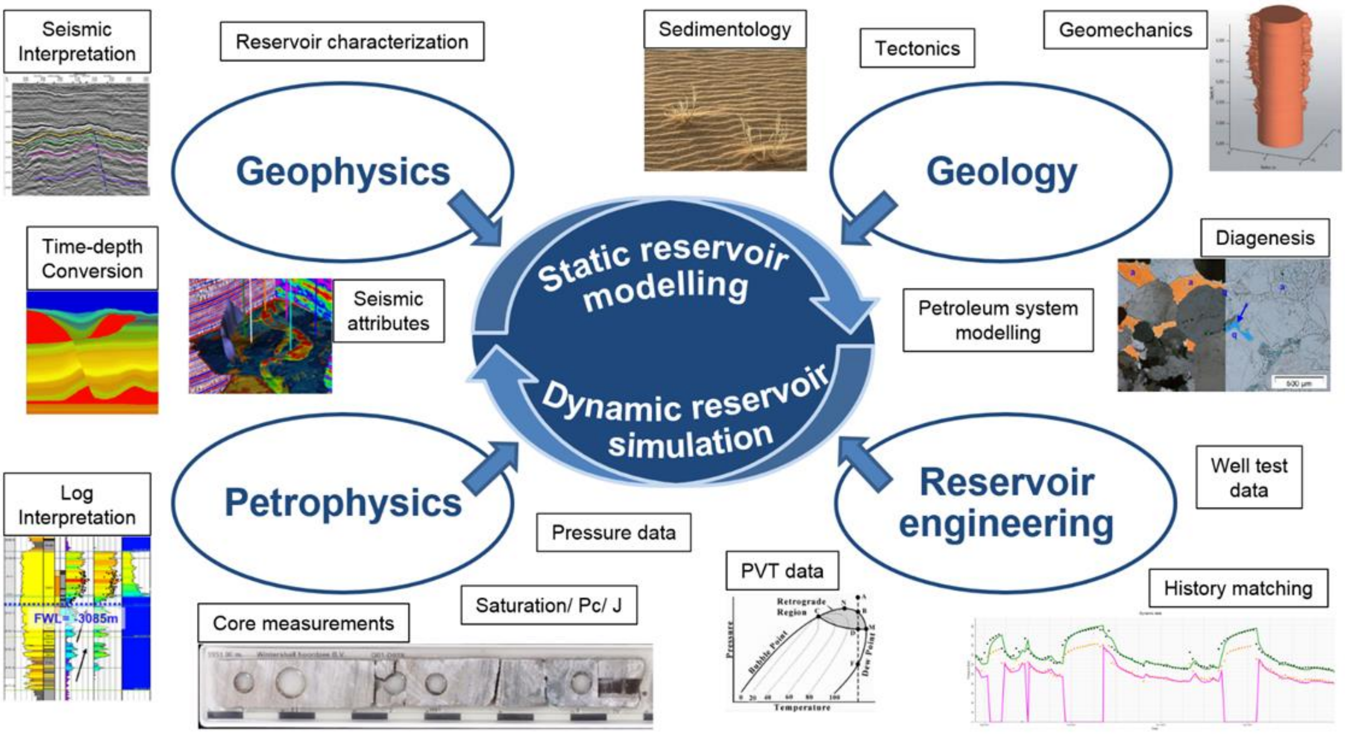
Integrated Reservoir Modelling

June 2019 Newsletter



Have Something to Contribute?

The IRM Newsletter is a joint publication for the Integrated Reservoir Modelling, Static Reservoir Modelling and Dynamic Reservoir Simulation Skill Networks of Wintershall DEA.

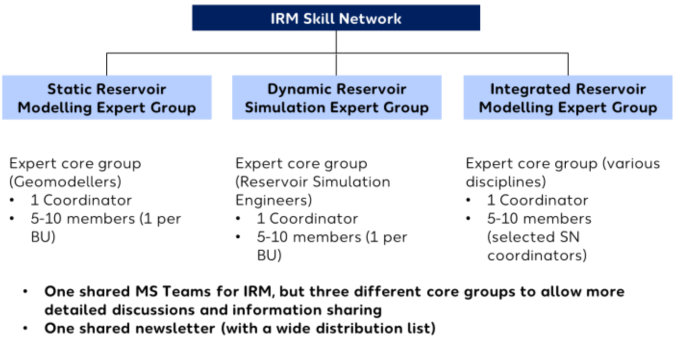
Please share your knowledge, ideas and reservoir modelling challenges with the network. Email your article to ***bastian.koehrer@wintershalldea.com***, ***koos.pipping@wintershall.com*** or ***adam.kasprzak@wintershalldea.com***.

You only need to provide the text, a figure or two and a photograph of yourself – we will format the rest for you!

Editors Column

we would like to welcome you to the June 2019 edition of the Integrated Reservoir Modelling Newsletter!

The Wintershall legacy setup of the IRM skill network has been established over the past year. Three different skill networks were successfully combined under the IRM umbrella to reach a wider distribution within the organization and make full utilization of synergies. The separate skill core groups remained unchanged, acting as expert groups:



Although the new setup of the skill networks in Wintershall Dea in not yet rolled-out, we believe that the existing networks can play a role in the post-merger technical integration process between Wintershall and DEA. For example, we recommend that regular local IRM meetings in each BU should be held to help steering the technical exchange. Also, the newsletter is already well-known to former-Wintershall colleagues, and we now also welcome all ex-DEA staff interested in reservoir modelling and simulation to contribute to this newsletter.

There are 4 articles in this edition:

- **Daniel Fitzsimons** (BU Middle East) describes a general Petrel workflow to generate fault segments for separate FWL definition.
- **Tore Herrevold** and **Ei-Sheen Lau** (BU Norway) demonstrate how scenario-based modelling is used for detailed well planning in the Nova field development project on the NCS.
- **Ciro Marzocchi, Liana Zakharova** and **Aleksander Kalinichenko** (BU Russia) present a history-matching case study from the Dobroye field onshore Russia, linking seismic fault data to dynamic information.
- **Abuajila Sallam** (BU Libya) briefly outlines a technique to improve fault visualization and extraction in Petrel.

We hope you'll find this newsletter edition interesting and that it will give you some useful ideas for current or future integrated modeling projects. And *please remember:* Please capture your challenges and solutions and share them with your network members via this newsletter!

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Fault segmentation workflow for Petrel Structural Framework Grids

Provided by Daniel Fitzsimons

The following workflow has been designed to overcome limitations of the Petrel Structural Framework fault modelling and grid generation method to enable the generation of fault segments for fluid contact definition. Two structural methods exist in Petrel which are depicted in Figure 1.

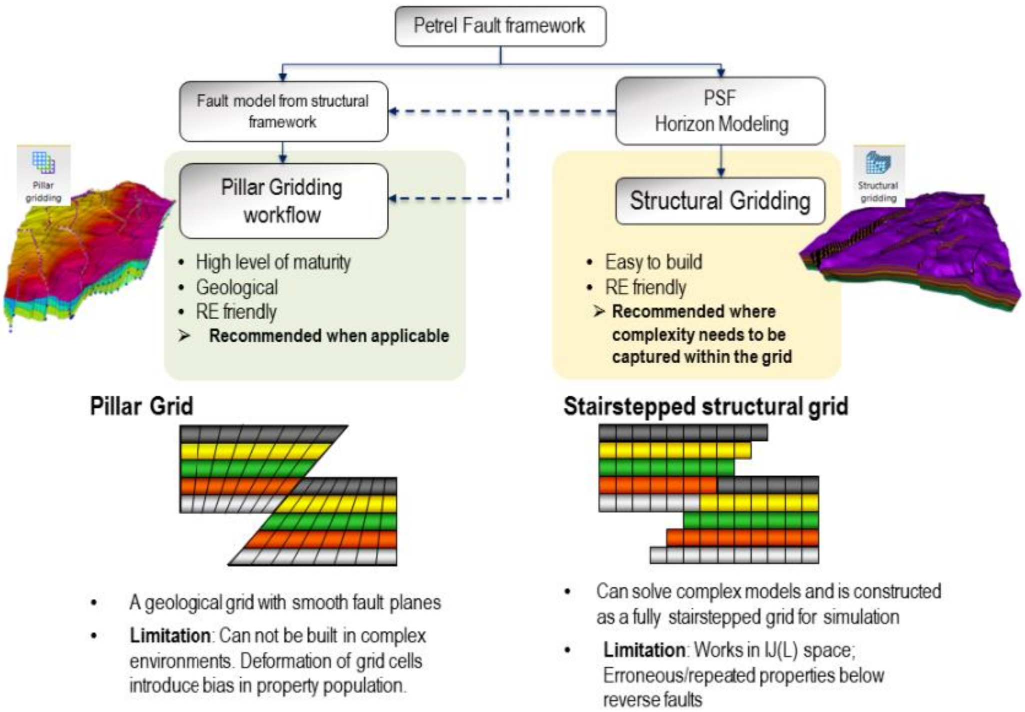


Figure 1. Comparison of structural gridding techniques in Petrel (Image courtesy of Schlumberger)

In highly complex faulted reservoir with low angle listric faults with numerous fault truncations, it is only possible to proceed with the structural framework (PSF) method. Although this means one can quickly build very complex faulted models there are some limitations when compared to the pillar gridding process. One issue is the inability to predefine additional block boundaries which allows fault segmentation for fluid contact definition. In the pillar gridding process this manual segmentation can be implemented at the initial stages of the grid building process by digitizing additional segment boundaries. However, for the structural framework method this option is not available. I present here a method to perform fault segmentation using several available processes in Petrel, and one process using the Blueblack Toolbox plugin marketed by Cegal.

