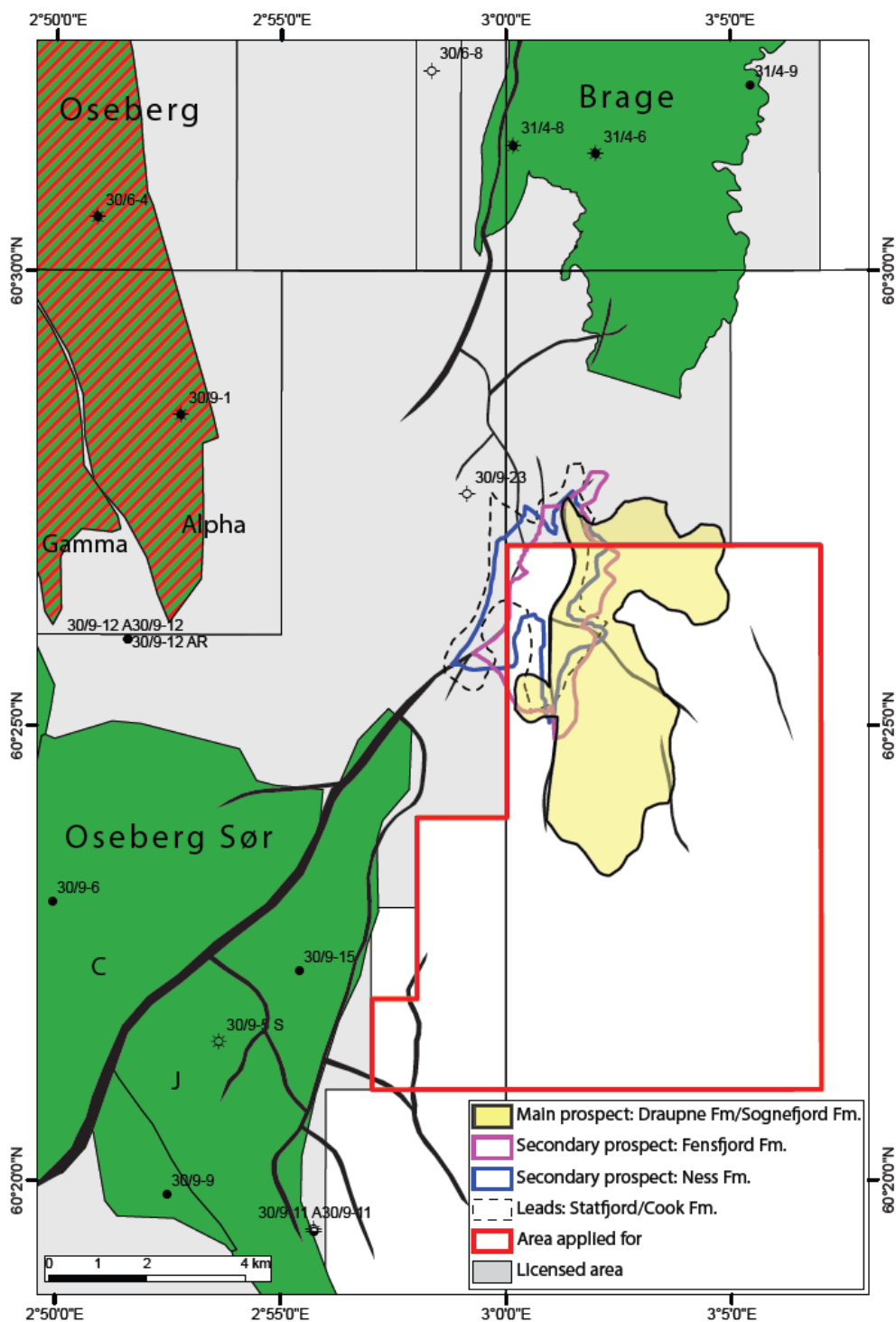


Figure 2: Prospect portfolio from APA 2010

#### 4. Completed work program and special studies

The work commitment was to reprocess 3D seismic, perform relevant geology and geophysics studies and make a decision whether to drill or drop the license within two years of award.

The merging and reprocessing of the 3D surveys NH0402, NH9204 and NH9802 was completed during spring 2012.

