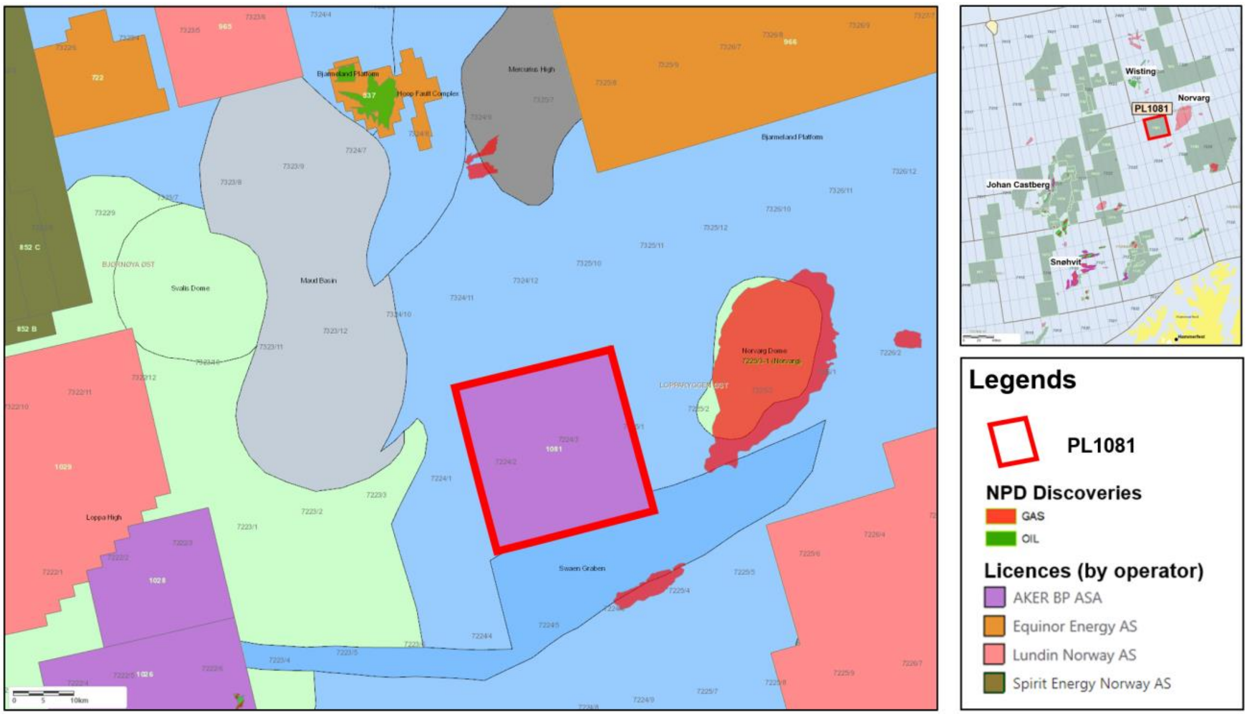
AkerBP

equinor

PL1081

Relinquishment Report



Relinquishment Report PL1081

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1 History of the production licence

The purpose of this report is to review the licence history and present an overview of the technical work and remaining prospectivity within the licence area (Fig. 1.1, Fig. 1.2). The acreage awarded in the APA2019 application round is located southeast of the Maud Basin on the Bjarmeland Platform, around 65 km S-SE of the Wisting Discovery (Fig. 1.1 and Fig. 1.2).

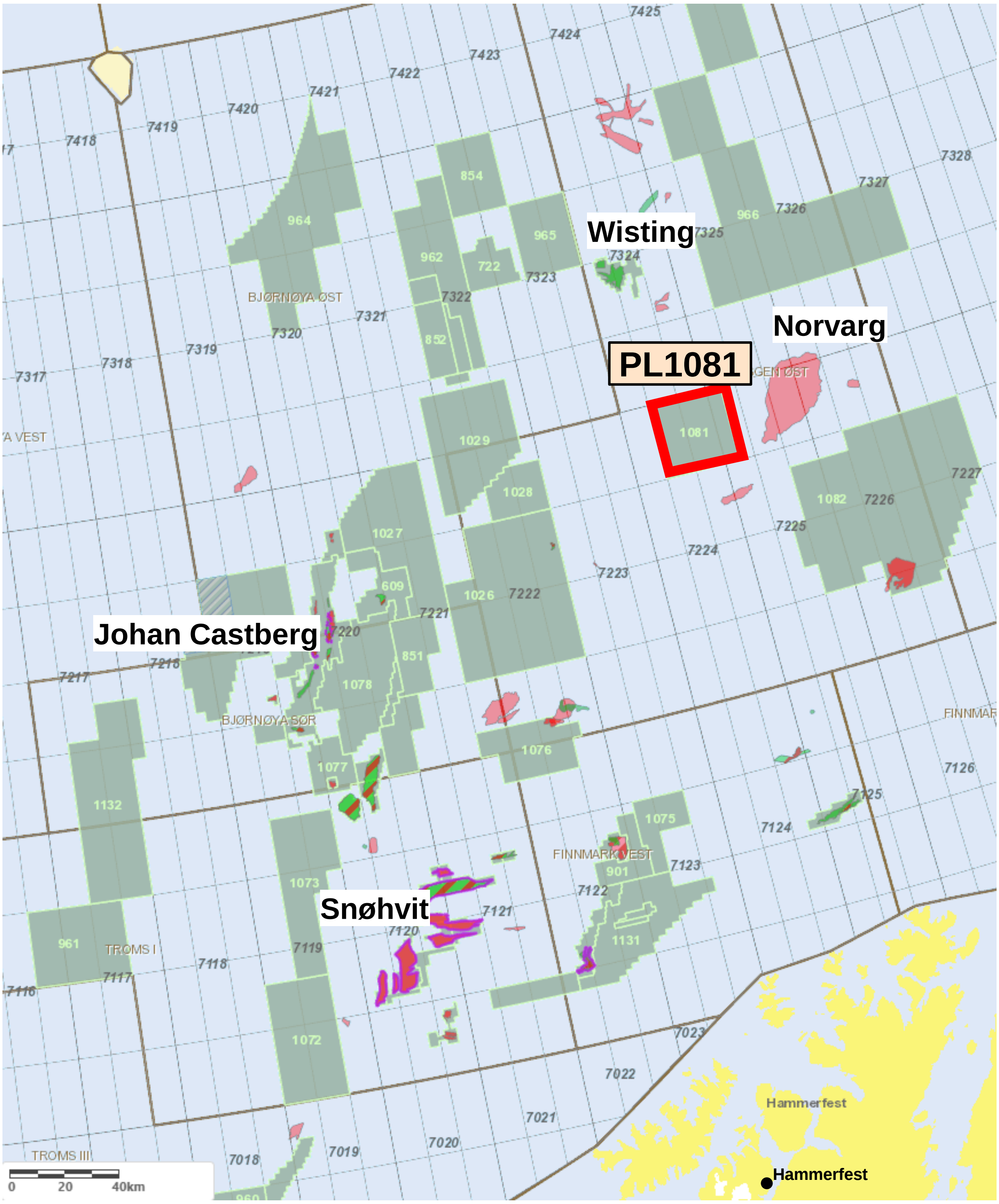


Fig. 1.1 PL1081 Location map. *June 2021*

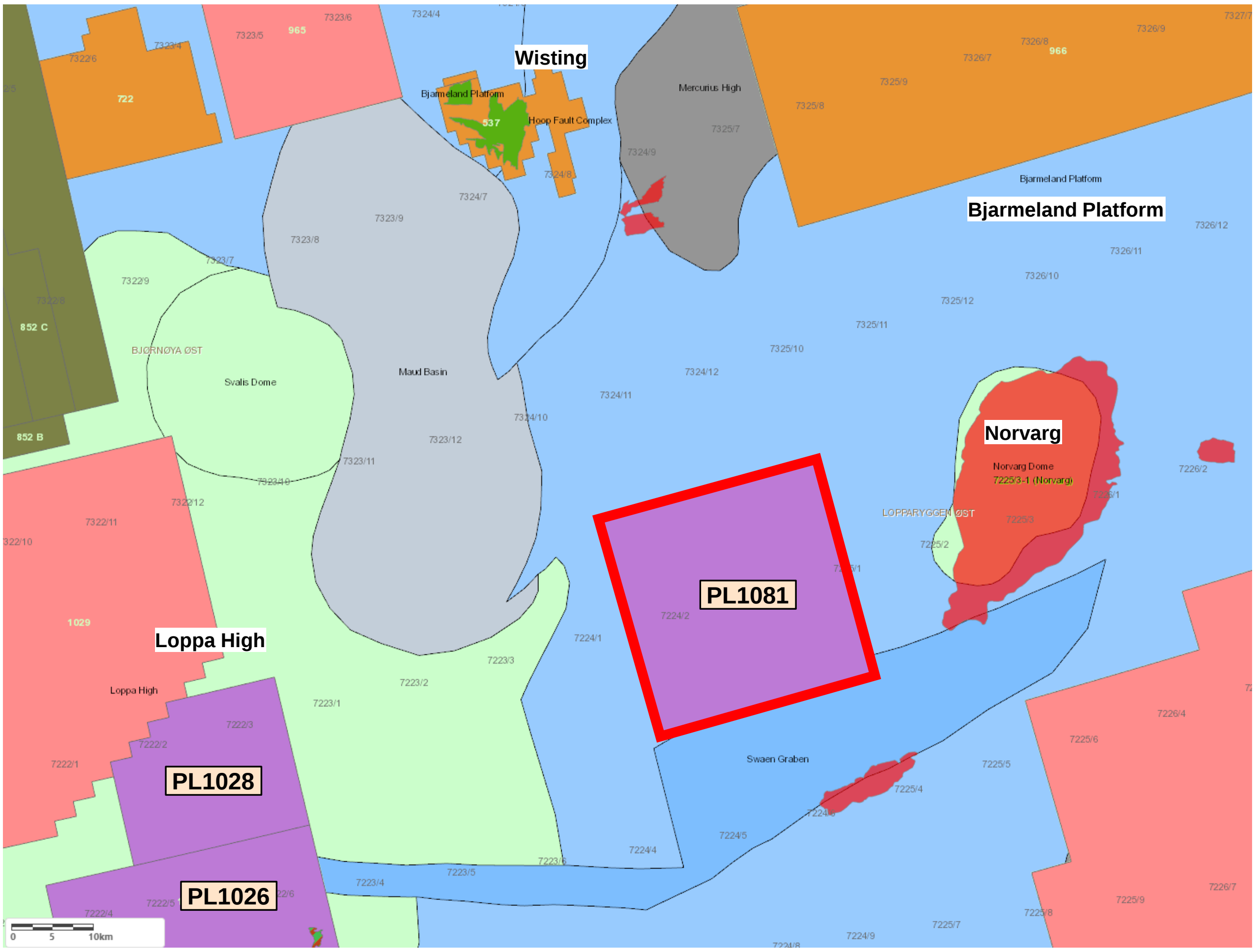


Fig. 1.2 Location and structural setting PL1081.

1.1 Licence History and Owners

In response to the invitation from the Ministry of Petroleum and Energy to apply for acreage in APA2019 application round, Aker BP ASA and Equinor ASA applied for a production licence covering blocks 7223/2 & 3 and parts of the block 7224/1 (Fig. 1.2 and Fig. 1.3). The APA2019 application was a follow-up of identified Kobbe prospectivity mapped in the neighboring PL1030 which revealed a huge, NW-SE oriented channel complex within the uppermost part of the Kobbe Formation. However, seismic interpretation proved that most of this channel complex was located in an area east of PL1030. Geophysical evaluation of this channel complex further increased the probability for presence of hydrocarbons and better reservoir properties in this eastern area compared to similar channel features mapped within the PL1030 acreage. Based on these encouraging observations Aker BP and AMI partner Equinor applied for this acreage in the APA2019 application round.

Additional prospectivity has later been mapped within the Snadd Formation (Ladinian) consisting of three segments (Storfjellet 1, 2 & 3) Fig. 1.3.