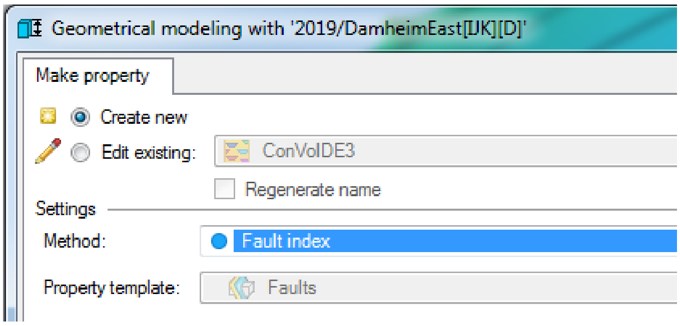
The workflow first generates a fault parameter in the Geometric modelling process, the next step is to edit this fault parameter to ensure the closure of required compartments. This can be performed manually using the facies paint brush or by using gridded surfaces that represent block boundaries to assign cells in the 3D grid. These block boundaries can be generated by building a second structural framework and using large extrapolation distances for the faults to ensure they reach the edge of the grid or truncate against another fault. In the pillar gridding structural workflow faults can be converted to surfaces that can be used in geometric modelling to assign values intersected by the surface. Unfortunately, faults converted from a structural framework are of the wrong format to be recognized by the geometrical modelling process. Therefore, an intermediate step to convert the structural framework model to a pillar grid model is required.

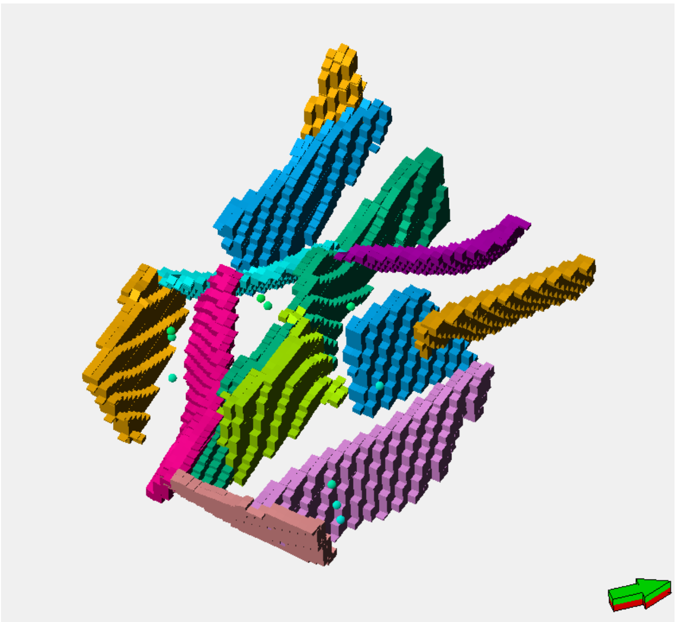
Once the faulted parameter is completed, connected volume analysis is then performed selecting cells connected to unfaulted cells. This generate a segment parameter with the limitation that the faulted cells are undefined. The final step allows these cells to be defined using a nearest neighbor (closest) option in the petrophysical modelling process. Prior to the interpolation a continuous segment parameter is generated in the calculator and then this parameter is assigned as 'upscaled' using the Blueback plugin 'set as upscaled'. This fools Petrel into thinking the parameter was generated by the scale up well logs process and allows it to be used in the petrophysical modelling process. After the faultblock parameter has been interpolated in the petrophysical modelling it is finally converted to a discrete parameter in the calculator after which it can be used in the make fluid contacts process.

In addition, if the renaming or numbering of the fault blocks is required, this can be performed by using a point data set. First, digitize using layer filters a single point in each fault segment. Then insert a continuous attribute and assign numerical value to each point. Upscale the point set and run petrophysical modelling using closest algorithm constrained to the fault segment parameter. Once run convert the new parameter to a discrete parameter in the calculator.