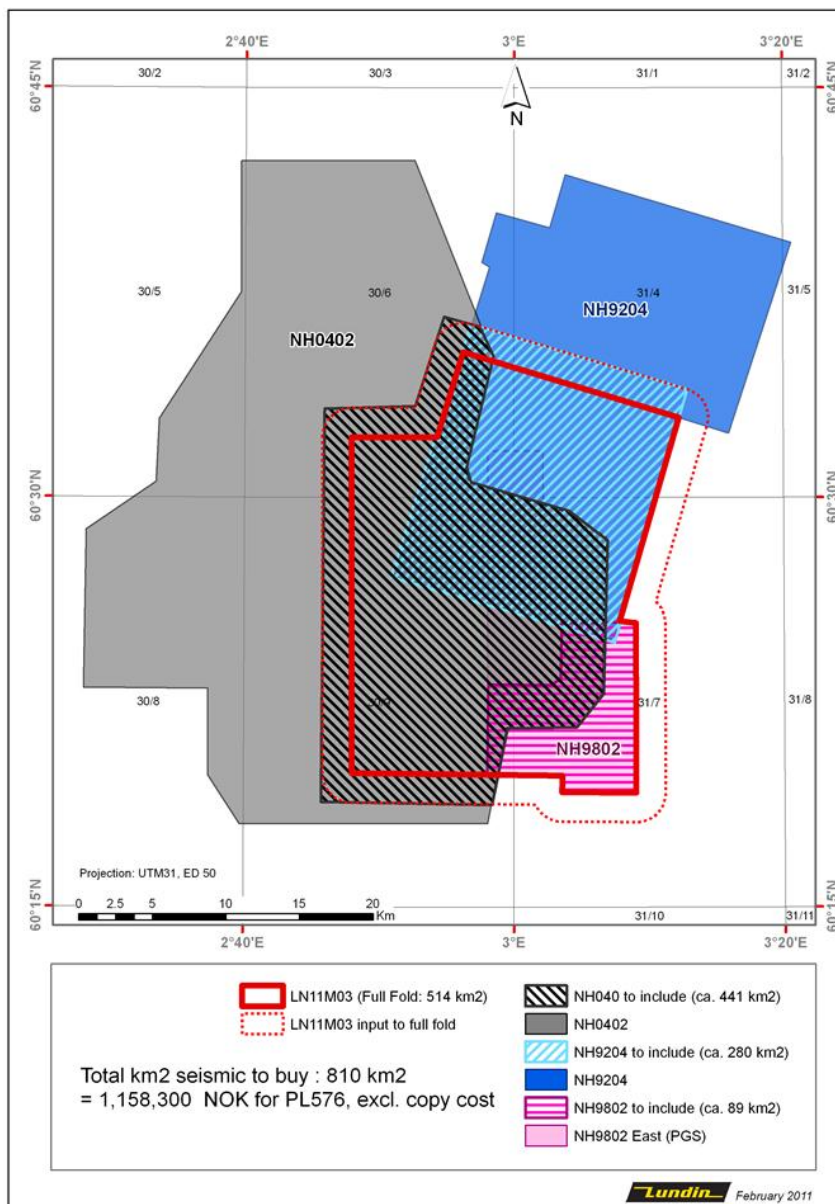


Fig. 3. Input 3d surveys to the new 3d seismic merged data set, LN11M03.

In addition to the work commitment, special studies have been performed, including:

- H-mult processing (to remove multiples below and parallel to the strong BCU reflector)
- Bandwidth extension processing (to enhance vertical resolution)
- Oil populations and petroleum systems studies
- Redating of wells and updated stratigraphy

## 5. Prospectivity evaluation

The reinterpretation of the prospect/leads was carried out on the merged/reprocessed 3D survey, LN11M03.

*Yngling structure*: There was only minor difference in the time interpretation of BCU of the old and new 3D seismic data (Fig. 4).