The stakeholders in PL1081 consists of:

- Aker BP ASA 60% (Operator)
- Equinor ASA 40%

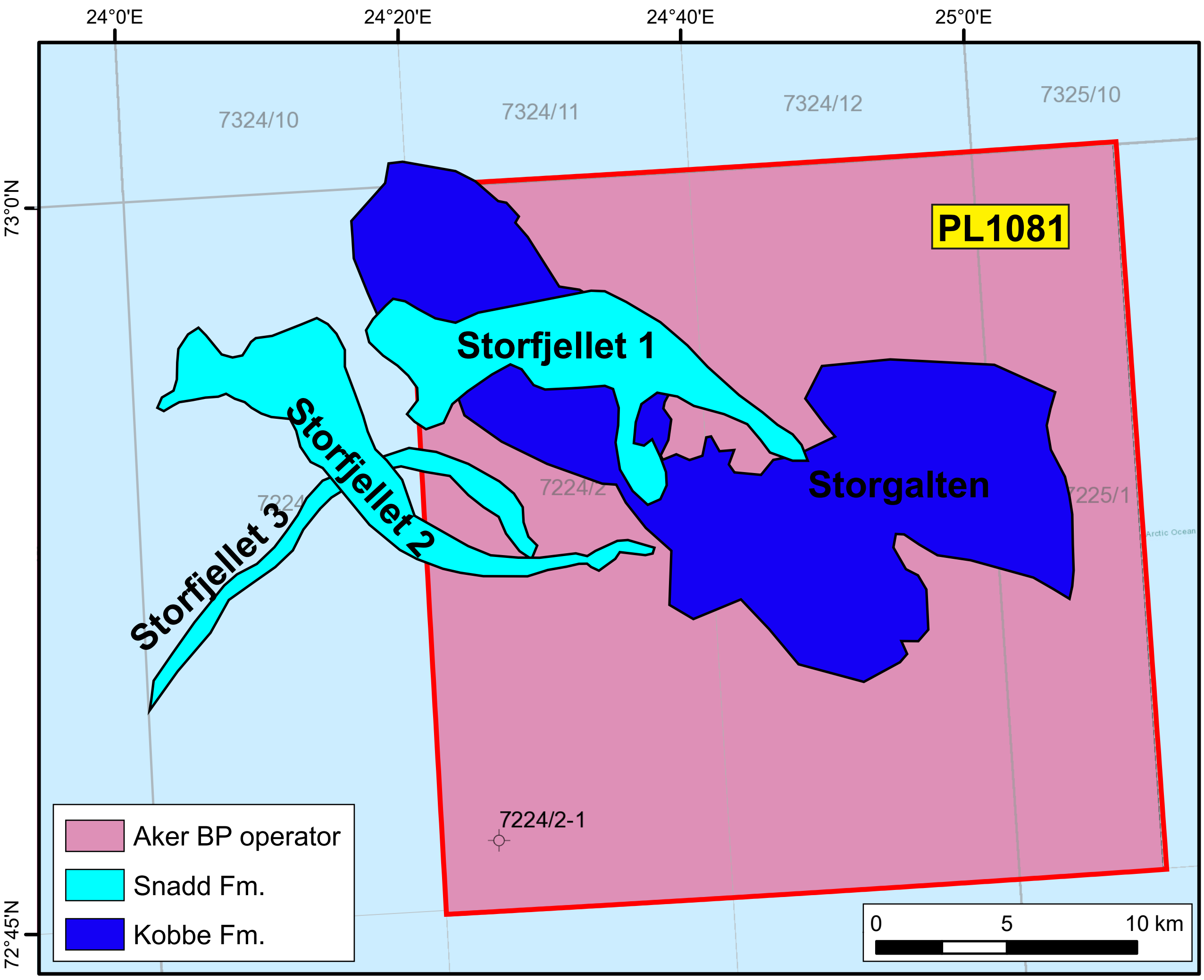


Fig. 1.3 Identified prospectivity in PL1081.

1.2 Award and Work Program

Award

The acreage covering PL1081 was awarded as part of the APA2019 round (14.02.2020) and covers an area of 764,496 km^2 involving blocks 7224/2 & 3 and 7225/1 (Fig. 1.2 and Fig. 1.3).

Work obligations

The work obligations were to perform geological and geophysical evaluation of the prospectivity and to decide to drill or drop within the **first year.** Given a decision to drill, the drilling commitment should be fulfilled within **3 years** from the award. A one-year extension of the original deadline was applied for in order to give the partnership ample time to further de-risk and mature the reservoir model of the Storgalten Prospect. An extension of 6 month was given.

During the licence period, three ECMC meetings and several internal Peer Assist/Peer Review were held by the operator (Table 1.1).

Table 1.1 Licence and internal meetings in PL1081.

Date	Activity	Description
2020		
14.02.2020	Licence awarded	As part of the Awards in Predefined Areas 2019
10.03.2020	ECMC meeting #1	Formal and administrative issues, Storgalten (Post APA work), common database proposal, work program and budget
23.04.2020	Internal Peer Review	Snadd prospectivity
19.08.2020	Internal Peer Review	Storgalten and Storfjellet prospects
08.09.2020	EC Work meeting	Storgalten Prospect (reservoir engineering screening and preliminary Technical-Economical evaluation)
01.12.2020	ECMC meeting #2	Storgalten and Storfjellet status and way forward.
2021		
15.02.2021	Extension of DoD deadline	Application for extension of DoD deadline. New deadline: 14.08.2021
25.03.2021	Internal Peer Assist	Storgalten and Storfjellet prospects
27.04.2025	Internal Peer Assist	Way forward towards DoD deadline
25.06.2021	ECMC meeting #3	License and exploration status

1.3 Identified Prospectivity

The focus within the licence acreage has been on the Middle Triassic Kobbe Play (brl,rm 5) and Upper Triassic Snadd Play (brl,rm 2) (Fig. 1.4 and Fig. 1.5).

Two prospects have been identified within the licence area:

1) Storgalten Prospect (Triassic Kobbe Play, Late Anisian).

2) Storfjellet Prospect (Triassic Snadd Play, Ladinian).

The main prospect, Storgalten (Late Aniaian Kobbe Fm.) has been thoroughly evaluated through rock physics modelling, seismic inversion and post inversion lithology-/fluid prediction modelling, using available seismic data as well as data from the nearby wells. Two conclusions can be drawn from these studies:

1) high chance of sand presence in the Storgalten Prospect,

2) hydrocarbon more likely than brine

However, empirical data show a high probability for low quality reservoir asosiatied with the Kobbe Formation and reservoir prediction and de-risking therefore challenging. Unfortunately, technical evaluation have not been able to reduce uncertainty related to reservoir quality in order to make a positive drill decision.

The prospectivity seen in the Jurassic and Cretaceous plays are very limited and unattractive. The identified prospectivity within PL1081 is shown in Fig. 1.3 and Fig. 1.4. A reservoir model with key stratigraphic surfaces is summarised in Fig. 1.6.

Triassic Kobbe Play - brl,rm-5

One prospect, Storgalten, was mapped in PL1081.

- Play: Triassic Kobbe
- Reservoir: Kobbe Fm, fluvial/deltaic/tidal SST
- Trap: Stratigraphic pinch-out
- Seal: Top seal is marine shales
- Source: Marine shales of Triassic age (Steinkobbe Fm)
- Risk: Reservoir quality and retention

Triassic Snadd Fm Play (Ladinian age) - bru-2

One prospect, Storfjellet, divided in 3 segments were mapped within PL1081.

- Play: Triassic Snadd Fm
- Reservoir: Snadd Fm, fluvial/deltaic/tidal SST of Ladinian age
- Trap: Stratigraphic pinch-out and structural trap
- Seal: Top seal is marine transgressive shales
- Source: Marine shales of Triassic age (Syeinkobbe Fm)
- Risk: Trap and seal. Reservoir quality

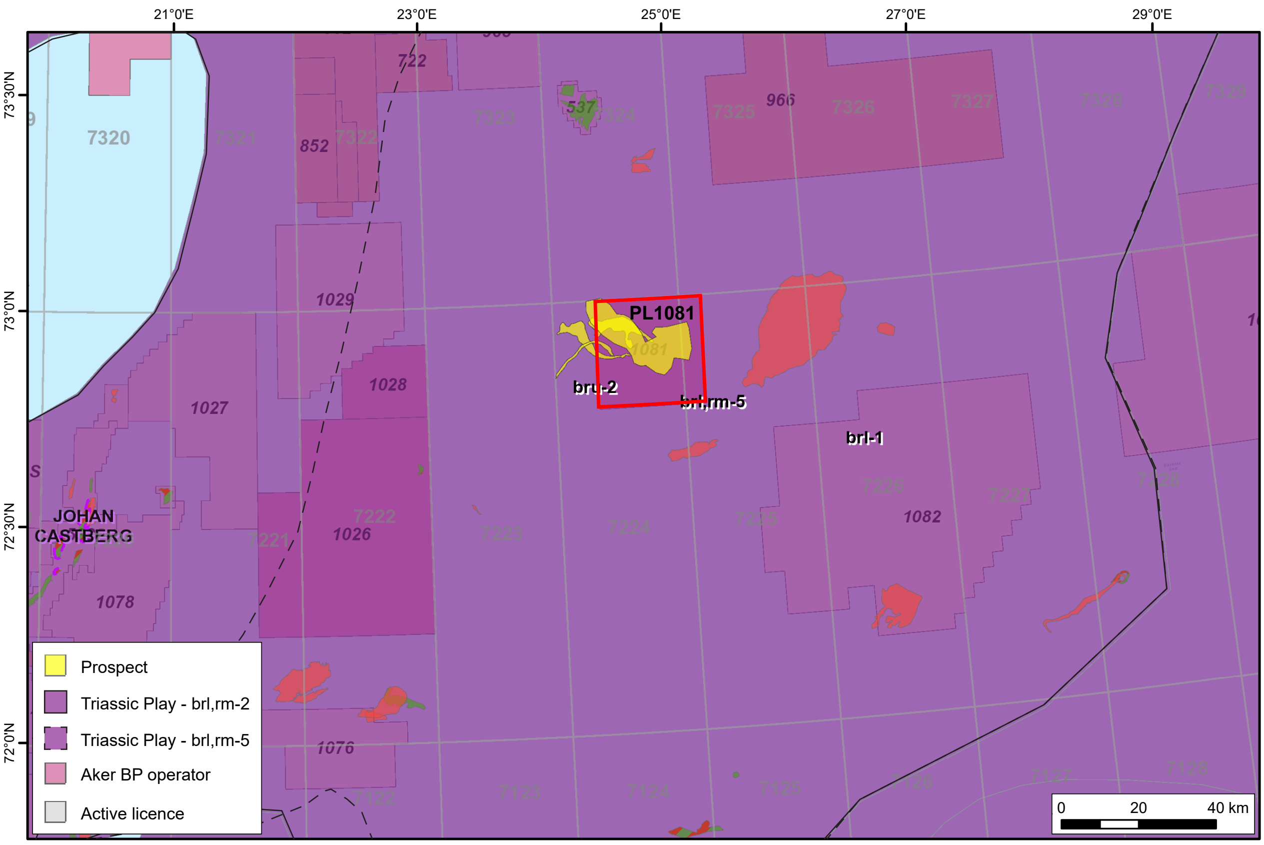


Fig. 1.4 Evaluated plays in PL1081. *Triassic Snadd Play (brl,rm 2) and Triassic Kobbe Play (brl,rm 5).*

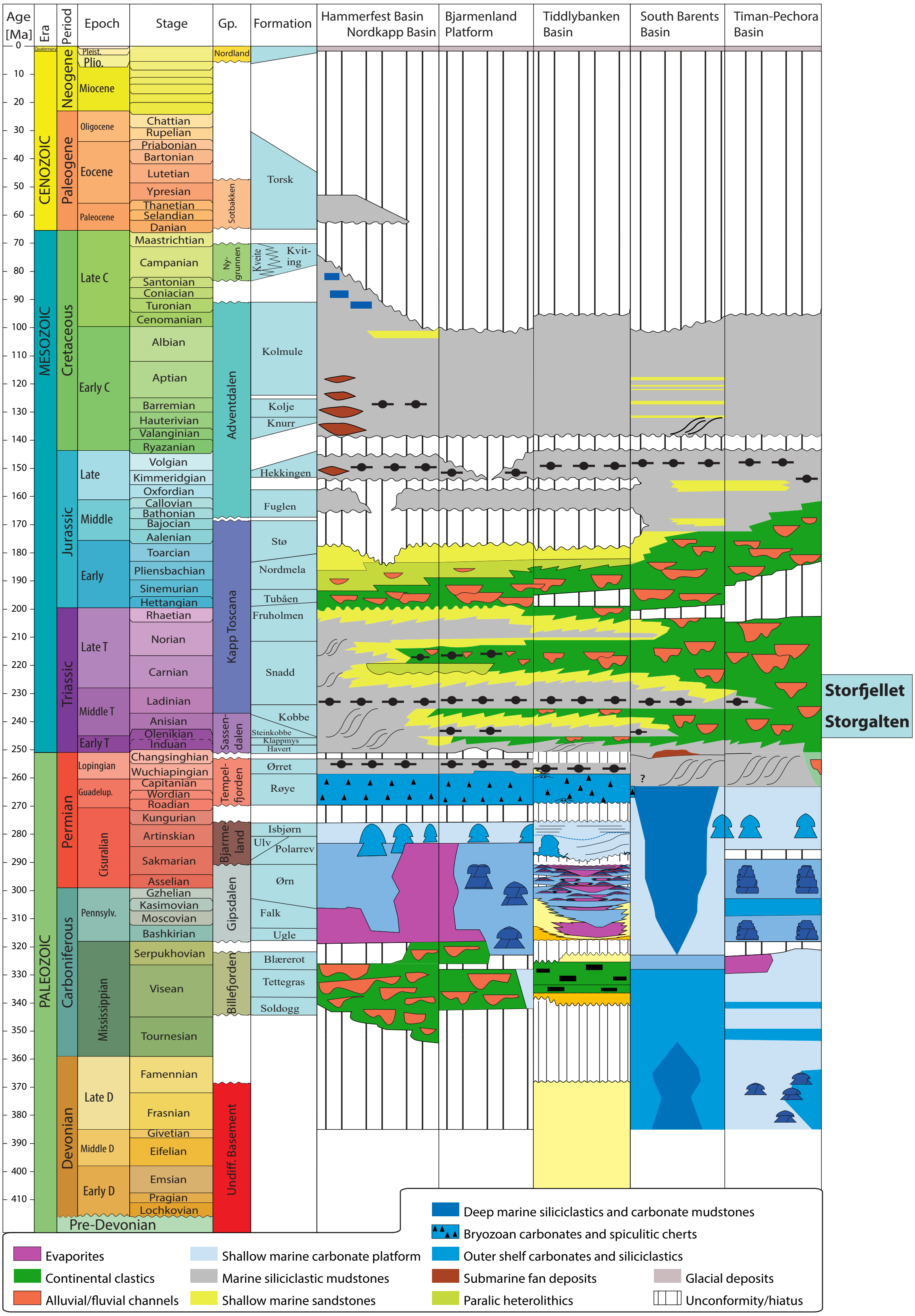


Fig. 1.5 Tectono-stratigraphic summary for the greater Barents Sea. *Chronostratigraphy and facies summary of the greater Barents Sea. The indicated lithostratigraphy applies to the Norwegian sector (modified from in-house data; Dalland et al. 1988; Dallmann 1999; Larssen et al. 2005; Henriksen et al. 2011a; Stoupakova et al. 2011).*