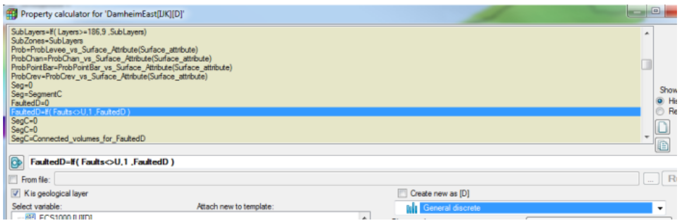
Workflow

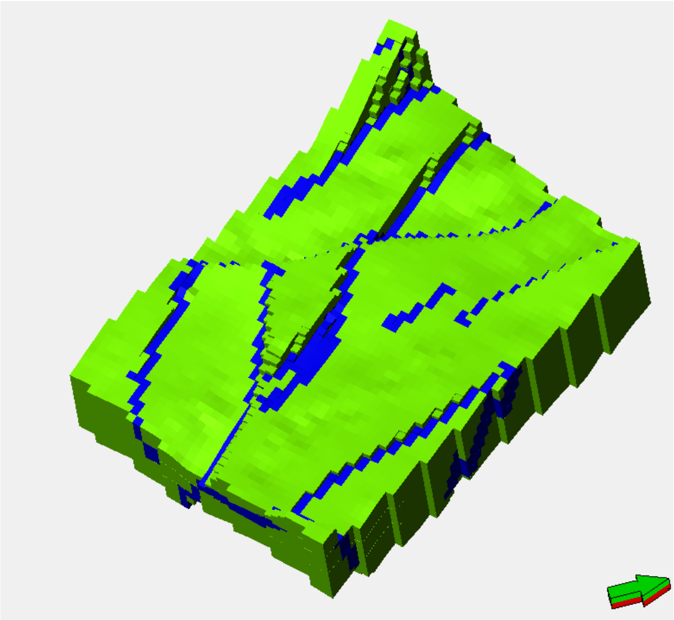
1. Generate fault index parameter



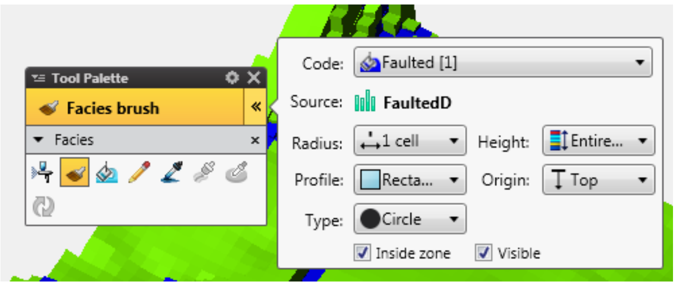


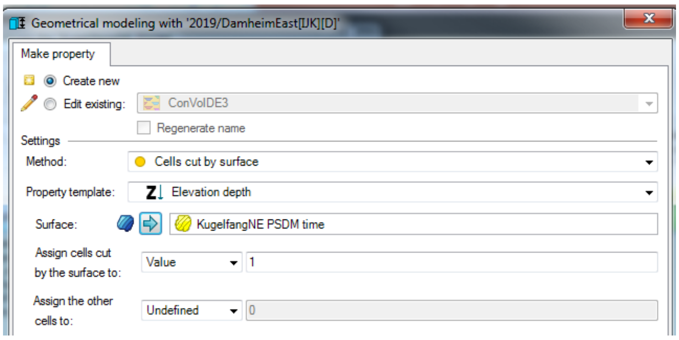
2. Generate faulted cells parameter



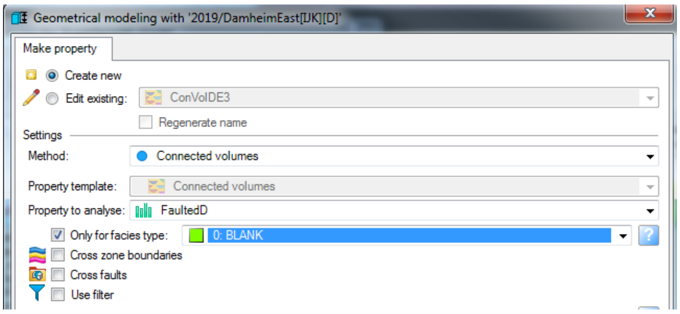


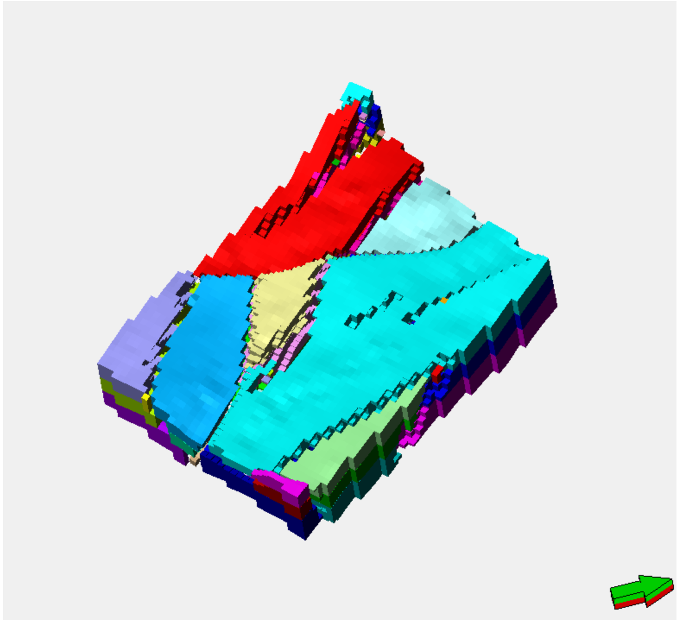
3. Edit manually truncated cells parameter to extend block boundaries using facies Paintbrush. Additional faulted cell parameter can also be generated using Geometrical modelling option Cells cut by surface and then then combined with parameter calculator expression.





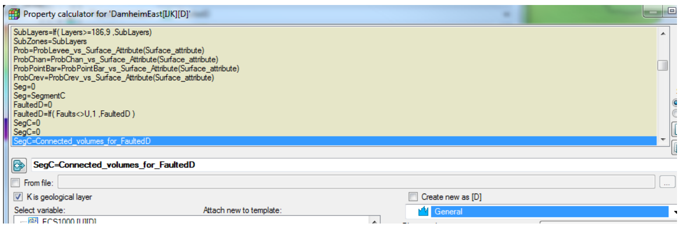
4. Use connected volumes process to generate fault segment parameter



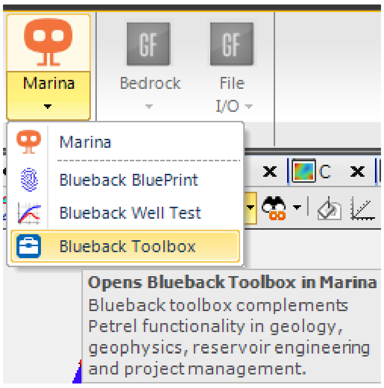


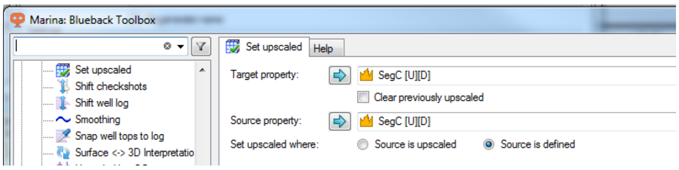
Note that the faulted cells remain undefined in the resulting parameter. It is now necessary to interpolate the undefined cells

5. Create a continuous parameter equal to the "ConnectedVolumesFaultSegment" in parameter calculator

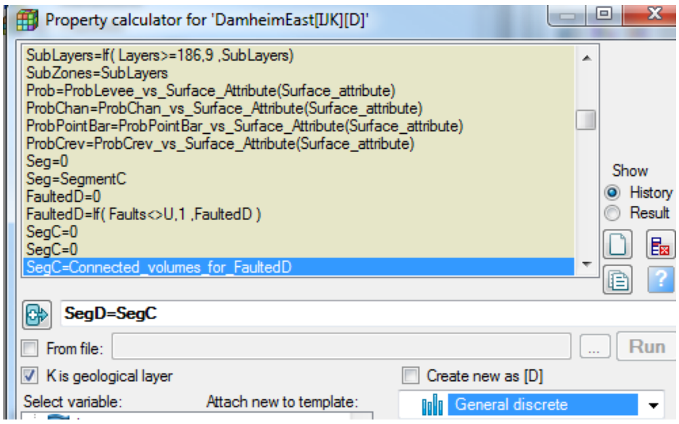


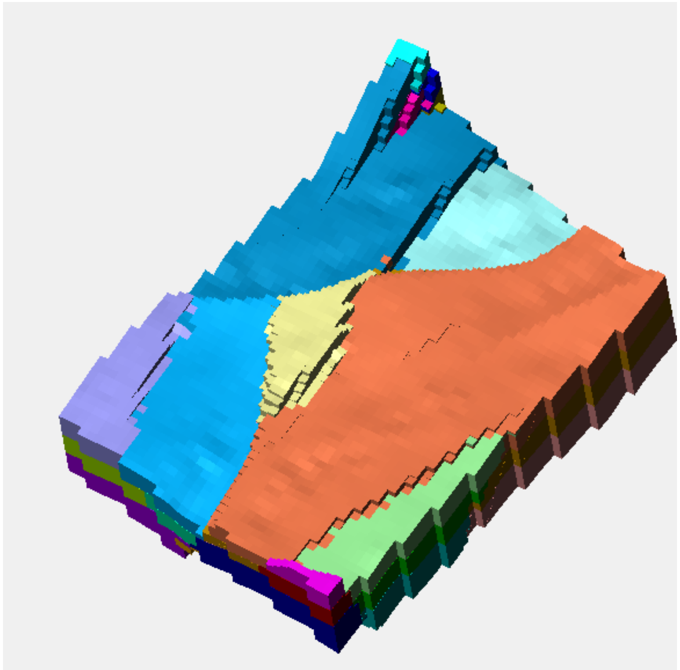
6. Convert SegC parameter to 'upscaled' parameter using Blueback toolbox function





7. Generate discrete fault segment parameter from previous output using parameter calculator.



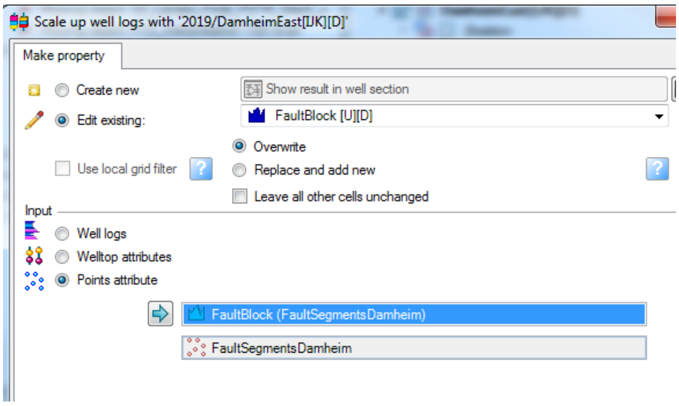


8. If required, the numbering of the fault segments can be performed following steps 9-12. Digitise point set in each fault block using layer filter, insert attribute named 'FaultBlock' and enter desired numerical codes for each block

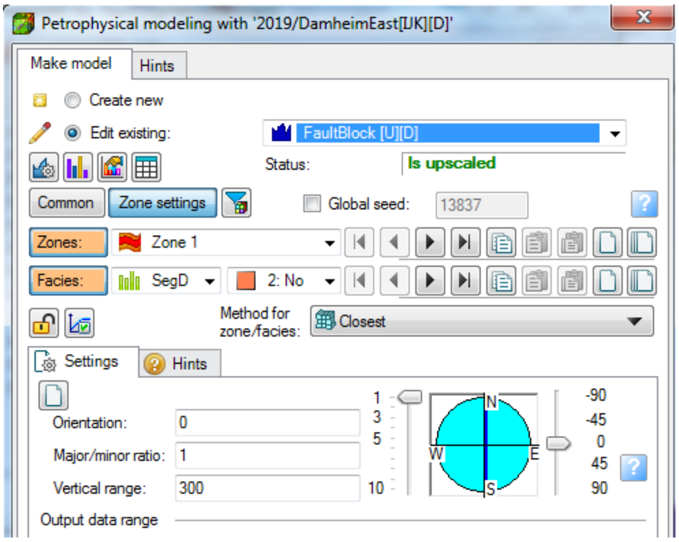
Point spreadsheet for 'FaultSegmentsDamheim'