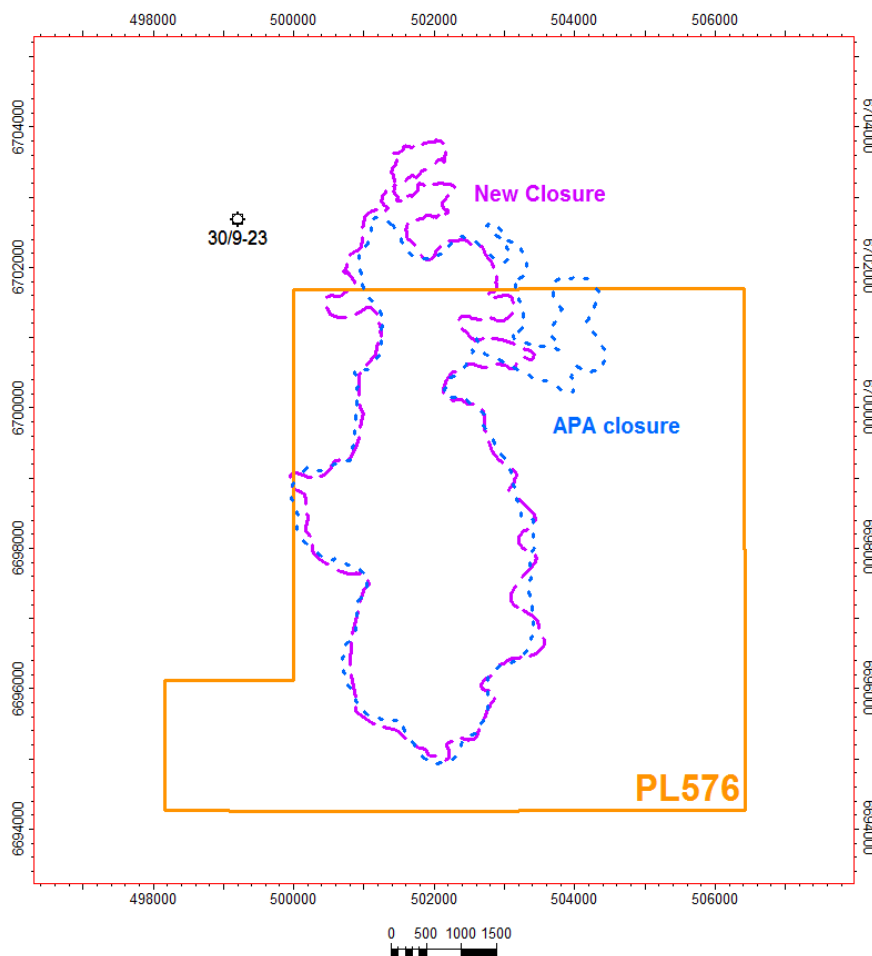


Fig. 4. Comparison of the BCU time closure from the New and APA mapping.

However, the use of stacking velocities in the depth conversion reduced the volumes of the main target (Draupne/Sognefjord fm) significantly. A comparison of the volumes is given in Table 1. A linear velocity function was used in the APA application and this gave a similar time and depth closure. When depth converting using the stacking velocities in a layer cake model (Fig. 5) the area of the closure was almost halved (Fig. 6). Two different velocity models were defined; model 1 used seismic velocities in the shallow channel layer whereas model 2 used a constant velocity of 1593 m/s in the channel (figures 7 and 8). However, the main reason for the reduction in the prospect area/volume is related to a north-south velocity gradient above Top Chalk over the southern part of the time closure.

Tab.1. Yngling structure prospective resources (in  $10^6 Sm^3$ ).

	Low	Base	High
APA Rec Oil	2	5.9	10.6
Jan 2013 Rec Oil	1.2	1.8	2.4

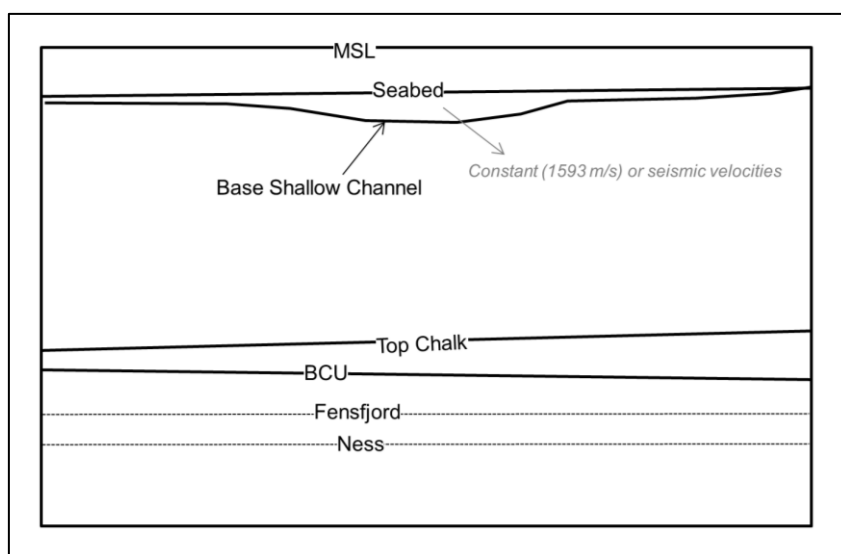


Fig. 5. The layers used in depth conversion (schematic).