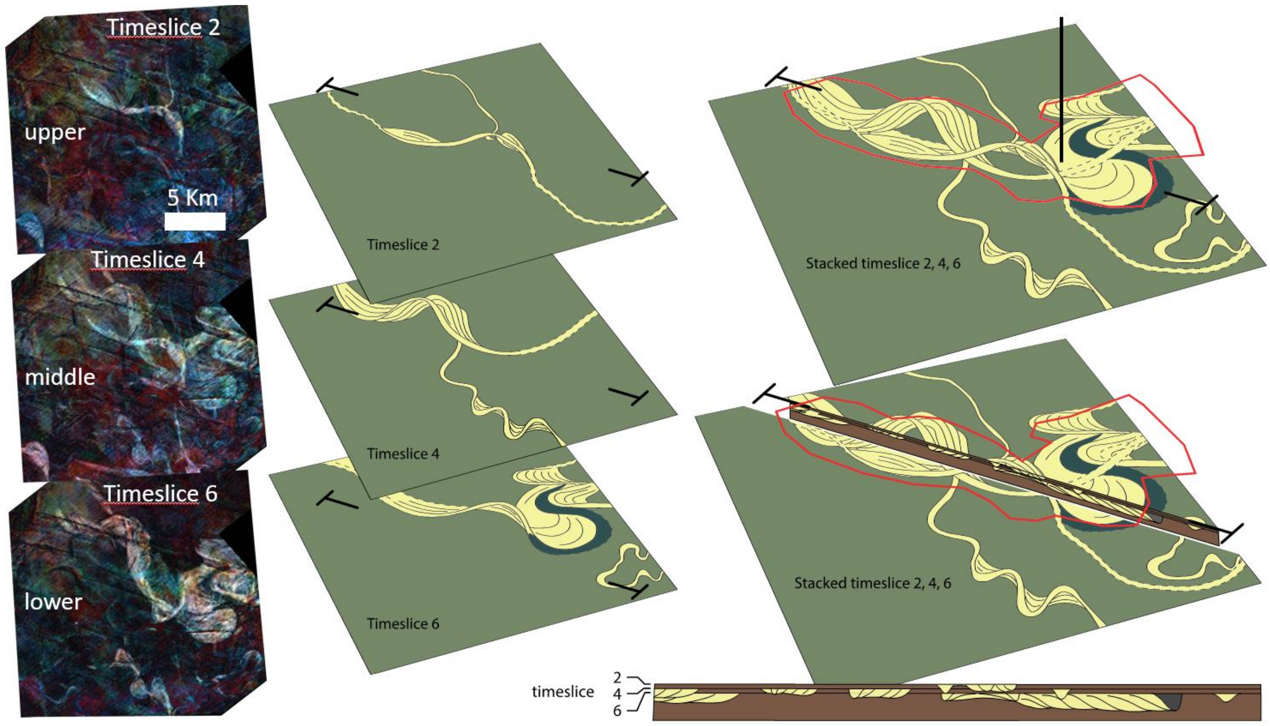


Fig. 1.6 Storgalten reservoir model. *Key uncertainties includes:*
Feature may be incisive trunk channel of strong regressive pulse (better reservoir?).
Feature may be composed of stacked distributary channels of smaller size (no significant energy increase?).
Tidal influence may have dampened energy in the channel (worse reservoir).
The relative influence of energy regime River/Tide/Wave-domination of delta at shoreline (significance is debated).
Sediment supply/load in the fluvial system may have been poor (Uralian sand quality) (possible non-reservoir sand to begin with).

2 Database overviews

2.1 Seismic Database

The seismic database comprises a selection of 2D and 3D seismic data (Table 2.1 and Fig. 2.1). The database has served as a solid foundation in the evaluation of the licence prospectivity. The 3D surveys WIN12003, DOL 14001R16 and 2D regional lines NBR06-12 provide the basis for all interpretations and evaluations of the Storgalten and Storfjellet prospects in PL1081 area.

Table 2.1 Seismic database.

Name	Type	Year of acquisition	Offset Data	Comment	NPDID
WIN12003	3D	2012	yes	Main seismic volume	7615
DOL14001	3D	2014	yes	Regional mapping	8006
GDF1201M13	3D	2013	yes	Regional mapping and well-tie	7593
SG9804	3D	1998	no	Regional mapping and well-tie	3941
BG1002	3D	2010	yes	Regional mapping	7276
SG9803STR09	3D	1998	yes	Regional mapping and well-tie	3940
DG12M1	3D	2012	yes	Regional mapping and well-tie	
WG14001	3D	2012	yes	Regional mapping	8017
BST4	3D	2010	yes	Regional mapping	
ST10M01	3D	2010	no	Regional mapping	
NH0608	3D	2006	yes	Regional mapping	4367
ST0828	3D	2008	no	Regional mapping	4615
HOOP 3D Complete	3D	2016	yes	Regional mapping	7424
NBR06RE11	2D	2006	yes	Regional mapping	4365
NBR07RE09	2D	2007	yes	Regional mapping	4451
NBR08	2D	2008	yes	Regional mapping	4573
NBR09RE11	2D	2009	yes	Regional mapping	
NBR10	2D	2010	yes	Regional mapping	7219
NBR11	2D	2011	yes	Regional mapping	7408
NBR12	2D	2012	yes	Regional mapping	7579

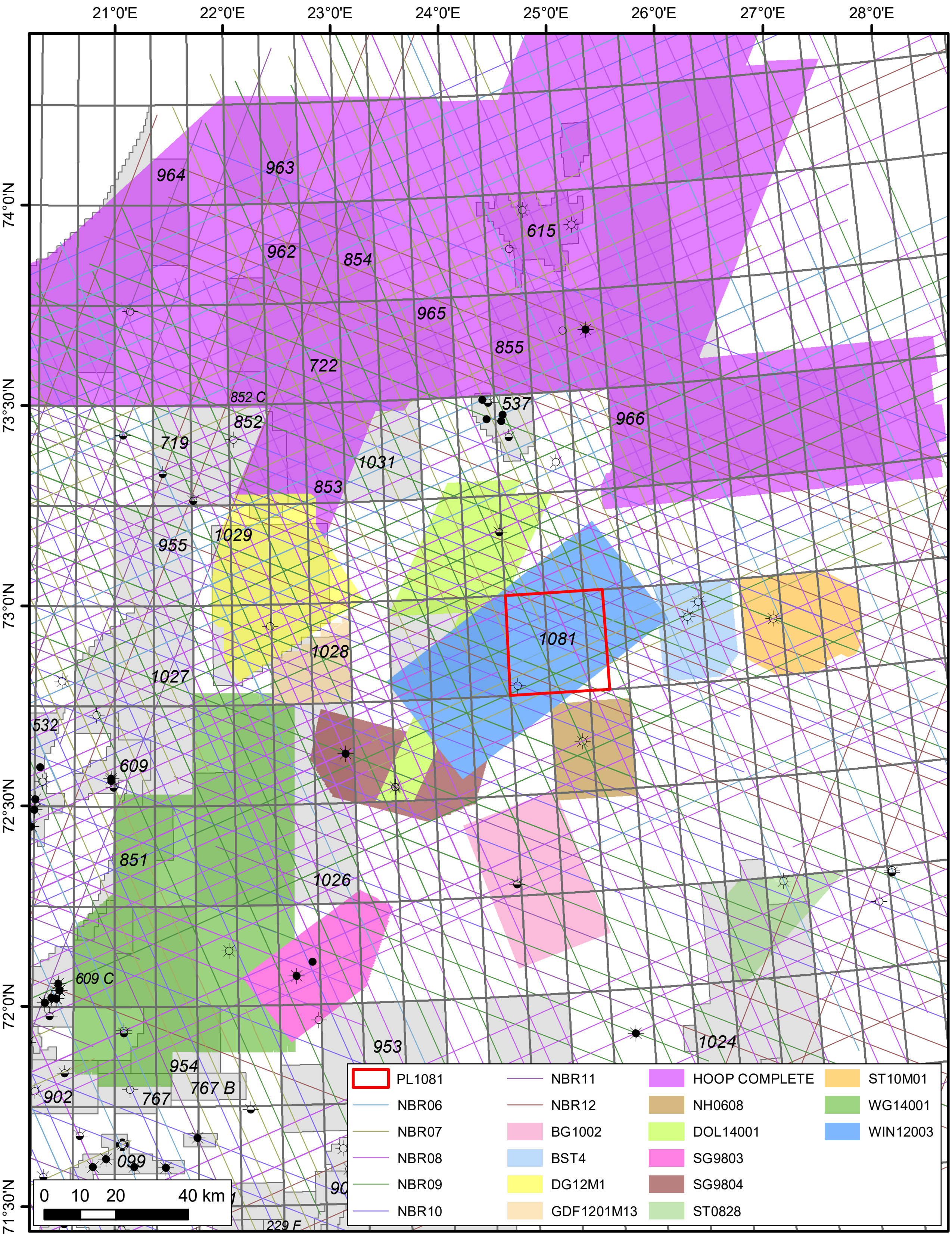


Fig. 2.1 2D and 3D seismic database.

2.1.1 Post-migration Seismic Conditioning

Seismic conditioning was necessary to fit the seismic data for AVO and seismic inversion. This work was performed by Sharp Reflections, with thorough supervision from the operator. Starting with raw migrated gathers (Fig. 2.2), the aim of the seismic conditioning was to increase signal/noice, improve the stacking velocities, balance the frequency spectre over the offset range and increase the vertical resolution. Improved data quality and increased stratigraphic and structural confidence was the result from the careful well-driven modelling and QC (Fig. 2.3)

[redacted]

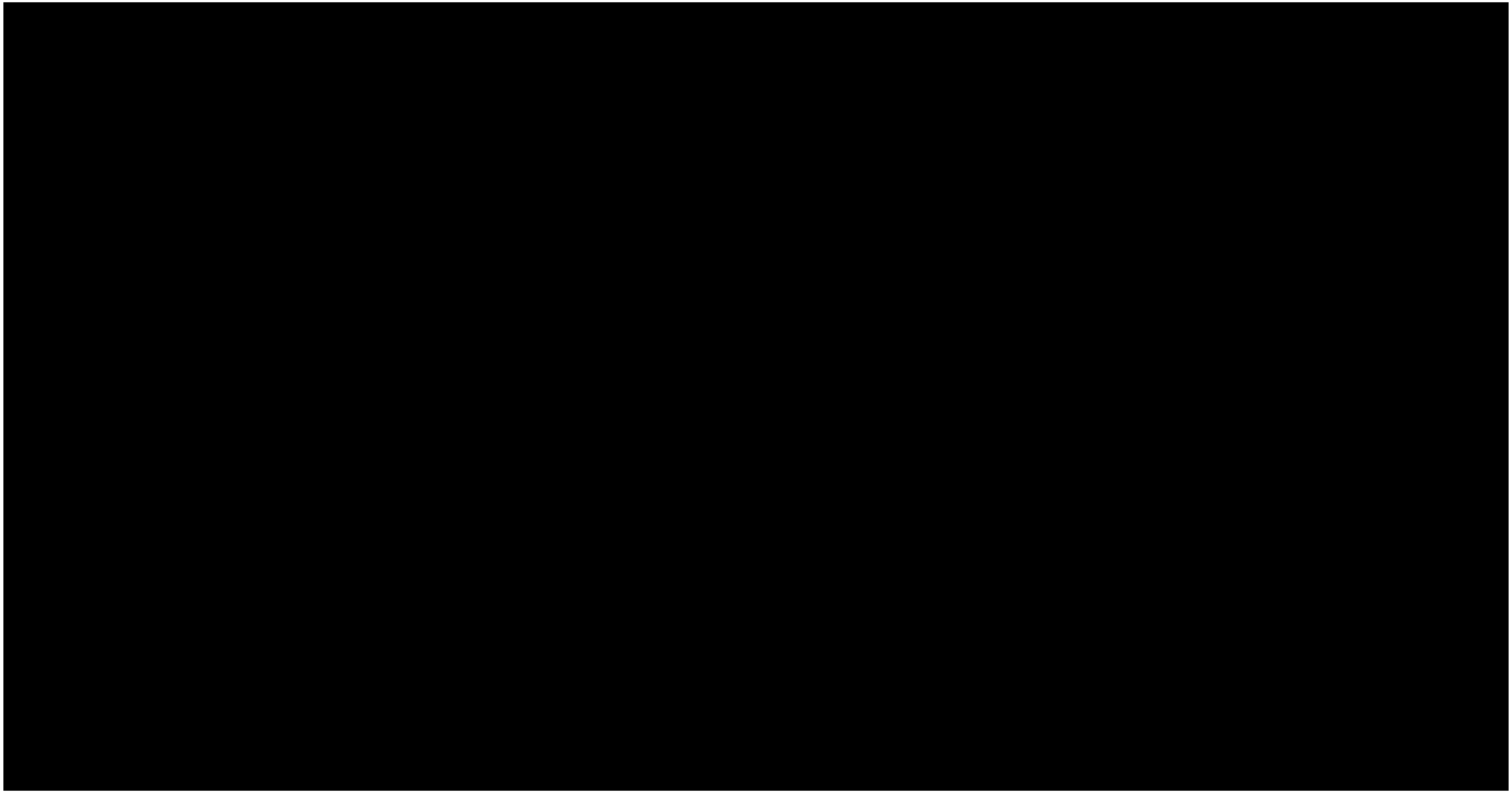


Fig. 2.2 Post Migration Gathers: RAW.