	X	Y	Depth	FaultBlock
4	3438638.62	5452668.55	-769.86	1
5	3438602.46	5453217.08	-741.52	2
6	3438716.15	5453711.73	-798.75	3
1	3438557.96	5452689.87	-826.03	4
2	3438536.76	5453269.36	-801.89	5
3	3438626.06	5454012.35	-870.28	6
7	3438726.72	5452635.34	-904.21	7
8	3438792.12	5453167.06	-882.37	8
9	3439029.23	5453770.22	-978.33	9
10	3440000.59	5453217.44	-888.75	10
11	3440006.80	5453235.69	-964.80	11
12	3439989.37	5453255.04	-1028.55	12

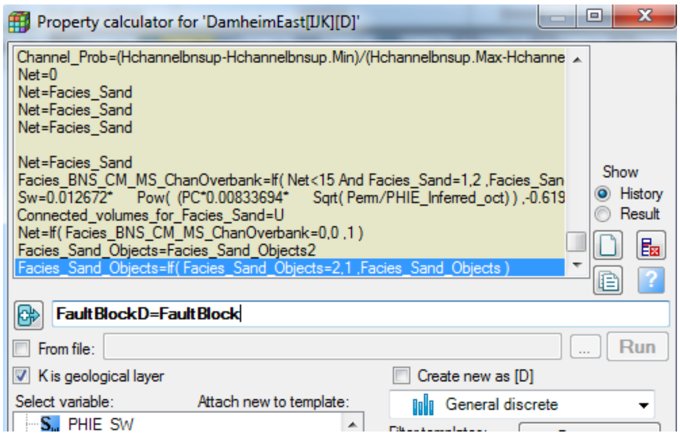
9. Scale up the FaultBlock attribute to the grid



10. Populate the FaultBlock using petrophysical modelling, method closest and conditioned to the discrete fault segment parameter SegD. (Select SegD as facies) Remember to use closest for all codes in SegD.

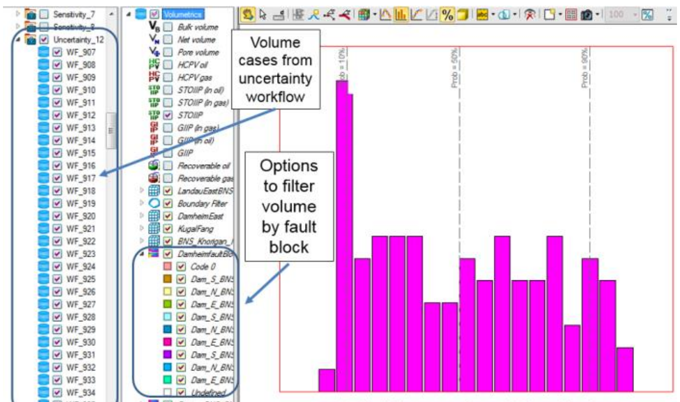


11. Create a discrete faultblock parameter using parameter calculator.



Summary

The final fault segment parameter can be used to define separate free water levels for each fault block which in turn can be used in saturation height modelling. The segment parameter can also be used in the volumetrics process which will allow volumes outputs to be filtered when viewing STOIIP histograms from an uncertainty workflow.



Stoiip Histogram from 100 realisations

In addition to the current workflow the process could be adapted using facies models to combine segmentation of faults and stratigraphic pinchouts.

Scenario Based Modelling for Detailed Well Planning – Nova Field case study, Norway

Provided by Tore Herrevold and Ei-Sheen Lau

During the PDO phase of field development, detailed and lengthy uncertainty studies are often performed. Complex and sophisticated workflows (combining key static and dynamic uncertainty parameters) are created to estimate a range of possible outcomes. The probabilistic production profiles generated are useful for assessing the project economics and for understanding the impact of multiple uncertainty parameters on the recoverable volumes. However, during the detailed well planning phase, these probabilistic models become less useful since it becomes impossible to plan for 100s of different or 'equi-probable' realisations (Figure 1).

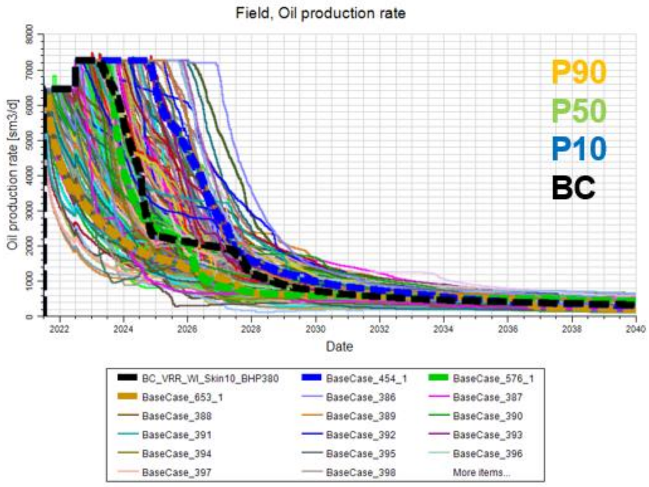


Figure 1. Nova field cumulative oil production

Instead, it becomes more important to focus on key uncertainties with high project impact. Risk management even for low likelihood scenarios needs to be consciously applied. Hence, scenario-based modeling has been adopted for this exercise.

In the case for Nova, with Late Jurassic turbidites, these scenarios include structural variation due to depth conversion, isochore thicknesses, presence of reservoirs of different quality, facies concepts and number of faults present.

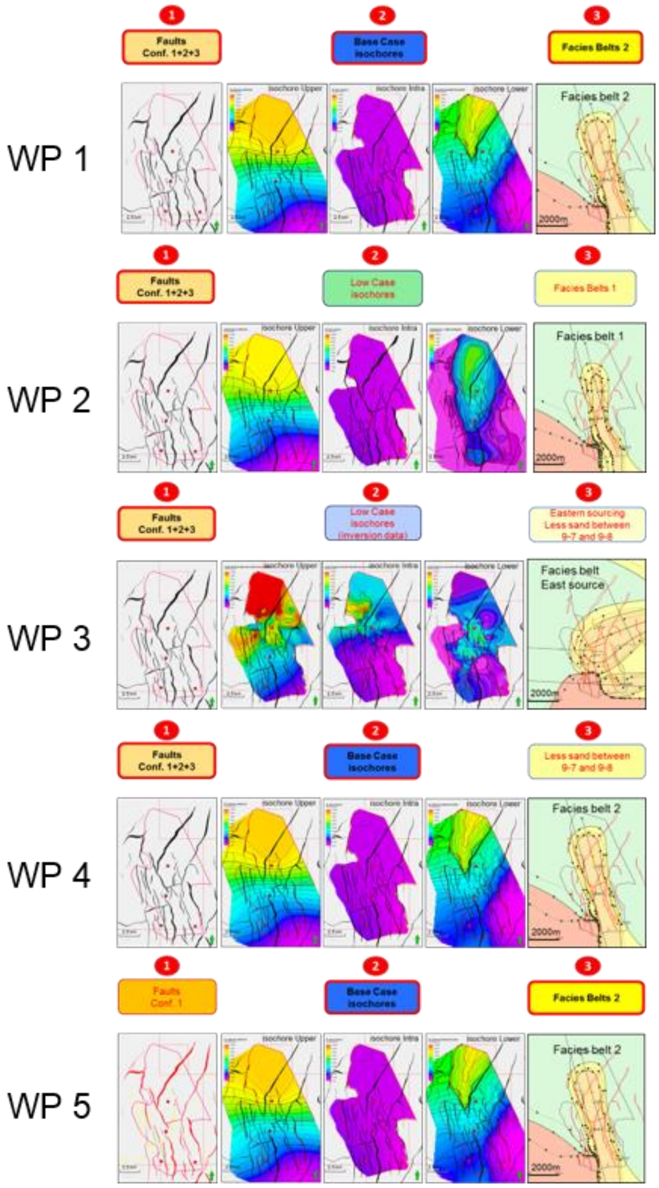


Figure 2. Static input scenarios for the different well planning models (WP1-5)

An internal and external framing session with the license partners was held to kick-start the integrated study. This involved a core-viewing session followed by an integrated workshop to sketch and discuss different depositional concepts. The five deterministic scenarios developed to represent the main subsurface risk scenarios are shown in Figure 2.

All five of these scenarios were then subsequently used to optimise the drainage strategy and well locations. The conclusions from the study included a requirement for a pilot hole in one of the segments. One of the slanted producers has also been converted to a horizontal producer for better areal coverage. Another injector has been shifted Westwards to mitigate the risk of poor communication between injector and producer. Water shut-off capability has also been shown to be beneficial for optimising the overall recovery. Figure 3 shows the current locations of the injectors and producers.

Additionally, these 5 geological realisations have also been helpful to screen for back-up locations. Based on the study and these 5 models, some preliminary decision trees have been constructed to be used during drilling.