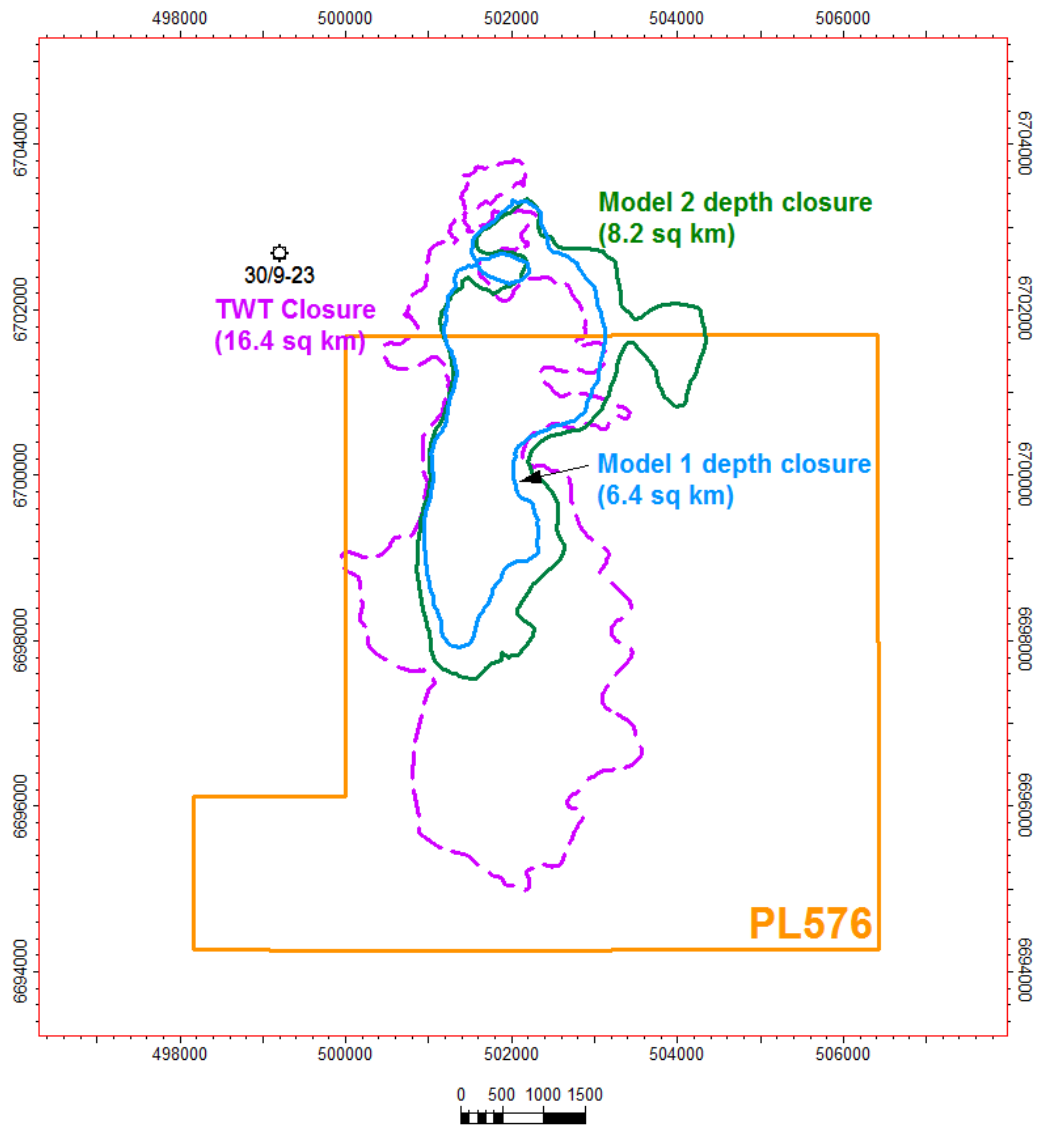


Fig. 6. Comparison of BCU time and depth closures for velocity models 1 and 2.