[redacted]

Fig. 2.3 Post Migration Gathers: CONDITIONED GATHERS. *Conditioned gathers (angle mute: 0-60 deg).*

Absolute Seismic Inversion

The seismic conditioned gathers (Fig. 2.3) were stacked in angle ranges of 5 degrees, from 5-60 deg. This served as input for the pre-stack probabilistic seismic inversion. After a thorough parameter testing the angle range for the seismic inversion was set to 7-35 degrees (mid angles). See Fig. 2.4 for more detailed parametrization, and Fig. 2.5 and Fig. 2.6 for the main output attributes from the seismic inversion, MuRho and LambdaRho, respectively.

Aker BP has also performed an in-house processing/conditioning on 2D seismic data angle stacks in order to optimise frequency content and address gather flatness issues. Amplitude preservation is a key element throughout this processing workflow.
The following workflow were applied to the seismic data:

<u>2D seismic line, NBR10-345014:</u>

- All angle stacks went through:
  - Bandwidth matching process
  - Trim Statics, with max 8 ms for the ultra far angle stack (very conservative approach)
  - Int/Gradient: Using Near (0-15°) and Far angle stacks (25-25°)
  - Using Int/Grad , Elastic Impedance analysis was performed for a range of Chi angles. As a result:
    - EEI 10° was chosen as anomaly cube.
    - EEI -65° was chosen as lithology cube.

[redacted]

Fig. 2.4 Seismic Inversion Parameters. *1) Top Intra Snadd is not included in the LF model. 2) Angles from 7 to 37 degrees are used as input to the inversion.*

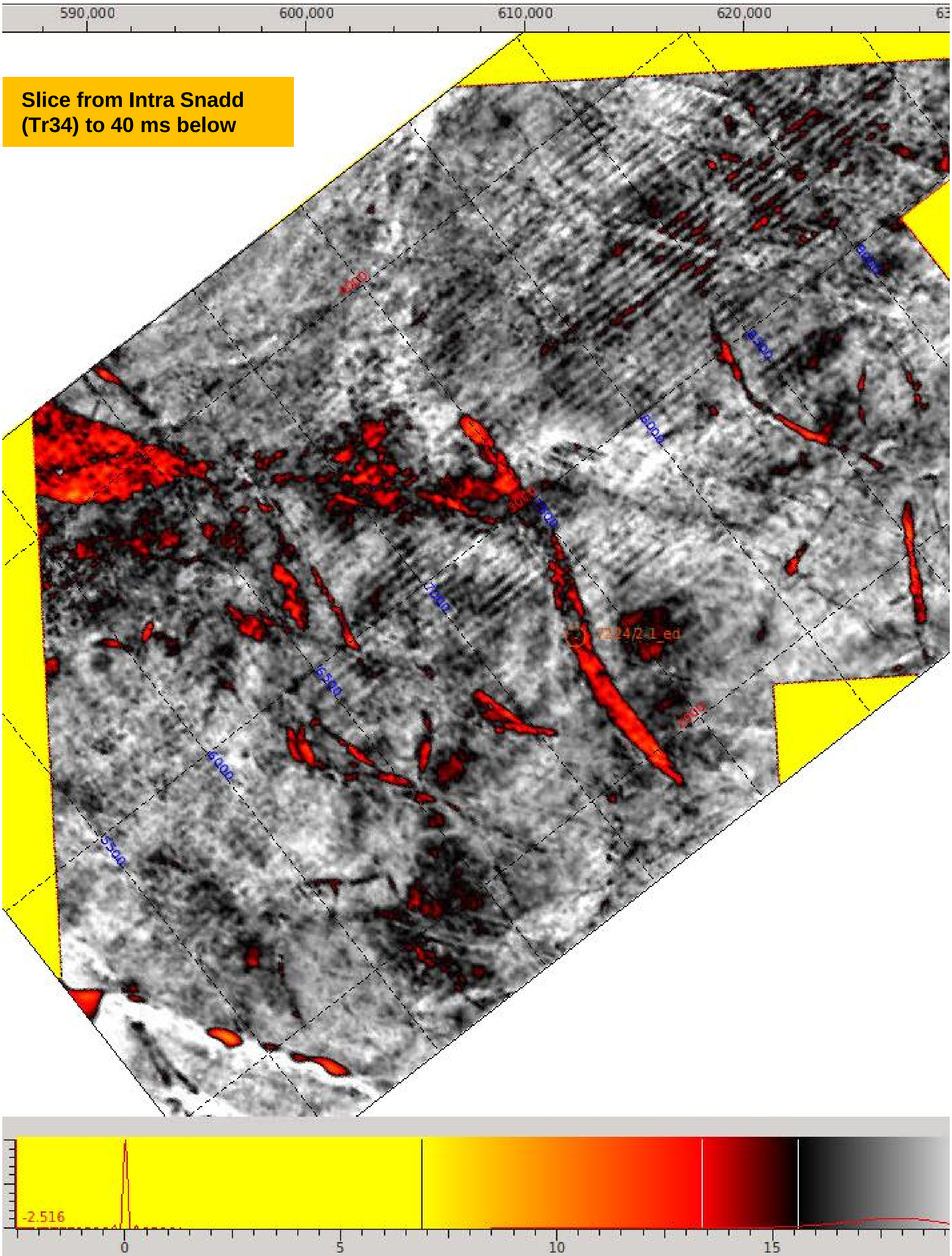


Fig. 2.5 Attribute from seismic inversion: MURHO

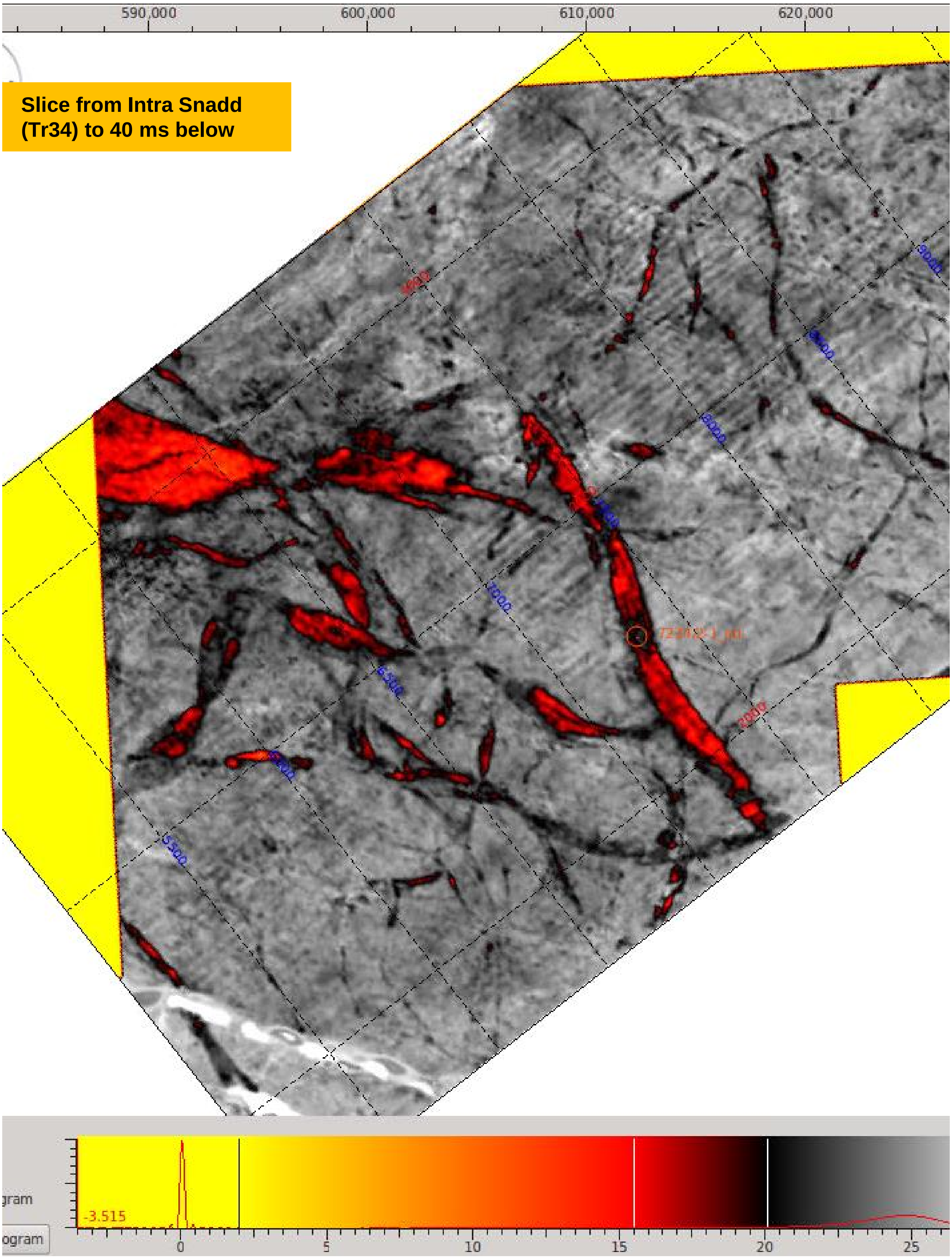


Fig. 2.6 Attribute from seismic inversion: LAMDARHO

2.2 Well Data

The exploration wells included in the geological and geophysical evaluation are displayed in Fig. 2.7 and listed in Table 2.2.

The well database has been used for generating the stratigraphic framework for the Kobbe and Snadd formations with focus on reservoir distribution and quality as well as hydrocarbon saturation and seal potential. Well data have also been used to build a semi-regional understanding of the petroleum system. Nearby wells such as 7225/3-1 (Norvarg 1), 7225/3-2 (Norvarg 2), 7222/11-2 (Langlitinden), 7222/1-1 (Aurelia), and 7224/2-1 (Kvalross) have been of particular importance for evaluation of the Kobbe depositional system, in addition to evaluating Triassic source rock potential and performing geophysical studies such as seismic inversion and post inversion lithology-/fluid prediction modelling.

Table 2.2 Well database. Key wells highlighted.

Well	NPDID	Location	Operator	Year	Content	TD (mMD)	TD stratigraphy
7222/1-1	**7987**	**Aurelia**	**ENI Norge AS**	**2016**	**dry**	**2400**	**Røye Fm**
7222/6-1 S	5755	Obesum I	StatoilHydro AS	2008	oil/gas	2895	Havert Fm
7222/11-1T2	5916	Caurus	StatoilHydro AS	2008	oil/gas	2658	Kobbe Fm
7222/11-2	**7317**	**Langlitind**	**Det norske oljeselskap ASA**	**2014**	**oil/gas**	**2918**	**Klappmyss Fm**
7223/5-1	5960	Obesum II	StatoilHydro AS	2008	gas	2549	Klappmyss Fm
7224/2-1	**7870**	**Kvalross**	**Wintershall Norge AS**	**2016**	**dry**	**2944**	**Havert Fm**
7324/10-1	1411	Alfa	Den norske stats oljeselskap a.s	1989	shows	2919	Havert Fm
7325/4-1	8211	Gemini Nord	Statoil Petroleum AS	2017	oil/gas	1178	Snadd Fm
7323/07-U-03			IKU Petroleumsforskning SINTEF	1986	scientific	551	Klappmyss Fm
7225/3-1	**6587**	**Norvarg 1**	**Total Norge AS**	**2011**	**gas**	**4150**	**Isbjørn Fm**
7225/3-2	**7149**	**Norvarg 2**	**Total Norge AS**	**2013**	**gas**	**2210**	**Kobbe Fm**
7226/2-1	5807	Ververis	StatoilHydro AS	2008	gas	2992	Havert Fm
7224/6-1	5835	Arenaria	StatoilHydro AS	2008	gas	2338	Kobbe Fm
7224/7-1	1245		Den norske stats oljeselskap a.s	1988	shows	3067	Havert Fm
7226/11-1	1177		Den norske stats oljeselskap a.s	1987	gas	5200	Basement