Recommendation in the modelling process during detailed well planning of a green field project:

1) Internal and partner framing sessions are important at the start of any integrated modelling work. We want to create fit-for-purpose models to be used for decision making and for risk mitigation.
2) Perform scenario-based modeling. These deterministic scenarios should reflect the key identified subsurface uncertainties with high project impact even if the probability of occurrence is low. Modelling of these cases will then help identify potential mitigation actions to reduce this risk (if possible) and to plan for a back-up strategy should they occur.

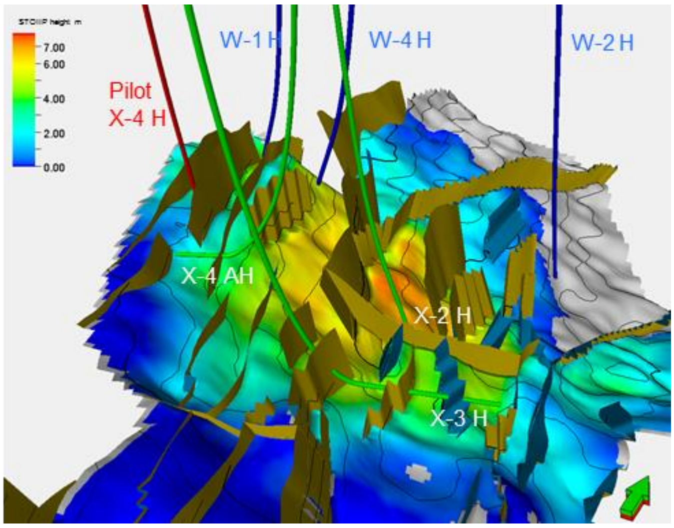


Figure 3. Planned injector and producer wells on Nova

Improving the history match of Dobroye field (Russian Federation) by close integration of dynamic data with seismic derived faults information

Provided by Ciro Marzocchi, Liana Zakharova and Aleksander Kalinichenko



Abstract

The objective of the study was to provide the ranges of recoverable HC volumes in view of an appraisal/producer well to be drilled on the HPHT Dobroye Oil Field operated by Wolgodeminoil (Russian Federation). The main reservoir is the sandstones of the Devonian Timansky Formation. A fundamental step was to obtain a good history match of the field to be able to reliably forecast the production which could come from the appraisal/producer well and perform the project economic evaluation. The Dobroye Field geological model was updated with a new seismic interpretation, which allowed a better definition of existing faults, even if not totally resolving them. Such faults were partially extended and/or adapted to improve the quality of the history match. Pressure transient analysis (PTA) supported this methodology and led to a definition of a set of compartments affecting the field. The updated model could be matched without altering the main reservoir properties such as porosity, permeability etc. The project was completed in a very tight schedule with a team of two geologists and one reservoir engineer.

Introduction

The Dobroye Oil Field is in the north-eastern part of Licence Area II of the LLC JV "Wolgodeminoil", about 30 km northwards from the City of Kamyshin on the right bank of the Volga River. The Dobroye Field was discovered in 2012 with the drilling the exploratory-wildcat well Avilovskaya-10 on the Dobraya Prospect. Three wells have been drilled in the field to date: AVIL-10, -32 and -33. Neighbours Fields are the Vostochno-Umetovskoye (discovered in 1987) and Zapovednoye (discovered by WDO in 2015 with Avil-15 well) fields which are producing from the same reservoir, the Timanskian (D3tm) Fm Upper Devonian sandy-silty section.

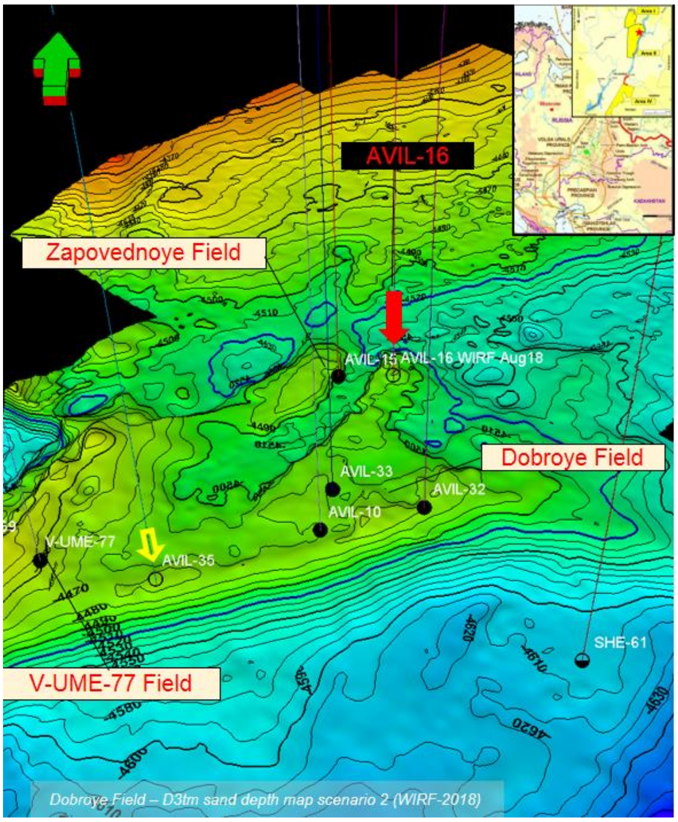


Figure 1. Dobroye Field D3tmTop reservoir depth map and initial OWC @ -4520m

The AVIL-16 Dobroye Field appraisal well is planned to be drilled by WDO JV starting in July 2019. The well will be drilled as a vertical hole to the Timansky (D3tm) reservoir and Pashisky (D2ps) reservoir (TD @ 4810m MD). Mapped as an NNE-SSW elongated structural high, the appraisal area is currently interpreted as a northern extension in continuity with the Dobroye Field, sealed off by an NNE-SSW running extensional fault from the Zapovednoye Field, located to the West (Figure 1).

Objectives

As part of the Avil-16 well evaluation the following RE study objectives were defined:

1. Verify if and how we can match the current wells
2. Verify if Avil-16 can be in communication or separated from the rest of Dobroye Field
3. Define possible ranges of RF

Available information and methodology

To evaluate the HC potential related to AVIL-16 and to geometrically define its segment, first a new seismic interpretation and an update to the Static Model was performed using the newly updated Depth map as Top of Reservoir and considering the OWC @ -4520m. This was then input to a Dynamic Modelling phase for history match and forecast.

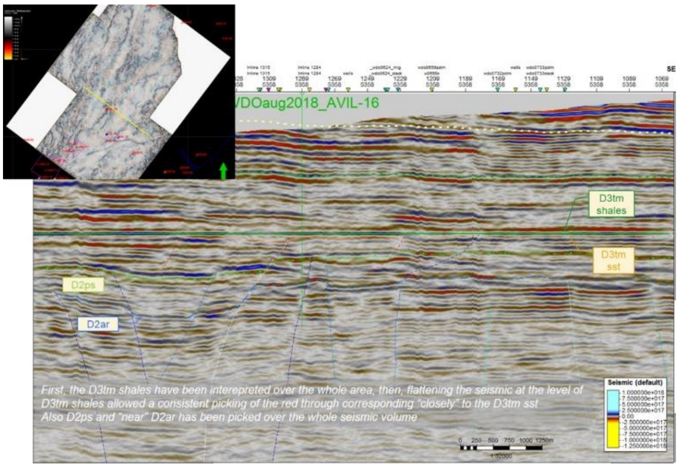


Figure 2. Interpreted horizons (volume flattened @ Top D3tm shales level)

Seismic interpretation

The Dobroye Field Area is covered by 119.7 sqkm of 3D seismic survey shot in 2012. To the north an additional 3D survey of 135.8 sqkm was acquired in 2016. The two 3D seismic surveys were specifically merged and reprocessed through PreSDM in 2018 (243.5 sqkm) with the purpose of better evaluating the AVIL-16 well location. Processing was completed in December 2018. Furthermore, a full suite of logs and markers were available from wells drilled nearby. A seismic interpretation has been performed in TWT domain, using mainly the depth to time converted anisotropic PreSDM. The activity started from the well to seismic tie in TWT domain and then completed with depth conversion using anisotropic seismic velocities and then tied to the well markers. A dense set of faults mainly running NNE-SSW was interpreted with the aid of CMY Amplitude Contrast volumes generated in Petrel (Figure 2). The presence of subseismic faults at the D3tm sst reservoir level has been taken to explain pressure measurements from wells in the area which are indicating the separation of Dobroye Field from V-UME-77 Field (Figure 3). A hypothesis which sees faults clearly visible and interpretable at D2ps level extending at the D3tm sst level was the basis to draw additional boundaries on D3tm sst map (Figure 4).