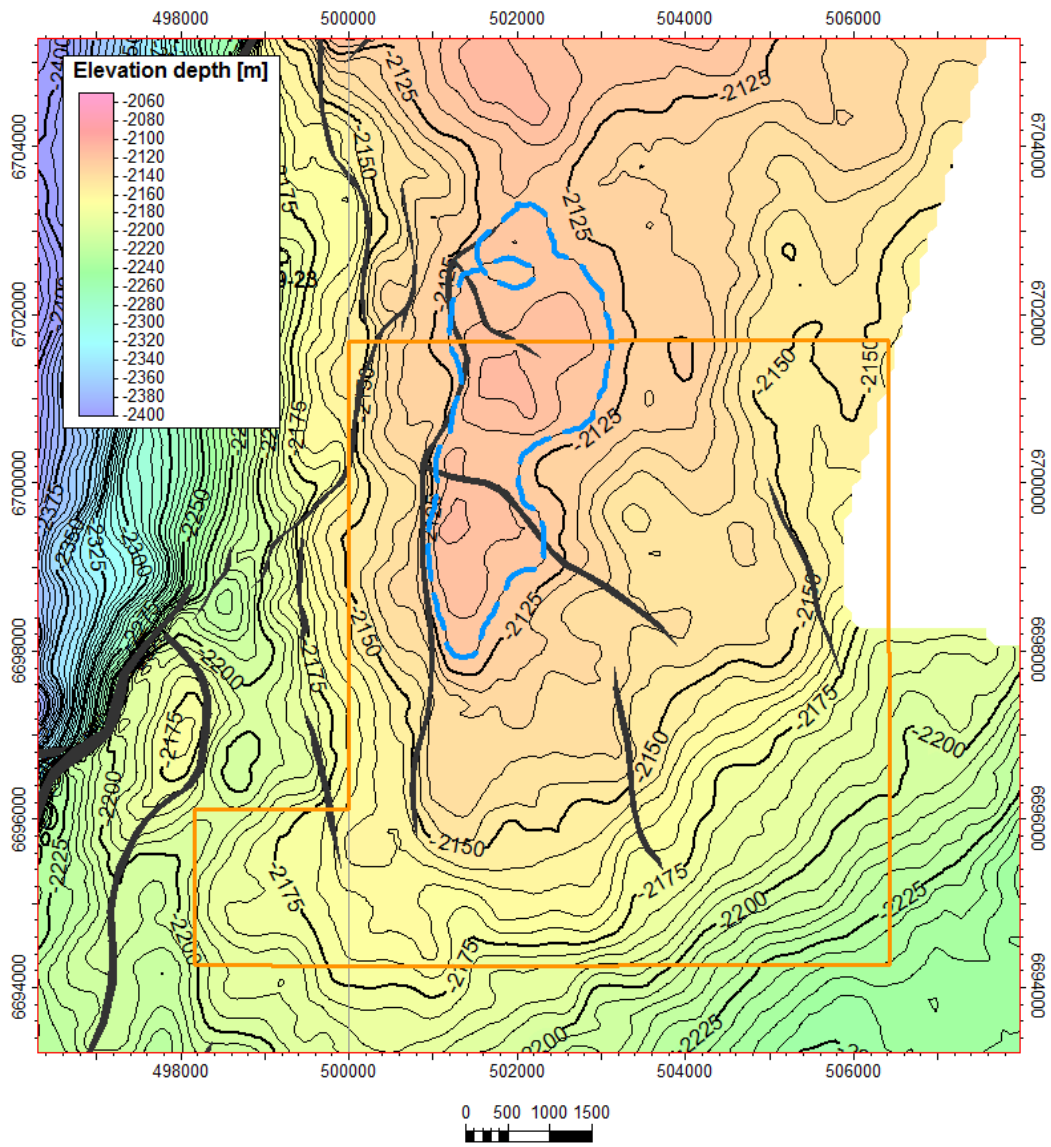


Fig. 7. Model 1 BCU depth map with 10 m contour interval. Closure in blue. Seismic velocities used in the shallow channel layer in this model.