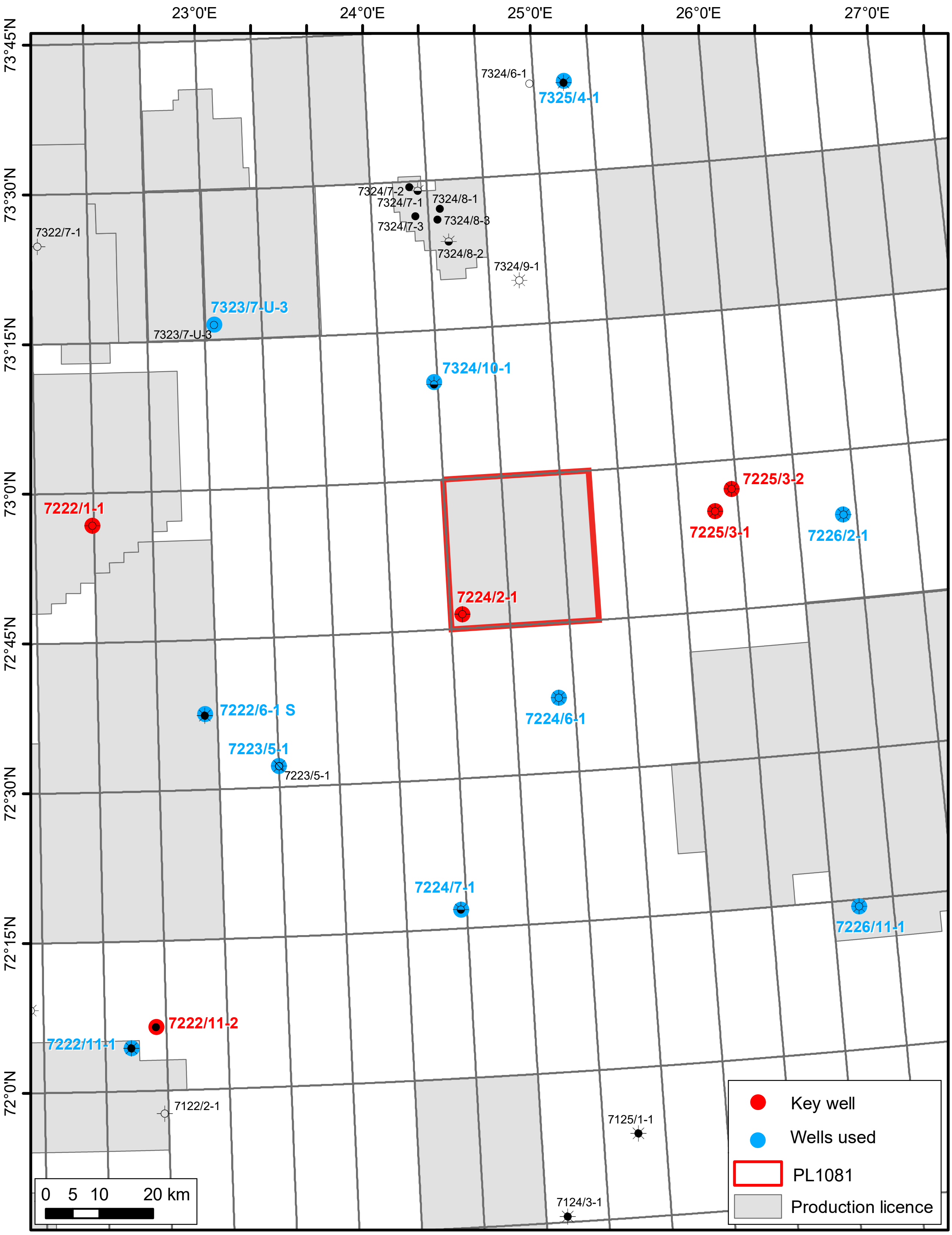


Fig. 2.7 Well database. *Key wells highlighted in red.*

3 Results of Geological and Geophysical Studies

Pcube

Pcube (Røe & Hauge) calculates probabilities for different lithology-fluid classes from seismic data and geological knowledge. The method combines stochastic rock physics relations between the elastic parameters and the different lithology-fluid classes (Avseth et al., 2005), with the results from a fast Bayesian seismic simultaneous inversion from seismic data to elastic parameters (Buland & More, 2004). Thus, it enables the maximum synergy integrating knowledge generated by different subsurface disciplines.

The process involves the following major steps:

- Define a lithology-fluid class dictionary & Simultaneous inversion of Angle stacks.
- Compute the probability for each of the lithology-fluid classes in the dictionary at every point in the subsurface.

Fuzzy logic

Fuzzy logic is an extension of conventional Boolean logic developed to handle the concept of partial truth. These values are those between completely truth and false values (Lotfi Zadeh, 1965). Fuzzy logic deals with the grey area between the simplified true or false value. In fuzzy logic the truth exists on a sliding scale. Also, because of the uncertainties in measurement and interpretation, a grey scale can be more useful explanation than the two end points (Cuddy, 1998). To quantify the greyness of the data, probability theories shouldbe used. Given an event has several outcomes, obtained from measurement or interpretations, the fuzzy logic assigns a probability (fuzziness) to each outcome. In addition, the obtained data would contain some measurement error. The fuzzy logic procedure combines the probabilities and predicts that some events are more likely than others. The fuzzy possibility of measured quantity x belonging to lithofacies type f (Cuddy, 1998) is defined as:

$$F(x_f) = e^{-(x-\mu_f)^2/2\sigma_f^2}$$

Fig. 3.1 Equation 1 (Cuddy, 1998).

This process is repeated for several attribute cubes (e.g. Vp/Vs, Density, etc). At this point we have several fuzzy possibilities. The fuzzy possibilities are combined harmonically to give a combined fuzzy possibility:

$$\frac{1}{c_f} = \frac{1}{F(x_f)} + \frac{1}{F(y_f)} + \frac{1}{F(z_f)} + \cdots$$

Fig. 3.2 Equation 2.

This process is repeated for each of the *f* lithofacies types. The lithofacies that is associated with the highest combined fuzzy possibility is taken as the most likely lithofacies for that set of logs. In addition, to prevent forcing data to match “the most likely” lithofacies at any price, an additional test is implemented into the algorithm. The additional tests if the sample x, now assigned to the “the most likely” lithofacies, is further than 3 standard deviation away from the mean value(s) of those classes. If the test is truth, then the “the most likely” lithofacies is set to 0, i.e. undefined. Otherwise, the “the most likely” lithofacies is accepted, and the procedure continues for the next sample in the attribute cubes.

Lithology-Fluid classification

The reservoir interval used in the Litho-fluid classification is based on the Kobbe Fm from 7225/3-2 & 7224/2-1 wells. The number of classes and their statistical moments are identical in both Pcube as well as in the fuzzy logic approach.

Pcube process generates several Probability and Combined probability data, which are used to generate miscellaneous attributes and maps. In addition, the following maps were produced:

- HC map.
- Sand (Brine+HC) Map.

Fig. 3.3 displays the probability maps for Sand & HC for Pcube and Fuzzy logic methodologies. These maps (Pcube & Fuzzy) predicts a higher chance of sandy facies in the eastern area (i.e., PL1081) than in the western area (i.e., former PL1030), and further, hydrocarbons are more likely than brine.

Reservoir characterization studies - Kobbe Prospect

The main prospect in the nearby relinquished PL1030 named Kobbe Prospect and Storgalten in PL1081 were evaluated in parallel. The evaluation of these two prospects has revealed a higher chance of success for the Storgalten prospect with respect to reservoir quality and volume potential. Litho/fluid prediction studies resulted in the following conclusions for the Storgalten Prospect:

- Pcube/Fuzzy predicts sandy facies in Storgalten (similar to what is seen on amplitudes on reflection data)
- Hydrocarbons more likely than brine
- Hydrocarbon response is more pronounced towards the Southeast (deeper on structure)
- Different fluid response on Storgalten indicates changes in reservoir parameters and/or reservoir thickness rather than fluids
- Difficult to separate oil and gas.
  - Variation in geology overprint oil vs gas response.
  - Mostly gas response according to Pcube classification
  - Mostly oil response according to Fuzzy classification.

AVO studies

A fluid substitution and AVO analysis has been performed on data from well 7225/3-2 (Norvarg) with focus on the upper channel sand within the Kobbe Fm interval (Fig. 3.4). In a geological setting similar as Norvarg, an oil filled channel sand will be characterized with a class 2 signature, seen as a weak soft response on near stack data and soft brightening on far stack data. A gas filled reservoir will be significant brighter on near and far stack data corresponding to a class 3 AVO response.

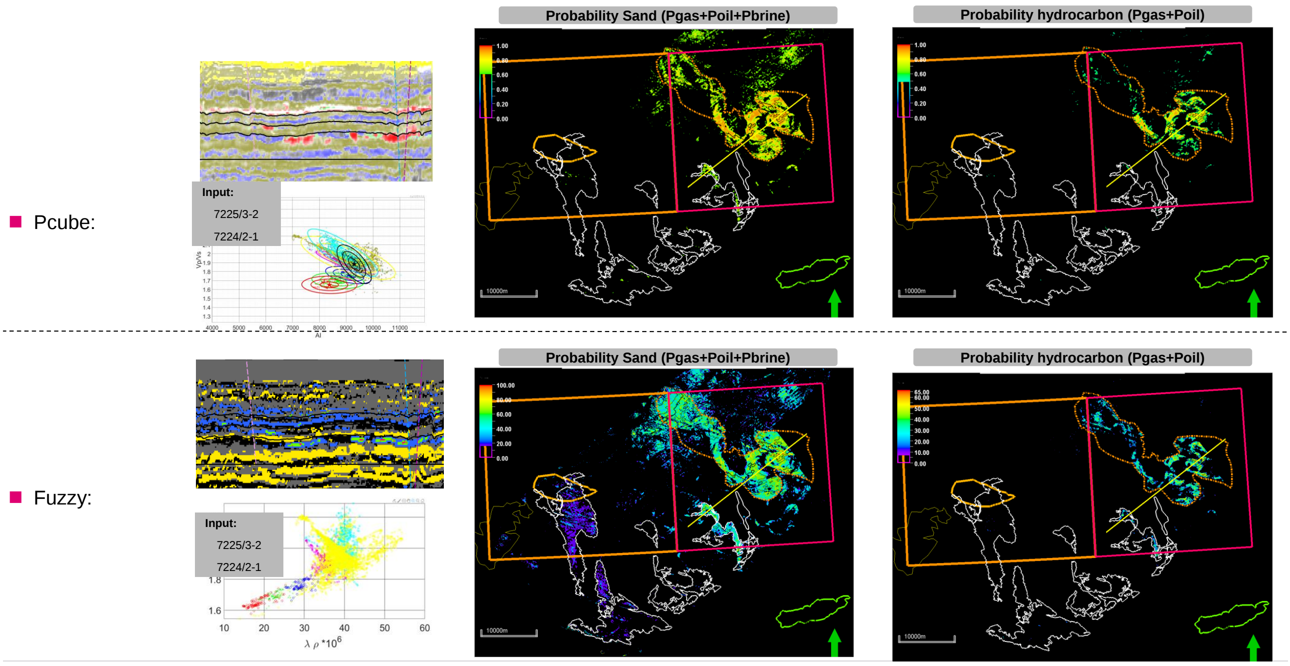


Fig. 3.3 Probability maps.
Higher chance of better reservoir quality in the Storgalten Prospect in the east compaired to channel in the west. Hydrocarbon response is also higher in the east (i.e., hydrocarbons are more likely than brine)

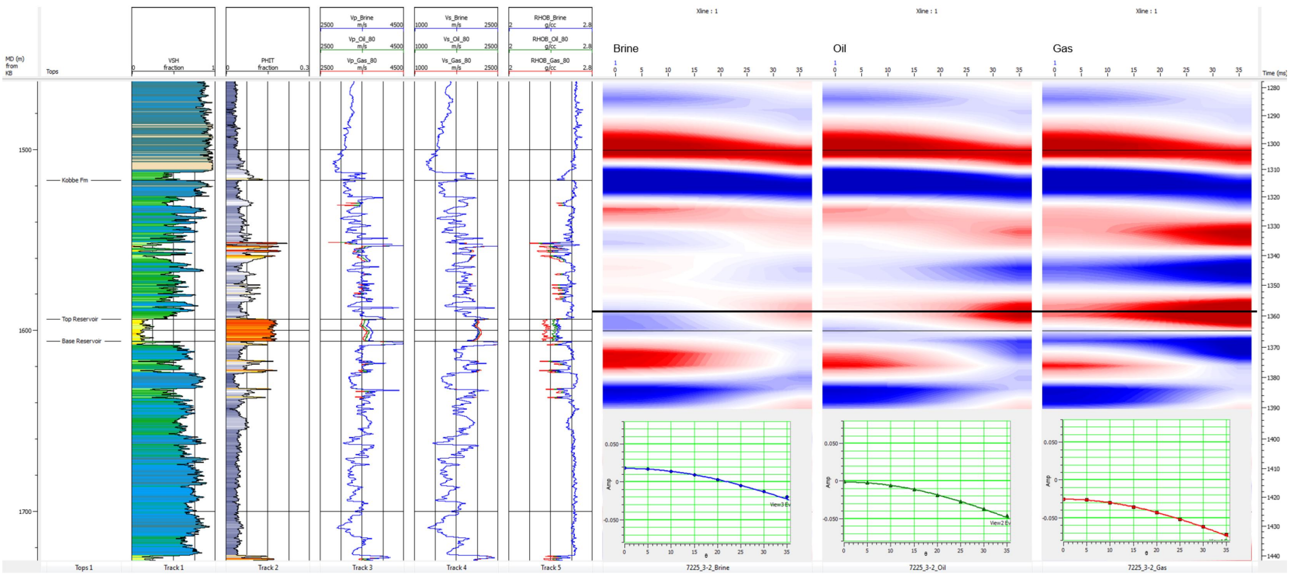


Fig. 3.4 Fluid substitution and AVO analysis for well 7225/3-2.

4 Prospect Update Report

The main focus within the licence acreage has been on the Middle Triassic Kobbe Play and Upper Triassic Snadd Play (Fig. 1.4, Fig. 1.5 and Fig. 4.1).