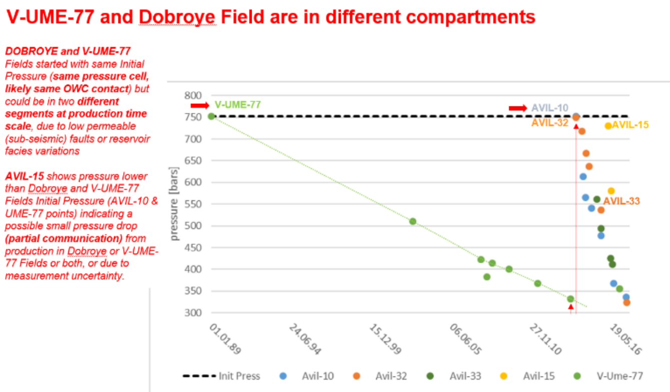


Figure 3. Reservoir pressure evolution in nearby wells

Static modelling

The Dobroye static and dynamic models exist in WIRF since 2013 and are being constantly updated based on the new data coming from wells and seismic. The current iteration of the geomodel was done based on the latest interpretation of the “merged” Dobroye and North-Dobroye cube as explained above. D3tm top sandstone structural map together with faults interpreted in seismic were used as the bases for the structural grid (Figure 5). The OWC was initialized @ -4520m. For the petrophysical modelling log data interpretation done in 2016 was used together with available core data (Figure 6). As no new wells were drilled since 2016 petrophysical model has not been updated since that period. The structural and log inputs for the model are in line with the parameters used for the GEOX run.

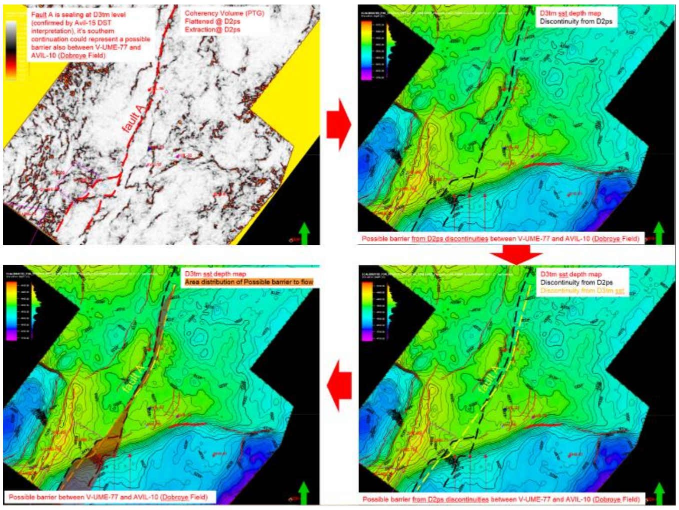


Figure 4. Workflow for boundary definition (Fault A) between V-UME-77 and Dobroye Field

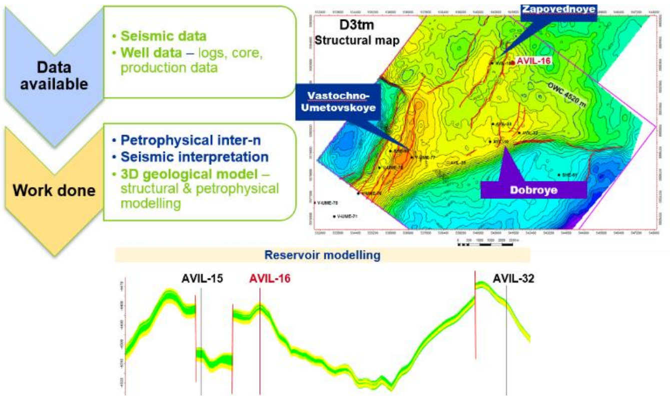


Figure 5. Geo model inputs

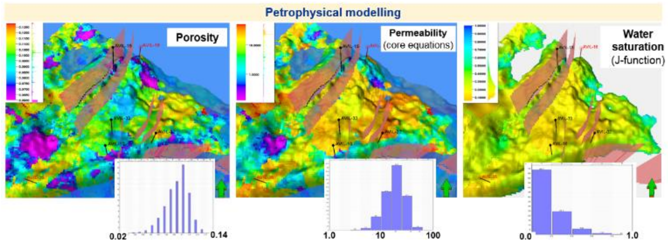


Figure 6. Porosity, permeability and water saturation grids

Dynamic modelling

Currently, well Avil-10 is producing about 40 m3/day of oil with ESP. Well Avil-32 producing in a natural flow with a rate of about 45 m3/day. Well Avil-33 after unsuccessful frac in September of 2018 is in periodically producing with a pump about 3 m3/day. Well Avil-15 is instead producing on a natural flow and has a rate of about 45 m3/day (Figure 7).

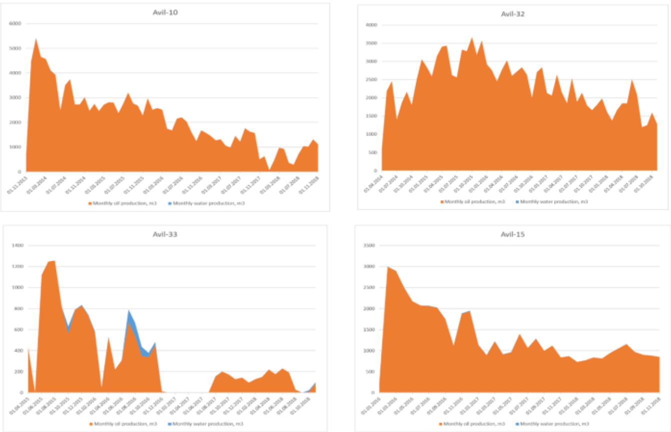


Figure 7. Production plots of active wells

The initial pressure of the field was measured in Avil-10 in November 2013 with 752 bar @ about -4600 m MD (highly overpressured with an over-hydrostatic gradient of 1.6). As the pressure in V-UME-77 in 2008 was already at around 360 bars, a direct communication between the two fields is unlikely, which was also verified by the simulation. A direct connection to Zapovednoye field is also very unlikely, as the initial pressure in Avil-15 in February 2016 was ~730 bars (substantially un-depleted), compared to the pressure regime of around 400 bars in Dobroye field.

The proposed well Avil-16 is located at the northern part of the Dobroye field, close to well Avil-15 of Zapovednoye field. Based on the updated geological model, a dynamic simulation was performed in-house. Initially, the model had 4 faults which coloured by blue in Figure 8. The first run of the dynamic model showed that the current mapping of fault distribution and/or reservoir structure was not enabling a good match. It is obvious from the chart in Figure 9 of well performance when the oil rate is compared with reservoir pressure.

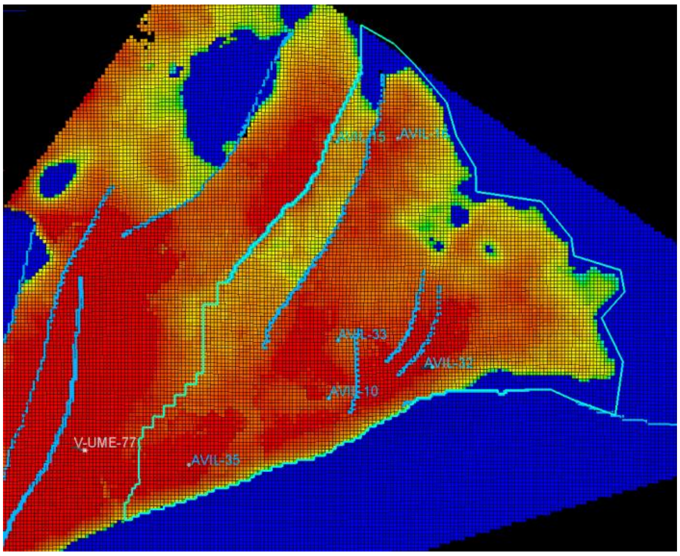


Figure 8. Initial faults in the zone of interest (OWC @ -4520m)

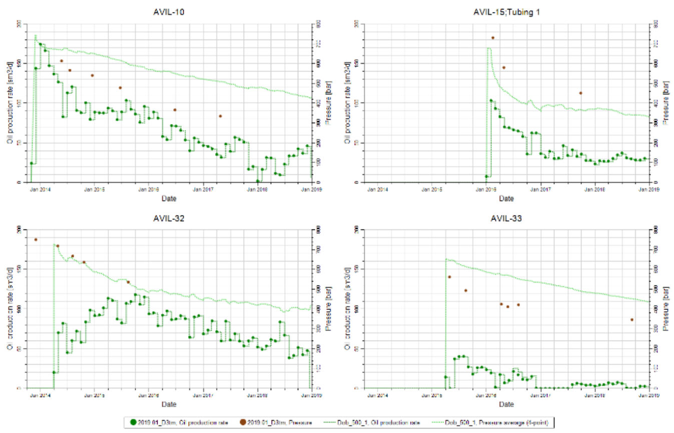


Figure 9. Initial run. Comparing historical (dots) vs simulated (lines) reservoir pressure

From the consideration that production data are more reliable than highly uncertain subsurface data it was decided to try to match the model by playing with subsurface architecture, mainly extending faults in the model, without playing with poro/perm multipliers. This was based on the understanding that some of the faults affecting the thin D3tm sst reservoir could well be sub-seismic. Such modifications where QCed on Coherency attributes extracted from 3D seismic data.