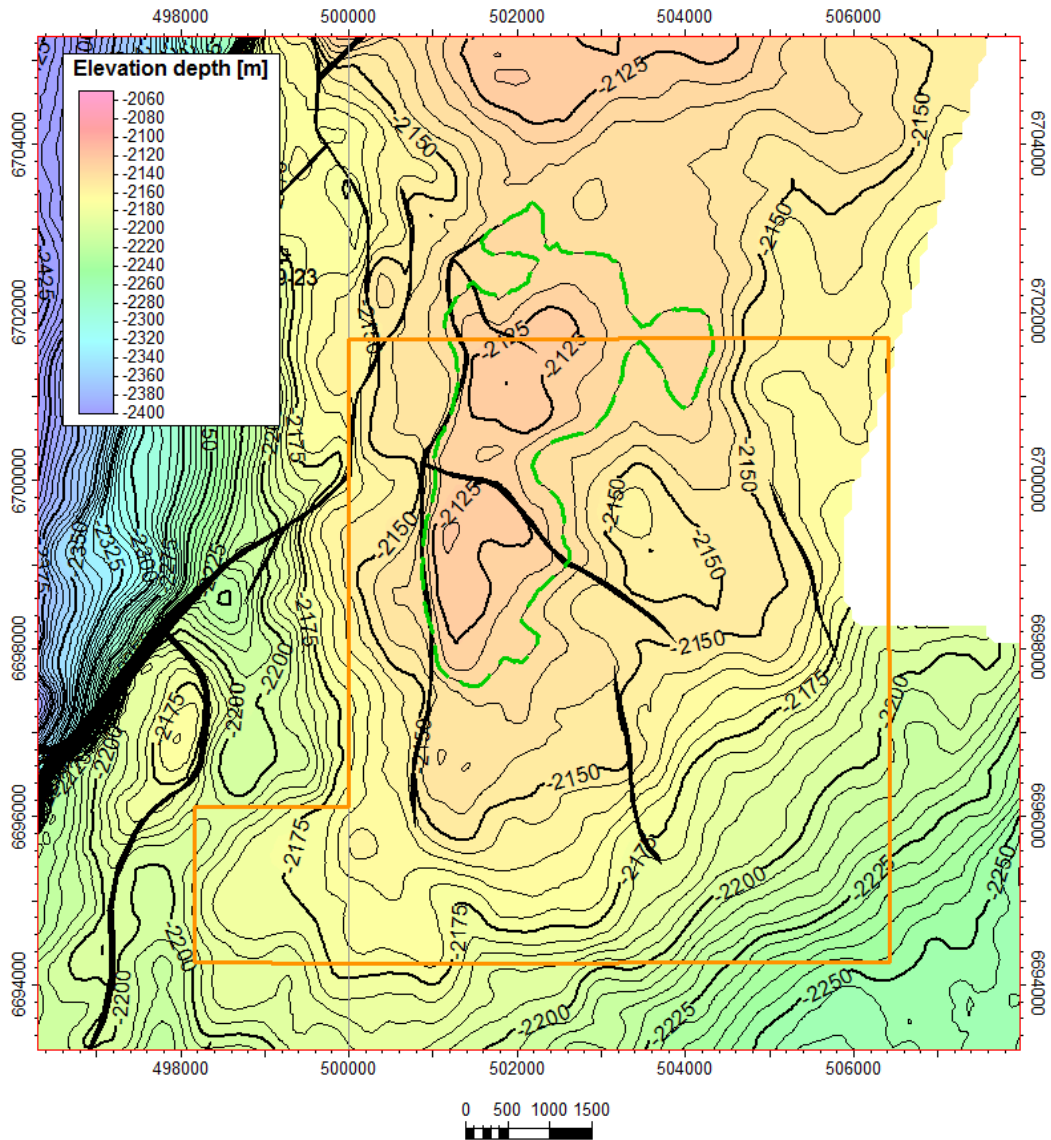


Fig. 8. Model 2 BCU depth map with 10 m contour interval. Closure in green. Constant velocity of 1593 m/s used in the shallow channel layer in this model.

The estimated chance of success for the Draupne/Sognefjord Yngling prospect is more than 20%, but the volumes are too small to be commercially interesting.