Two prospects have been identified within the licence area:

1) Storgalten Prospect (Triassic Kobbe Play, Late Anisian)

2) Storfjellet Prospect (Triassic Snadd Play, Ladinian)

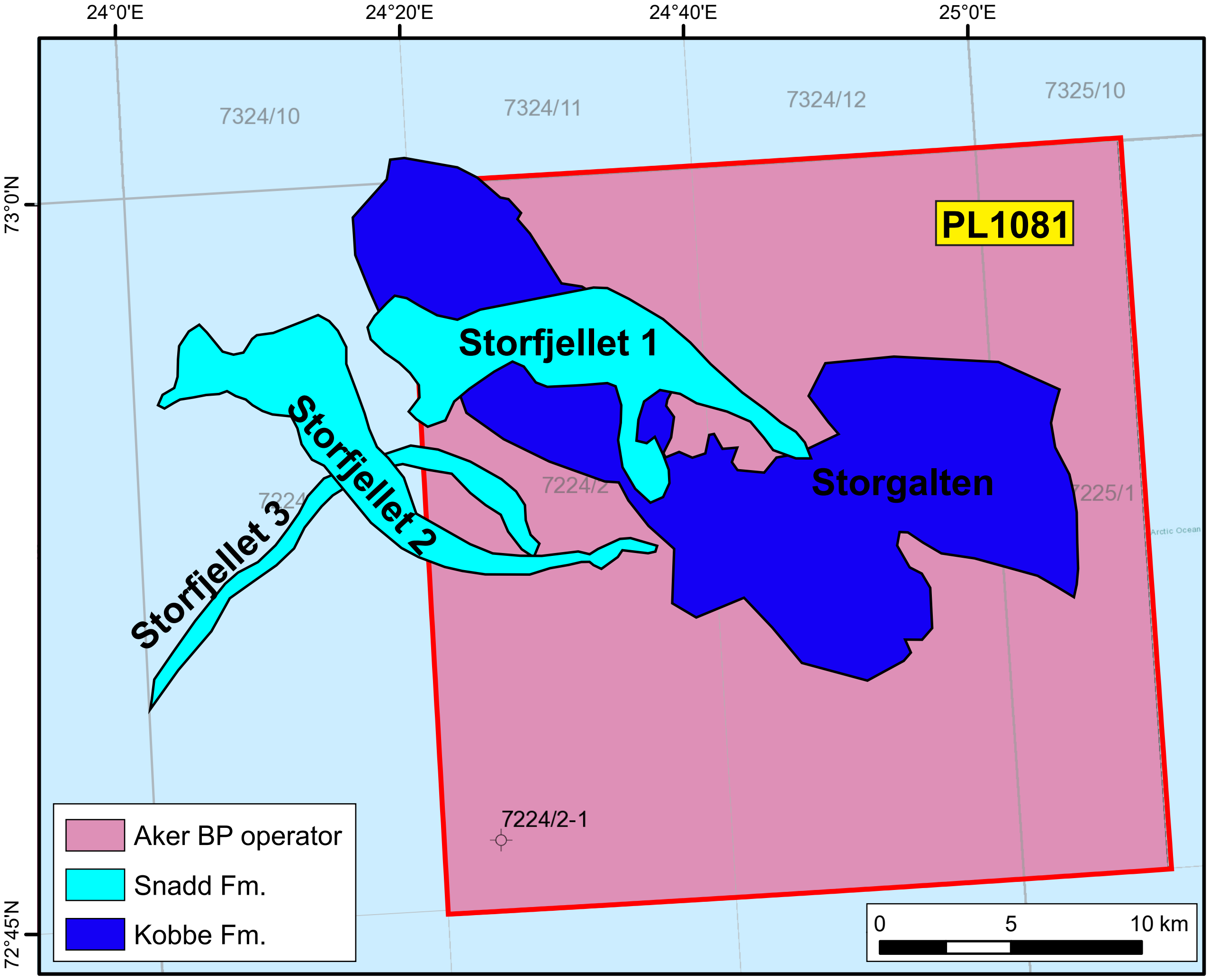


Fig. 4.1 Prospect overview. *Identified prospectivity in PL1081.*

4.1 Storgalten Prospect

The Storgalten Prospect was identified on 3D seismic data as an amplitude anomaly defining a large fluvial channel complex within the uppermost part of the Kobbe Formation (Fig. 4.2, Fig. 4.3 & Fig. 4.4). This stratigraphic level represents maximum regression before the major Late Anisian to Early Ladinian transgression at the Kobbe Formation to Snadd Formation transition. The prospect outline is defined by 3D seismic FAR/NEAR angle attribute maps (minimum amplitude) assuming an effective reservoir section limited by the brightest amplitudes (Fig. 4.2). A clear difference is seen in the amplitude response between the FAR- and NEAR-stack seismic stack for the Storgalten Prospect, which is not the case for the channel complex defined within the in former PL1030. In the PL1081 area a well defined channel feature is observed using FAR-stack data, but not observed using NEAR-stack data (Fig. 4.2). Hence, an AVO effect is observed which could be related to both better reservoir quality and presence of hydrocarbons. These conclusions are further supported by probability maps (PCube & Fuzzy) presented in Fig. 3.3, which predicts a higher chance of sandy facies in PL1081 than in former PL1030, and further, hydrocarbons are more likely than brine.

A risk summary and resource distribution for the Storgalten Prospect is shown in Table 4.1. The main risks associated with the prospect are reservoir quality (0,5), seal presence (0,6) and migration and timing (0,6). In the latter case, all risk is on phase. In an empirical perspective there could be argue that unfavourable models (i.e. tight reservoir) are more likely and a risk of 0,4 or lower could be applied. However, the reservoir quality risk at 0,5 reflects the probability of better reservoir quality in the Storgalten area compaired to historical results for the Kobbe play. These arguments and possible differences are summarised in Fig. 4.4.

Reservoir summary.

- **Reservoir presence (1,0)**
  - Kobbe Fm. proven in nearby wells
  - *Seismic pattern strongly indicate stacked fluvial channels*
  - Marine sandstones in uppermost Kobbe Fm. (final flooding event)
- **Reservoir quality (0,5)**
  - Poor quality regionally and in nearby wells (Fig. 4.4)
  - *Grain size generally very fine to fine, but coarse also found in Nordkapp Basin to the east*
  - Permeability severely deteriorated by grain size and clay from mineral diagenesis of feldspar
  - *Only 3mD average permeability in nearby Norvarg wells*
  - Up to 100mD based on data from shallow cores in the Nordkapp Basin ~100km to the East (ref., Bugge et al. 2002)

Reservoir presence considered proven but reservoir quality a major risk.

Trap and Seal:

- **Trap geometry (0,9)**
  - Stratigraphic pinch-out trap within a mega-closure on the Mercurius High (Fig. 4.3)
  - Prospect well defined by amplitudes representing gross extent of reservoir
- **Seal (0,6)**
  - Main channel direction normal to structure which is favorable for lateral sealing
  - Minor north-south trending channels may cause lateral leakage
  - Fault throw not considered a major risk
  - 4-way robust structure pre and post uplift and erosion (Fig. 4.5)

Amplitude defined stratigraphic trap with potential lateral seal risk.

Source rock and migration

- **Presence (1,0)**
  - Large area of Steinkobbe Fm. with source rock potential mapped in the area
  - Only a few wells drilled through the source rock potential in Klappmyss Fm.
  - Several oil discoveries and shows in Triassic located within the mapped source rock area
  - Oil source rock potential very close to the Storgalten and Storfjellet prospects
- **Maturation and Migration (1,0)**
  - Source rock mature at maximum burial
  - Vertical migration from source rock immediately below Kobbe Fm. reservoir
  - **Fluid Phase Risk (oil 0,6, gas 0.4)**
    - Storgalten prospect likely to retain oil during uplift
    - Remigration, loss of oil, degassing during uplift reduce the paleo accumulation in Storgalten
    - Gas from exsolution during uplift likely

Mature source rock present, however post migration uplift related retention risk.

Geophysical Studies Summary

- Pcube/Fuzzy predicts sandy facies in Storgalten (similar to what is seen on reflection data)
- Hydrocarbons more likely than brine
  - Hydrocarbon response is more pronounced towards the Southeast (deeper on structure)
- However, different fluid responses on Storgalten could indicate changes in reservoir parameters rather than fluids
- **Difficult to separate oil and gas.**
  - Variation in geology overprint oil vs gas response
  - Mostly gas response according to Pcube classification
  - Mostly oil response according to Fuzzy classification

Geophysical modelling support sand and hydrocarbons in Storgalten. See chapter 3 Results of Geological and Geophysical Studies for more details.

Table 4.1 Risk and resource summary for the Storgalten Prospect.

Descriptions		Storgalten	Comments
Risk Factors		**Risk**	
Reservoir	Reservoir Presence	1.0	Channel complexes confidently interpreted on 3D seismic.
	Reservoir Quality	0.5	Low permeable sands in the Kobbe Fm in offset wells. Closest reference are the Norvarg wells with 3-4mD average in Kobbe channels.
Trap & Seal	Trap Geometry	0.9	Combined stratigraphic and structural closure well defined in 3D and 2D data.
	Seal Presence	0.6	Risk on retention and lateral seal as sub seismic sands may occur.
Source	Source Presence	1.0	Proven in nearby wells.
	Migration & Timing	0.6	All risk on HC phase.
COS		**0.16**	
Mean recovery total resource (mmboe):		**561**	
Mean recovery oil resource (mmboe):		**474**	

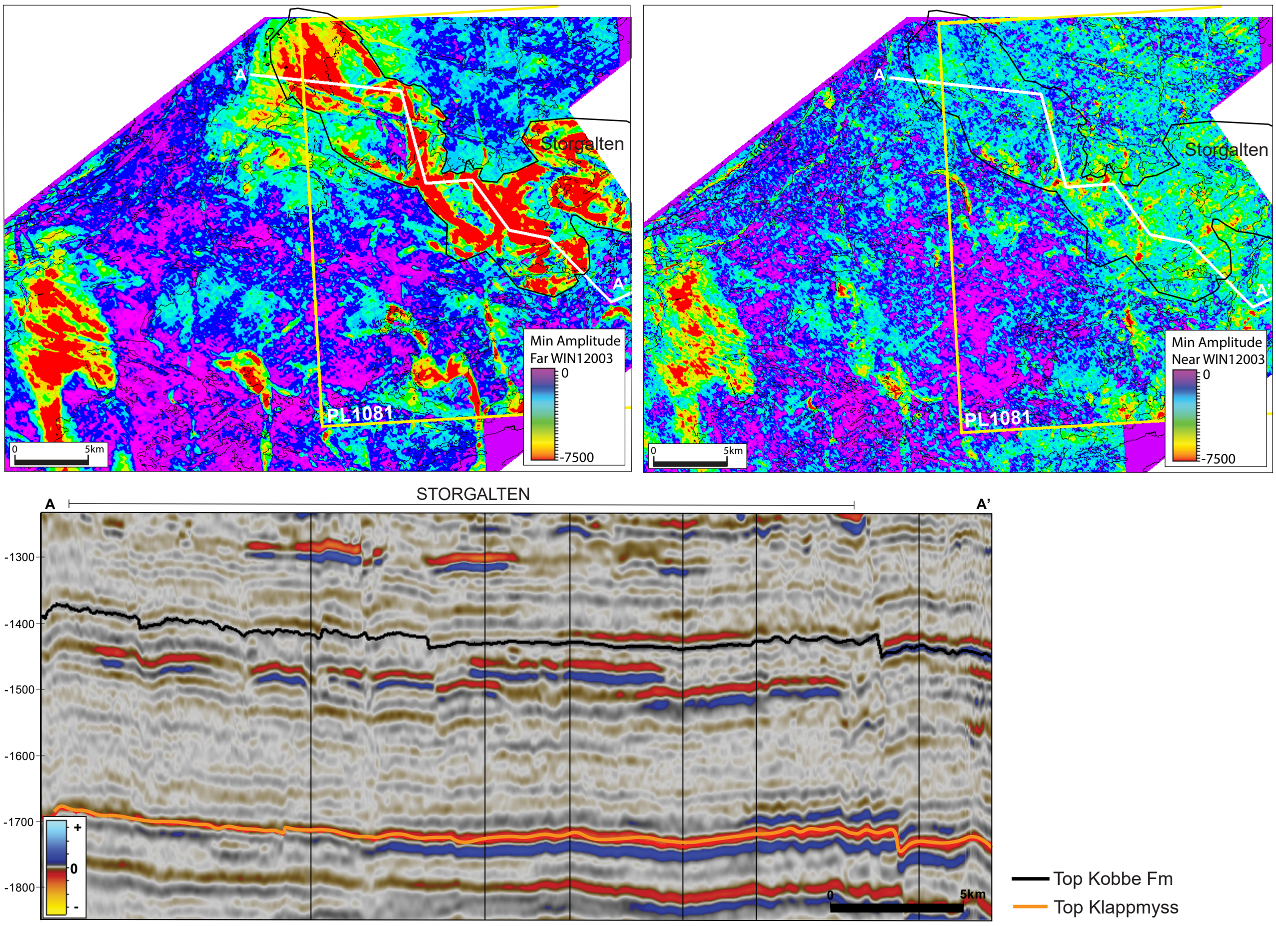


Fig. 4.2 Storgalten Prospect.
Minimum amplitude maps extracted from the Top Kobbe Fm with a search window of 30 ms and 60 ms offset downwards using far stack and near stack data. The maps show the amplitude anomaly defining the Storgalten Prospect. Note different anomaly respond from FAR to NEAR stack. The composite seismic line A (WIN12003 far stack) shows the channels in the Storgalten Prospect.