The well Avil-15 was matched (Figure 10) first by extending a fault to the north between Dobroe and Zapovednoe fields and merging two faults in the south. So, Zapovednoe reservoir became fully isolated. The well test proves this theory and confirms that the well is in the narrow stretched ribbonlike reservoir with virgin initial pressure. Adding this fault extension improved history matching. In the following figures, blue lines are simulated reservoir pressure from the case without initial faults, in purple – with edited/extended faults.

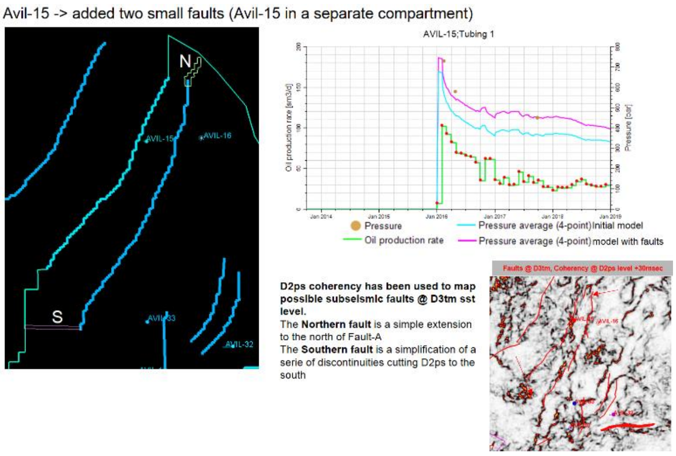


Figure 10. Avil-15 history match

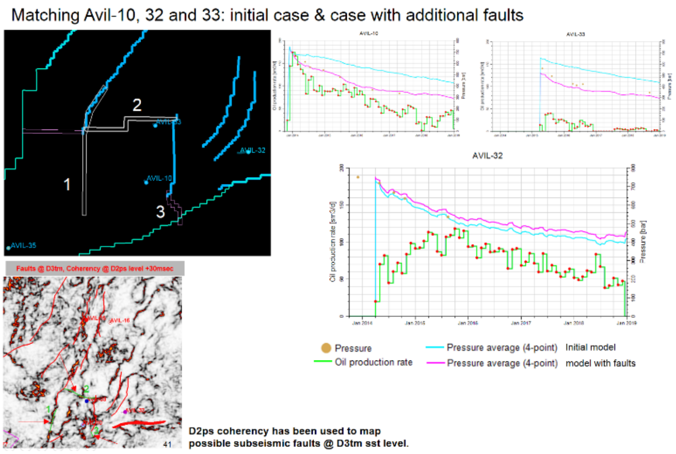


Figure 11. Avil-10, 32 and 33 history match

Avil-33 has relatively good reservoir properties. But it started production with already partially depleted reservoir pressure. To the moment of starting Avil-33, the closest well Avil-10 has been working already for more than 2 years. The dynamic models showed that reservoir pressure should decrease more aggressively so an additional impermeable boundary was implemented to the north of Avil-33 as shown in Figure 11.

Also, Avil-10 needed some adjustment. A simple extension of the existing barrier between Dobroe and Zapovednoe helped to match reservoir pressure as shown in Figure 11.

To match well Avil-32 a small prolongation to the south of the fault between Avil-10 and Avil-32 was enough to bring the reservoir pressure behavior close to reality (Figure 11).

Because of this initial history matching phase Avil-32 and Avil-16 would end up in the same compartment (Figure 12).

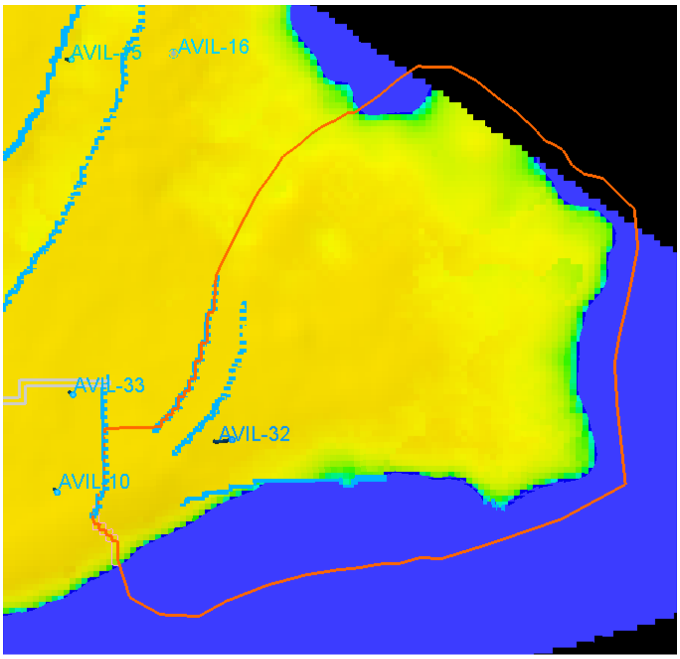


Figure 12. Avil-16 in the same compartment of Avil-32

As oil-water contact in Dobroe and Zapovednoe fields was not penetrated there is some uncertainty in the OWC definition. A further history match sensitivity was then performed, creating a separate compartment for Avil-16, separate from Avil-32, just by moving the Avil-32 compartment OWC down to -4540m (20m deeper than the previous HM) and extending a fault to the NE. Water saturation was again calculated by J-function based on this contact. The case with OWC=-4540 m did match the historical data quite well confirming such a scenario as a possible one (Figure 13).

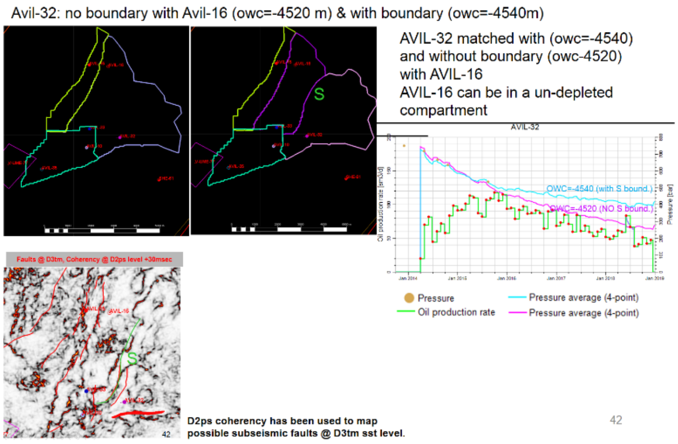


Figure 13. the two Avil-16 scenarios matching history data

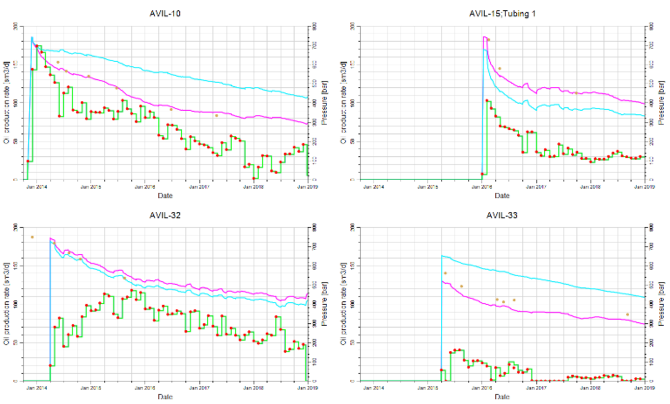


Figure 14. Reservoir pressure matching: Blue 'initial model', purple 'fault adjusted' (here shown case with Avil-32 separated from Avil-16)

Results

Current wells have been matched with two alternative scenarios (Figure 12, 13):

1) Adding a few boundaries, without any multipliers, no artificial aquifer support, with Avil-32 connected to Avil-16.

2) Same as above but adding a boundary between Avil-32 and Avil-16 (Avil-16 in a separate compartment) adding 20m HC column in Avil-32 compartment (OWC -4540m).

The comparison of pressure behavior for matched and unmatched models is shown below (Figure 14).