*Yngling stratigraphic trap:*

A potential stratigraphic trap with Sognefjord reservoir is defined as shown on figure 9. The presence of Sognefjord 5-series in the Yngling prospect area is model based; the erosional limit to the west is uncertain and the sand thickness is difficult to map as it is below seismic resolution in large parts of the license (Fig. 10). The stratigraphic trap is dependent on a lateral seal towards the northeast but sealing lithology at this level is not observed in the well 31/4-9. In addition migration into the trap from the west is difficult. Hence, the chance of success is estimated at less than 10%. A rough reserve estimate for this lead is  $10.4 \times 10^6 \text{ Sm}^3$ .

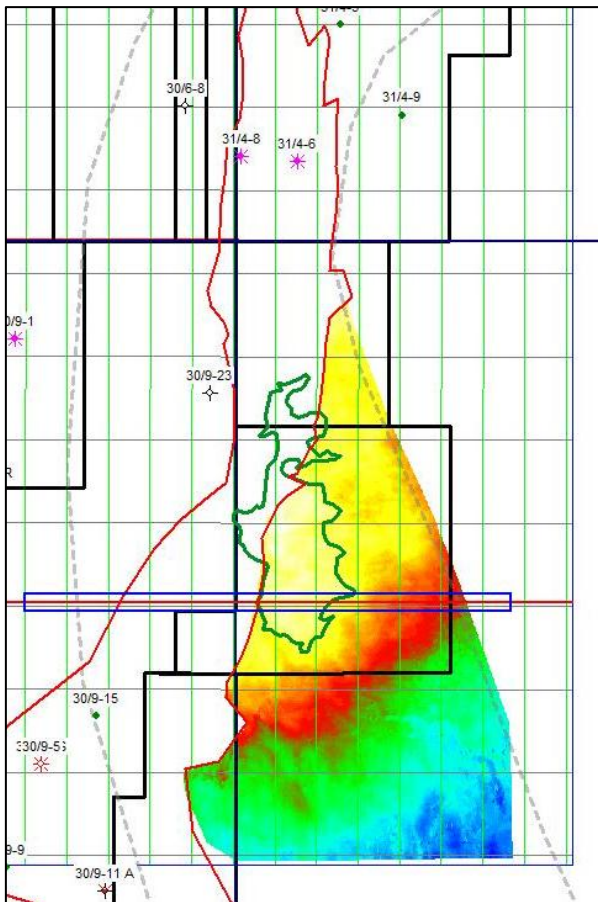


Fig. 9. Near Top Sognefjord TWT map showing tentative outline of stratigraphic trap.

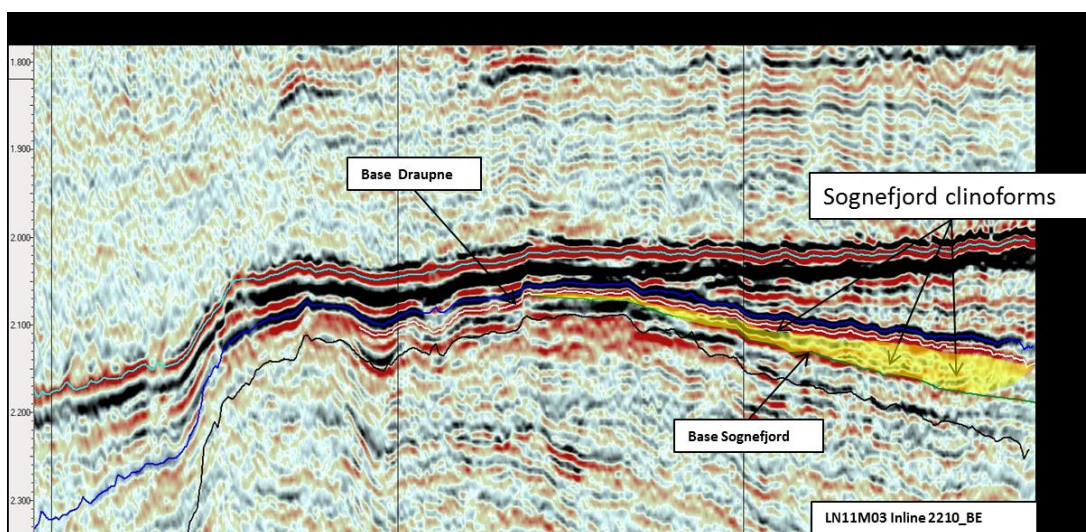


Fig. 10. Seismic line showing possible Sognefjord in yellow on seismic.