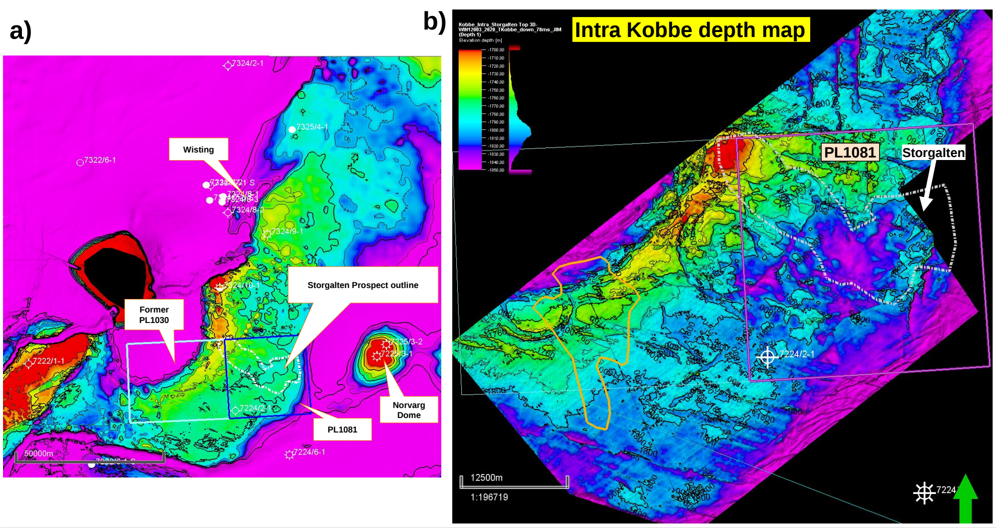


Fig. 4.3 Depth map intra Kobbe Fm. *Top reservoir depth structure map, Storgalten Prospect in PL1081 (white, dotted polygon).*
a) Top Kobbe Mega-closure on the Mercurius High with PL1081 and Storgalten Prospect,
b) Top Reservoir (Storgalten depth map).

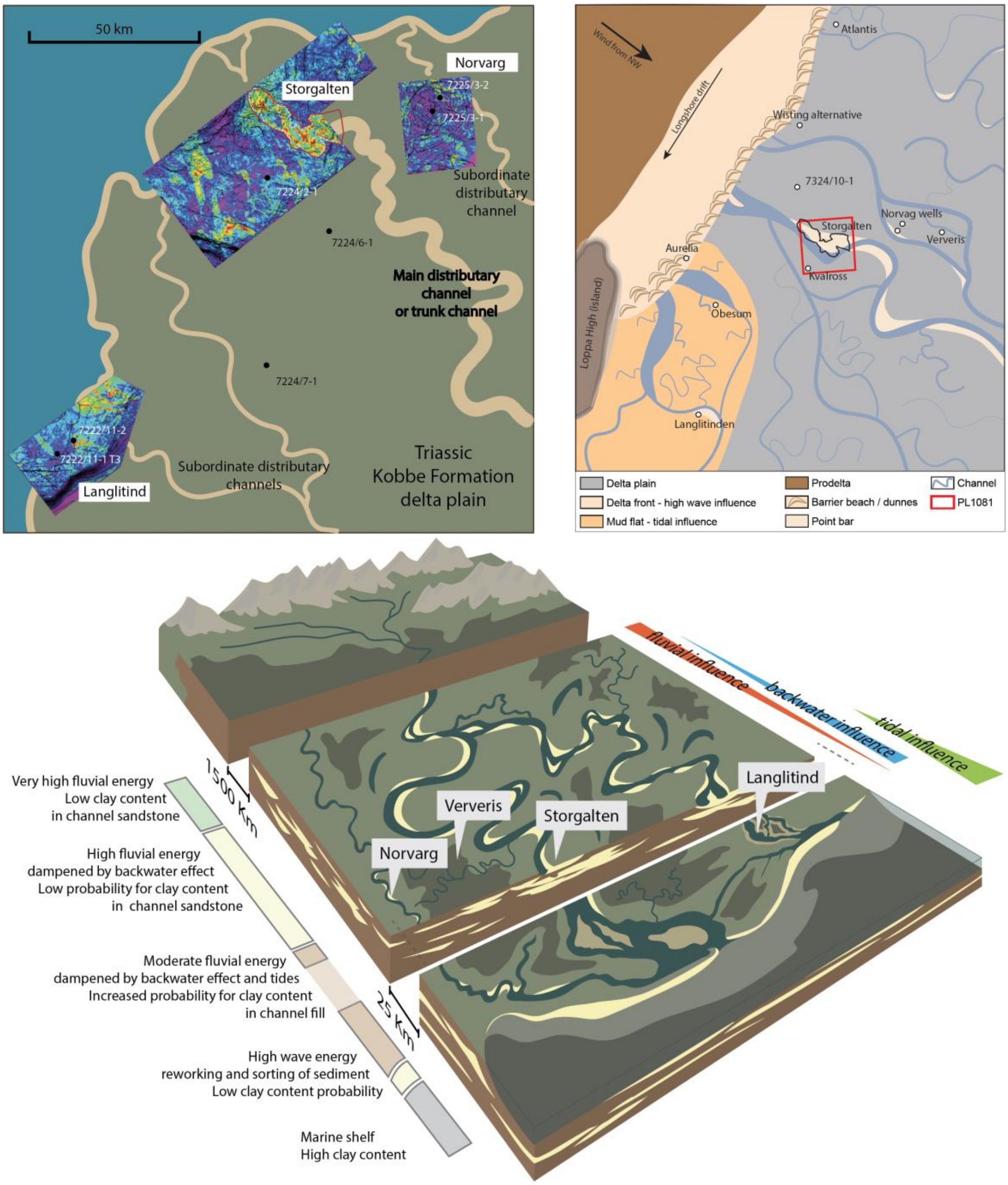


Fig. 4.4 Geological setting Storgalten Prospect. *Main differences to Langlitind/Norvarg channels:*
(1) Size is an order of magnitude wider channel belt than Norvarg and Langlitind channels.
(2) Compared to Langlitind, Storgalten shows a concentrated distribution axis unrelated to distributive dispersal.
(3) Storgalten scale (size) could suggest a higher energy setting than Norvarg/Langlitind.
(4) In turn, this setting offers potentially better reservoir qualities than Langlitind, such as larger grain size, lower clay content.
(5) Presence of sand supported by geophysical analyses (i.e., Litho/fluid studies).

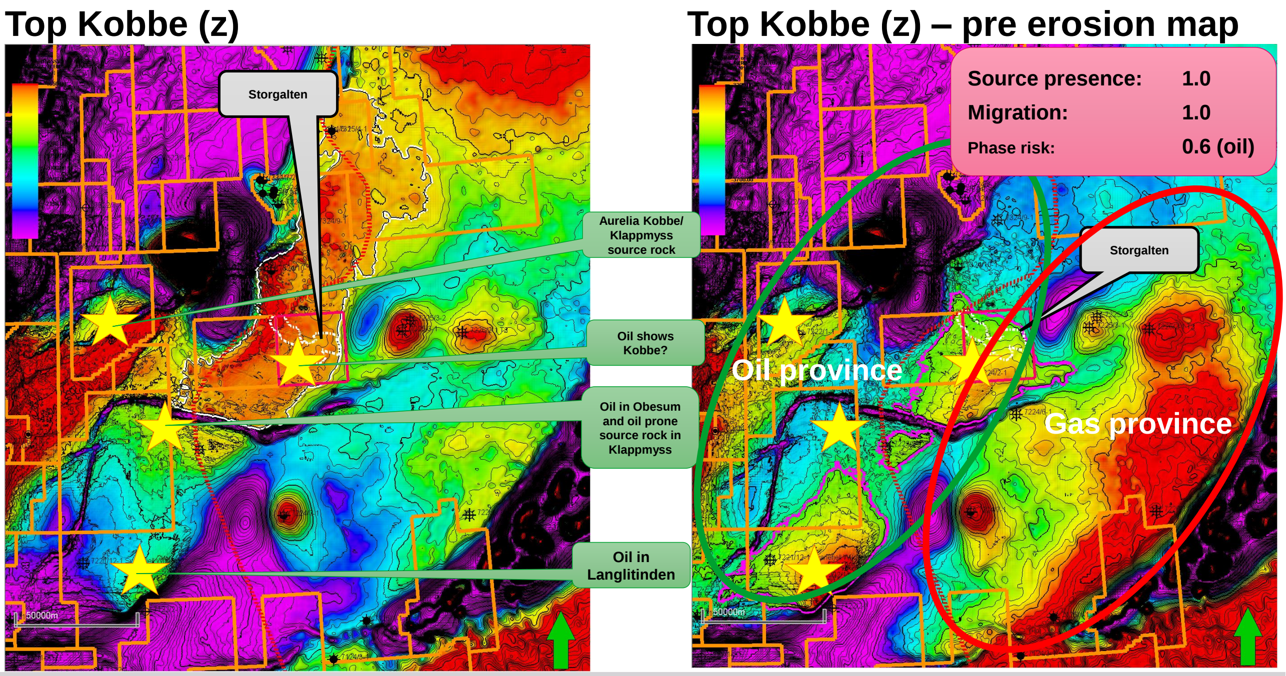


Fig. 4.5 Post and pre-erosion structuring.
Top Kobbe depth maps. 4-way robust structure pre and post uplift and erosion.

4.2 Storfjellet Prospect

The Storfjellet Prospect is an amplitude driven, stratigraphic to structural, fault-dependent trap(s) with intra Snadd Formation fluvial sandstone reservoir sealed by intra Snadd marine to coastal plain shales and charged by Steinkobbe source rocks (ref. Caurus, Langlitinden and Svanefjell discoveries). The minimum amplitude maps in Fig. 4.6 shows the amplitude anomalies displaying the Storfjellet Prospect, defining three fluvial channels (upper, middle and lower) of Ladinian age (Fig. 4.6). All three channels are best displayed on the FAR-Stack and Lambda Rho inversion data (Fig. 4.6). On the near-stack the amplitudes are weaker and the channels poorer defined. This weak soft response on near stack data and soft brightening on far stack data could be related to a AVO Class 2 oil filled reservoir rather than a gas filled reservoir which should be significant brighter on near and far stack data, hence a class 3 AVO response. However, fluvial channels of Ladinian age have been tested by well 7222/6-1 (Obesum) showing moderate to low reservoir quality (reflected in the reservoir quality risking: 0,5). The observed AVO response could be related to lithological effects couplet with low saturation of hydrocarbons. A forth channel is identified (in former PL1030) and labelled Storfjellet04 in Fig. 4.6 and Fig. 4.7. This channel is classified as a lead.

A risk summary and resource distribution for each of the Storfjellet channels are shown in Table 4.2.

The main risk is seal followed by migration and timing. A slightly higher risk is added to the Lower (Storfjellet 1) and Middle (Storfjellet 3) segments as these two channels are located downflank of apex compared to the Upper (Storfjellet 2) segment which crosses the apex, defining a more robust trap in this area (Fig. 4.7).

The trapping of hydrocarbons in the Storfjellet Prospect relies on a combination of stratigraphic pinch-out trap and structural closure. Thief sands in the form of minor channels could cause drainage of the trap(s) due to inter-fingering between different channels.

The Storfjellet Prospect is not a standalone drilling candidate due to a non-economic resource potential and high explorational risk.

Table 4.2 Risk and resource summary for the Storfjellet Prospect.

Descriptions		Storfjellet 1 - Lower channel	Storfjellet 2 - Upper channel	Storfjellet 3 - Middle channel
Risk Factors		**Risk**	**Risk**	**Risk**
Reservoir	Reservoir Presence	1.0	1.0	1.0
	Reservoir Quality	0.5	0.5	0.5
Trap & Seal	Trap Geometry	1.0	1.0	1.0
	Seal Presence	0.42	0.63	0.42
Source	Source Presence	1.0	1.0	1.0
	Migration & Timing	0.48	0.48	0.48
COS		**0.10**	**0.15**	**0.10**
Mean recovery total resource (mmboe)		100	105	30
Mean recovery oil resource (mmboe)		90	95	27
Aggregated *(Alle three segments)* mean recovery total resource (mmboe):		**194**		
Aggregated *(Alle three segments)* mean recovery oil resource (mmboe):		**175**		