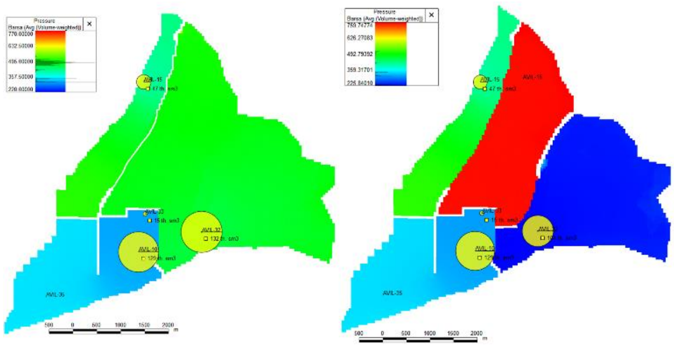


Figure 15. Reservoir press & cum oil production 01.01.2019 without and with boundary Avil-32/Avil-16 (to the right the values in Avil-32 compartment should be disregarded, being related to OWC @ -4520)

Conclusion

Wells production data show Dobroye field as compartmentalized and/or likely affected by permeability barriers; faults visible on conventional migrated seismic of 3D Dobroye survey (3D PostSTM, 3D PreSDM) did not provide a satisfactory history match with production data, therefore a more detailed look at possible discontinuities was performed using the Coherency Volume available, looking at such discontinuities as developing also from the section just below D3tm (D2ps). Such lineaments were then integrated into the model and utilized to get a satisfactory history match as follows:

- Subseismic faults/barriers have been introduced to isolate Avil-10 and 33 from Avil-32 well and Avil-15 from the rest. V-UME-77 Well/Field has also been kept into a separate compartment as suggested by the pressure decline recorded by the wells (Fig 15).

The history match resulted in the definition of two main scenarios for Avil-16 segment definition:

a) AVIL-16 in a common compartment with AVIL-32

b) AVIL-16 in a separated undrained compartment

Recommendation for future activity

The production forecast shows that wells AVIL-10 and AVIL-33 will stop production in 2020, AVIL-32 in 2022 due to reservoir pressure depletion. The prolongation of field life could be done by water injection for example. This scenario is the target for feasibilities study of water injection in Dobroye field under investigation now.

A technique to improve fault geometry visualization and extraction

Provided by Abuajila Sallam

Creating a good geological model is very crucial for optimized field production and development strategy. On the other hand, a poor geological model will have a negative impact on development strategy.

The geological model includes creating depth, thickness maps and faults, etc. from seismic and well data. Sometimes it is almost impossible to get a representing geological model from seismic data using conventional seismic interpretation approaches because of imaging and quality issues especially at greater depths

In the P-field of WILI in Sirte basin we have noticed that the current static geological model is inconsistent and does not match the dynamic reservoir behavior and observed production data (pressure mentoring data, water cut), most of these inconsistencies came from the failure in fault interpretation near the producing wells and reservoir properties. Therefore, the decision has been taken to update the existing geological model to match dynamic reservoir behavior and observed production data.

This work aims at providing a new approach to get a better fault definition and visualization. The approach of this techniques as describe in below points

- Creating variance attributes to enhance fault edges by highlight fault discontinuities
- Ant track volume attributes (highlight fault traces) as showing in the Figure 1

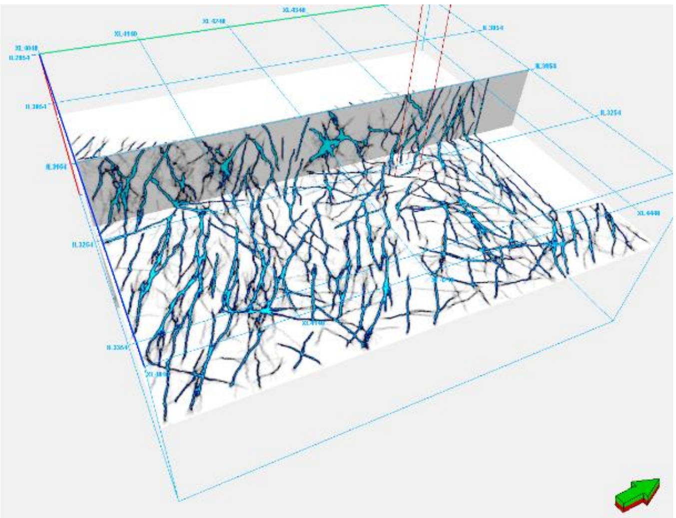


Figure 16. Generated Ant Cube

- Volume attributes clipping against area of interest as showing in Figure 2

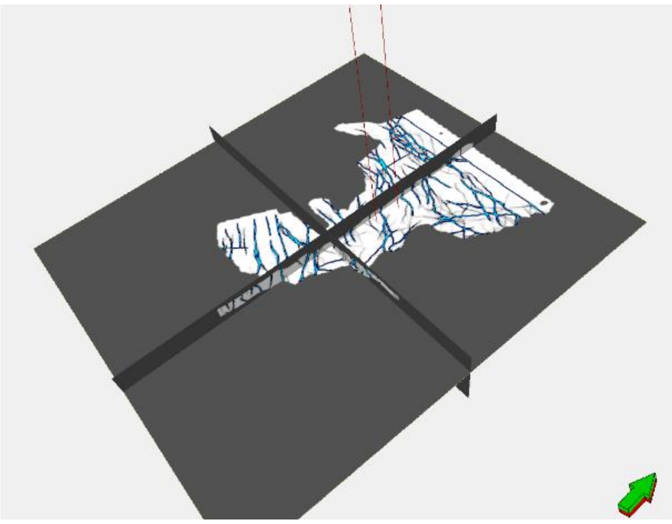


Figure 17. Volume clipping to highlight AOI

- Creating box probe & render it based on certain opacity range
- Extract geobodies from visualized fault traces
- Convert the geobodies to points
- Creating fault model frame work from converted geobodies points

The images below show results of the new approach. Obviously, the new approach has giving by far a better interpretation of the fault networks. However, for a full assessment of the approach we need to run dynamic reservoir simulation.

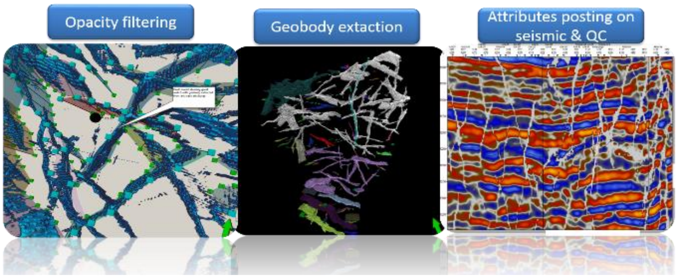


Figure 18. Workflow approach & Comparison between the old and new model

Using this approach helps a lot to remodel the faults and horizons by:

- Visualizing the faults before model in 3D view and how changing laterally and vertically will construct a good imagination of the earth model and how it is formed
- Building a realistic structure model by better honoring of seismic data
- Less Time required to remodel the fault instead of reinterpreting it
- Getting a better understanding of geological structural process

What's new? - Pinboard

SHAREPOINT – IRM

The IRM SharePoint (on BASF server) deals as open data and communication platform: ***https://basf.sharepoint.com/sites/wiho-knowledge-center/integrated_reservoir_modelling/SitePages/Start.aspx***

We are working hard to establish a new MS Teams platform allowing access for both former Wintershall and DEA colleagues.

SKILL NETWORK MEETINGS 2019

The 2019 meetings of the re-staffed Static Reservoir Modeling and Dynamic Reservoir Simulation skill core groups will be presumably held in Germany in Q4/2019 (location needs to be defined). More information will follow soon.

IRM NETWORK GROUP AT FORCE (NORWAY)

The network group "Integrated Reservoir Modelling" within the FORCE knowledge exchange forum in Norway *(http://force.org/en/)* invites regularly for lunch'n learn and other events. More information can be found here: ***https://www.npd.no/en/force/improved-oil-and-gas-recovery/integrated-reservoir-modelling/#***

DIRECTIVES, GUIDELINES AND PROCEDURES

The **Directive for Integrated Reservoir Modelling (IRM)** has been incorporated into the E&P Management System in 2017 and has been updated in April 2019.

The updates are minor, and reference is made to more discipline specific best practice documents. The document explains the IRM policy and describes the process for the planning and execution of Integrated Reservoir Modelling.

The IRM Directive defines procedures on how to evaluate in-place hydrocarbon volumes, reserves (resources), production forecasts (see also Wintershall Global Forecasting Directive) and production optimization measures in an integrated manner. It delivers a practical workflow that can easily be applied to all modelling projects, throughout all stages of projects in the E&P life cycle. The document focusses on model-framing, model-building and the necessary QA/QC steps, including integrated reviews. It also refers to guidelines which are applicable as part of the IRM process. The process is mandatory whenever static/dynamic reservoir models are used as a basis for business and technical decisions. Its application will be checked as part of Peer- and Project Reviews. The exploration and/or development managers in the OPCO's and Headquarter are responsible for an appropriate execution of IRM activities in their organisation. They shall ensure that asset managers, project coordinators etc. are aware of and follow the IRM Directive. Local IRM focal points in each OPCO can be installed to help with the implementation of this Directive. If you cannot find the Directive, please request a copy by sending an email to: ***koos.pipping@wintershall.com***.