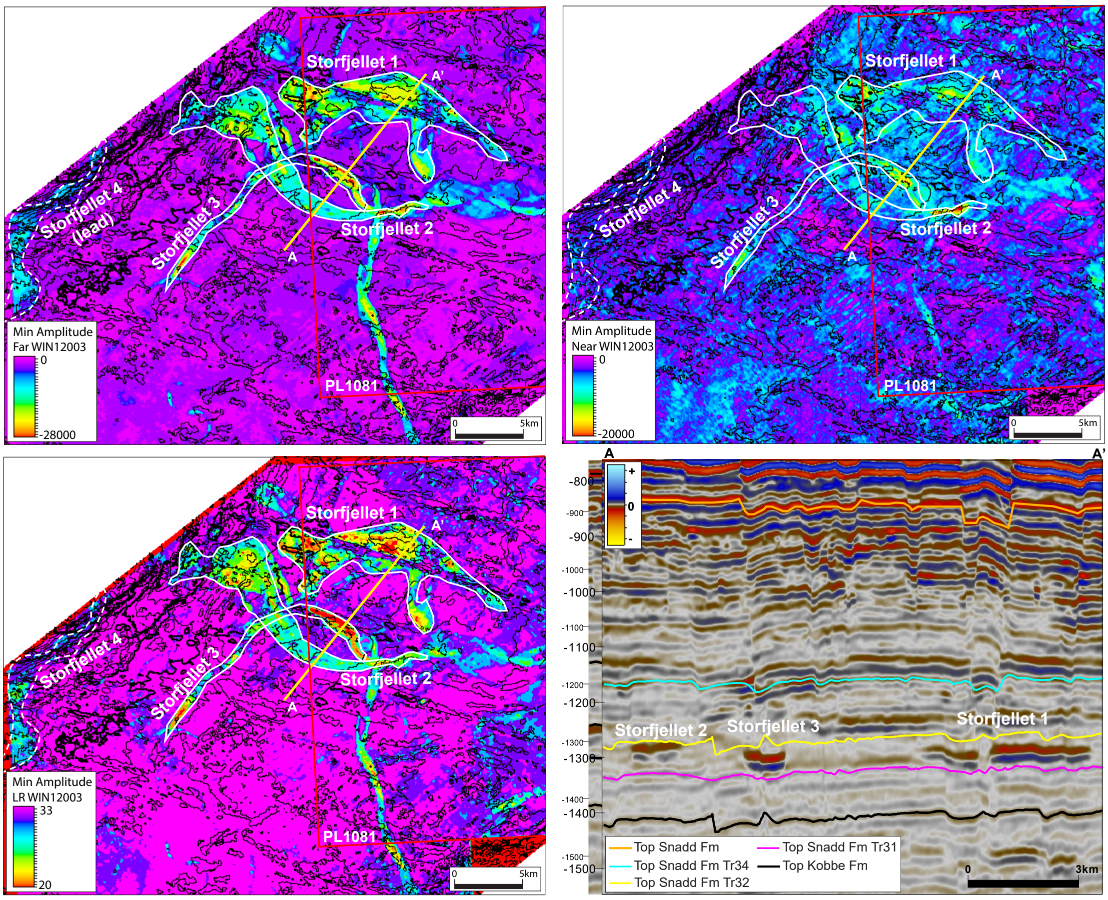
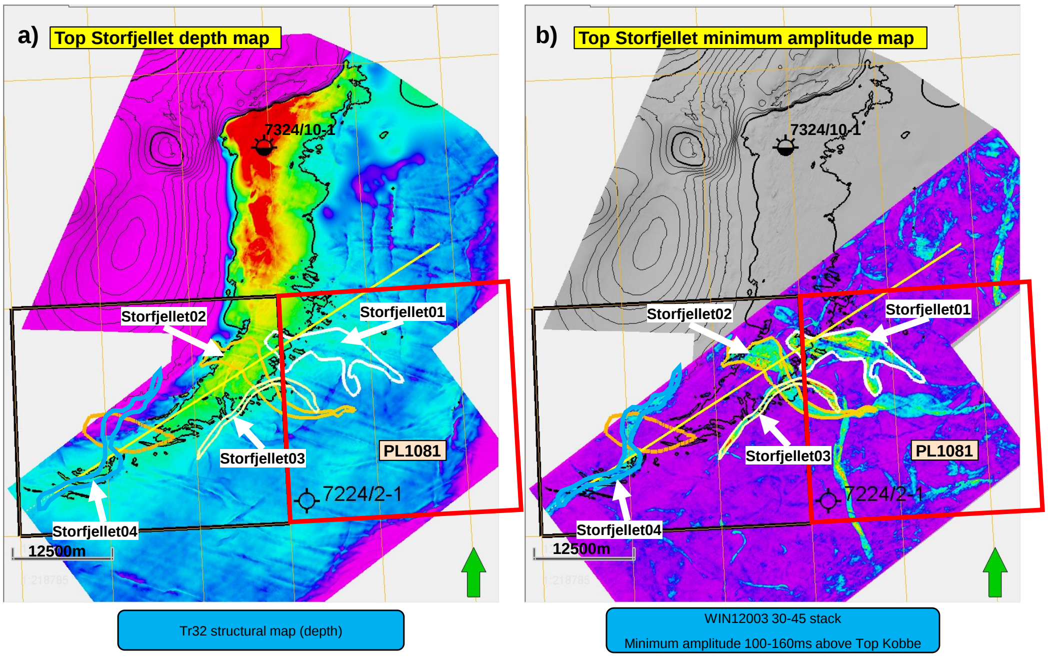


Fig. 4.6 Storfjellet Prospect overview.
Minimum amplitude maps extracted around the Storfjellet Prospect, using far stack, near stack and Lamda Rho inversion data. The maps show the amplitude anomalies defining the channels of the Storfjellet Prospect. The composite seismic line (WIN12003 far stack) shows the Storfjellet Prospect represented by 1) Lower channel, 2) Upper channel and 3) Middle channel.



Area:

*Storfjellet**01**:* *48 km²*

*Storfjellet**02**:* *41 km²*

*Storfjellet**03**:* *16 km²*

*Storfjellet**04**:* *33 km²*

Fig. 4.7 Storfjellet depth map.

5 Technical Assessment

Two prospects have been identified within the licence area, Storgalten Prospect and Storfjellet Prospect, with only the Storgalten Prospect with potential for a standalone development.

Storgalten Prospect

PL1081 and the Storgalten Prospect is located ca 65 km south of the Wisting Discovery, 150km east-northeast of Johan Castberg and about 260km north of Hammerfest. The infrastructure is limited in the area and a standalone solution is therefore the considered field development solution.

The Storgalten Prospect is a high risk/high reward prospect with high risk on reservoir quality but with very attractive volumes, also as a potential tie-back. However, economic success is highly sensitive to permeability and thereby producibility. A 6 mD scenario is defined as minimum permeability for a economical feasible development, hence permeabilities below 6 mD considered as reservoir failure (non-producible).

A sensitivity test were performed using 6, 10 and 30 mD average permeability as minimum, mode, maximum with re-injection (3 scenarios) and import of gas (3 scenarios) to maintain reservoir pressure, a total of 6 scenarios. The case with gas import and a 10mD average permeability gave the highest NPV of 1072 MUSD (539 mmboe recoverable oil) with a break even oil price of 33,6 USD/bbl and a total capex of 6744 MUSD. Gas volumes are too small and only consider in reinjection scenarios to increase recovery factor for oil. A Minimum economic field size (MEFS) is estimated to be within a range of 250-400 mmboe for a standalone development and round 100-150 mmboe as a tie-back MEFS to a future Wisting hub.

Storfjellet Prospect

The Storfjellet resource potential is far below the threshold for any commercial development and borderline as a tie-back to a future Wisting hub. No business case is therefore presented.

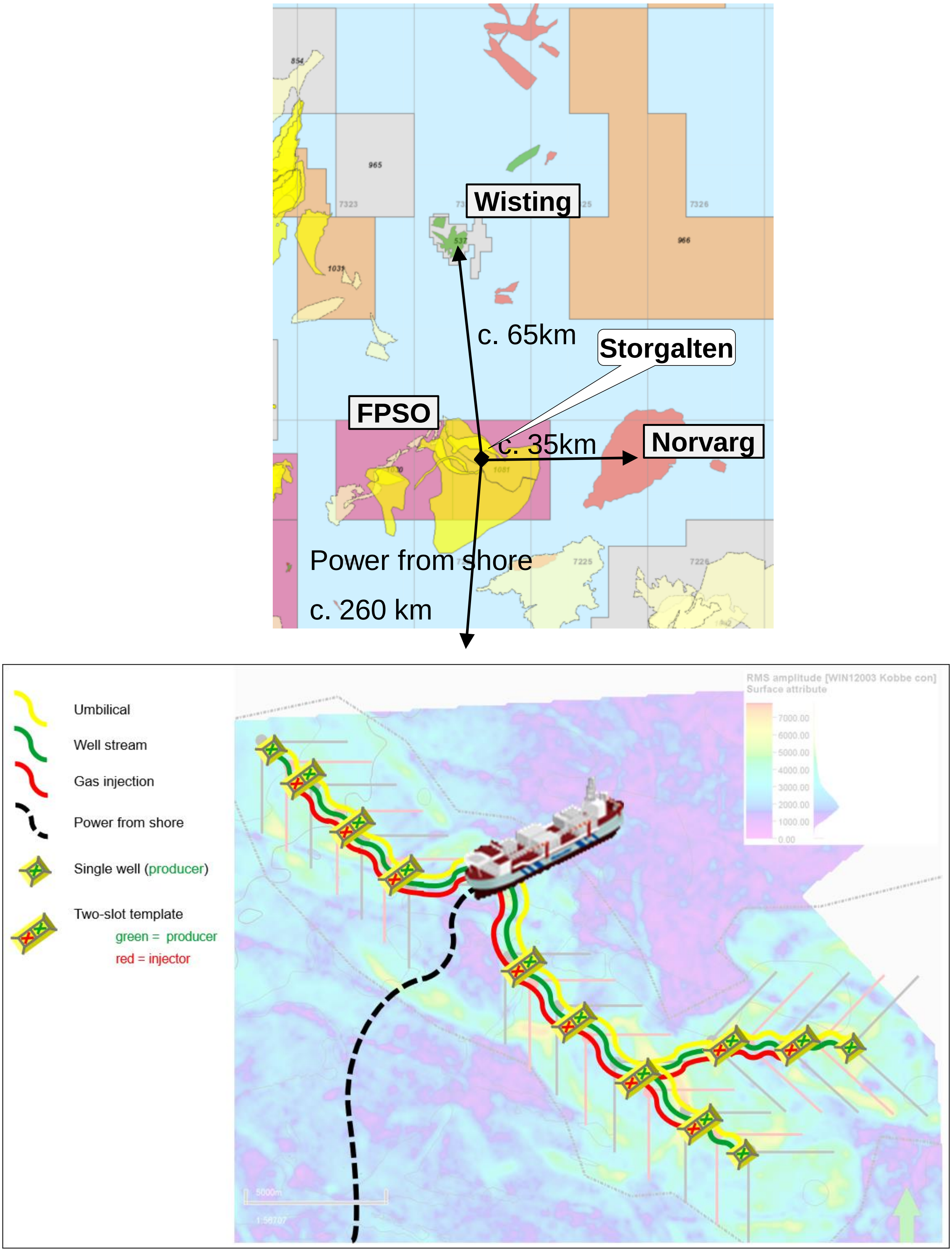


Fig. 5.1 Location and field development solution.

6 Conclusion

Geological and geophysical studies have been carried out to improved the understanding of the hydrocarbon potential in PL1081 with the aim of proving resources for development.

The Storgalten Prospect (Fig. 6.1) is a high risk/high reward prospect with high risk on reservoir quality but with attractive volume estimates for an economic development. Technical evaluation have shown that hydrocarbons are more likely than brine within the Storgalten trap. However, economic success is highly sensitive to permeability and thereby producibility. Distribution and quality of Kobbe sandstone reservoirs are complex and thus the major risk factor for the Storgalten Prospect. Reservoir producability and de-risking is challenging and historical results have not proved effective reservoirs within the Kobbe Play outside the Goliat Field. Technical work has unfortunately not been able to reduce the uncertainty related to reservoir quality in order to make a positive drill decision. Secondary prospectivity represented by the Storfjellet Prospects (Fig. 6.1), are too small volumes for standalone development and at the borderline as a tie-back candidates to a future Wisitng hub.

The partnership in PL1081 therefore agrees to relinquish the licence.

Table 6.1 Resource estimates and COS.

Prospect	Rec resources P90 mmboe	Rec resources P50 mmboe	Rec resources P10 mmboe	Fluid phase	COS
Storgalten Prospect	328	535	830	oil	16%
Storfjellet 1- Lower channel	61	95	147	oil	10%
Storfjellet 2- Middle channel	68	103	145	oil	15%
Storfjellet 3- Upper channel	20	29	42	oil	10%

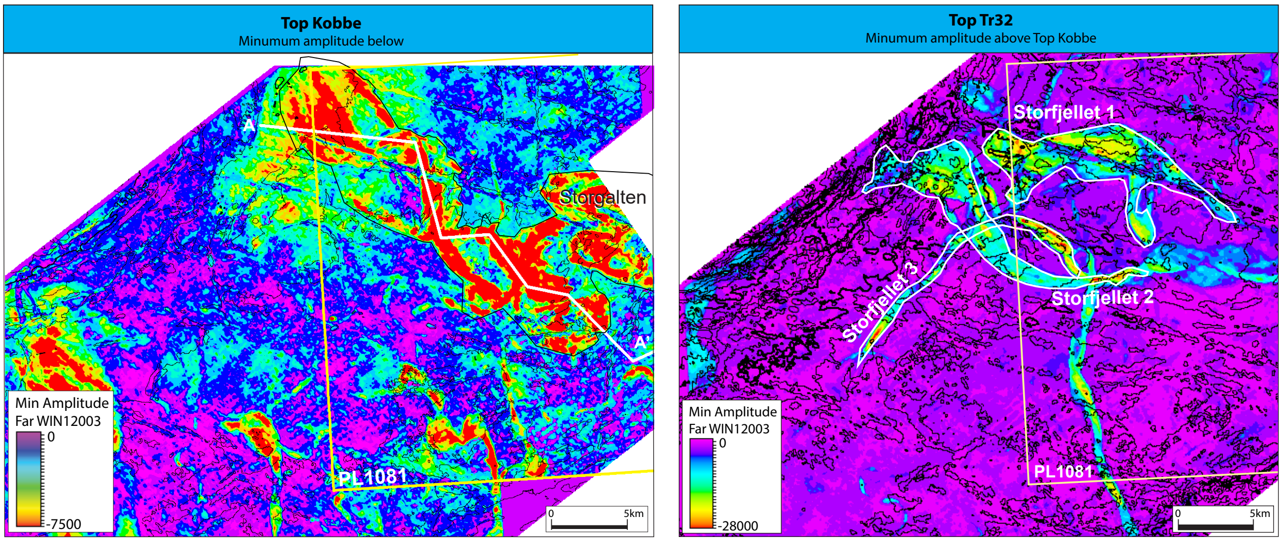


Fig. 6.1 Identified prospectivity.
Minimum amplitude maps (FAR stack) showing the outline of identified prospect in Kobbe and Snadd formations.

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