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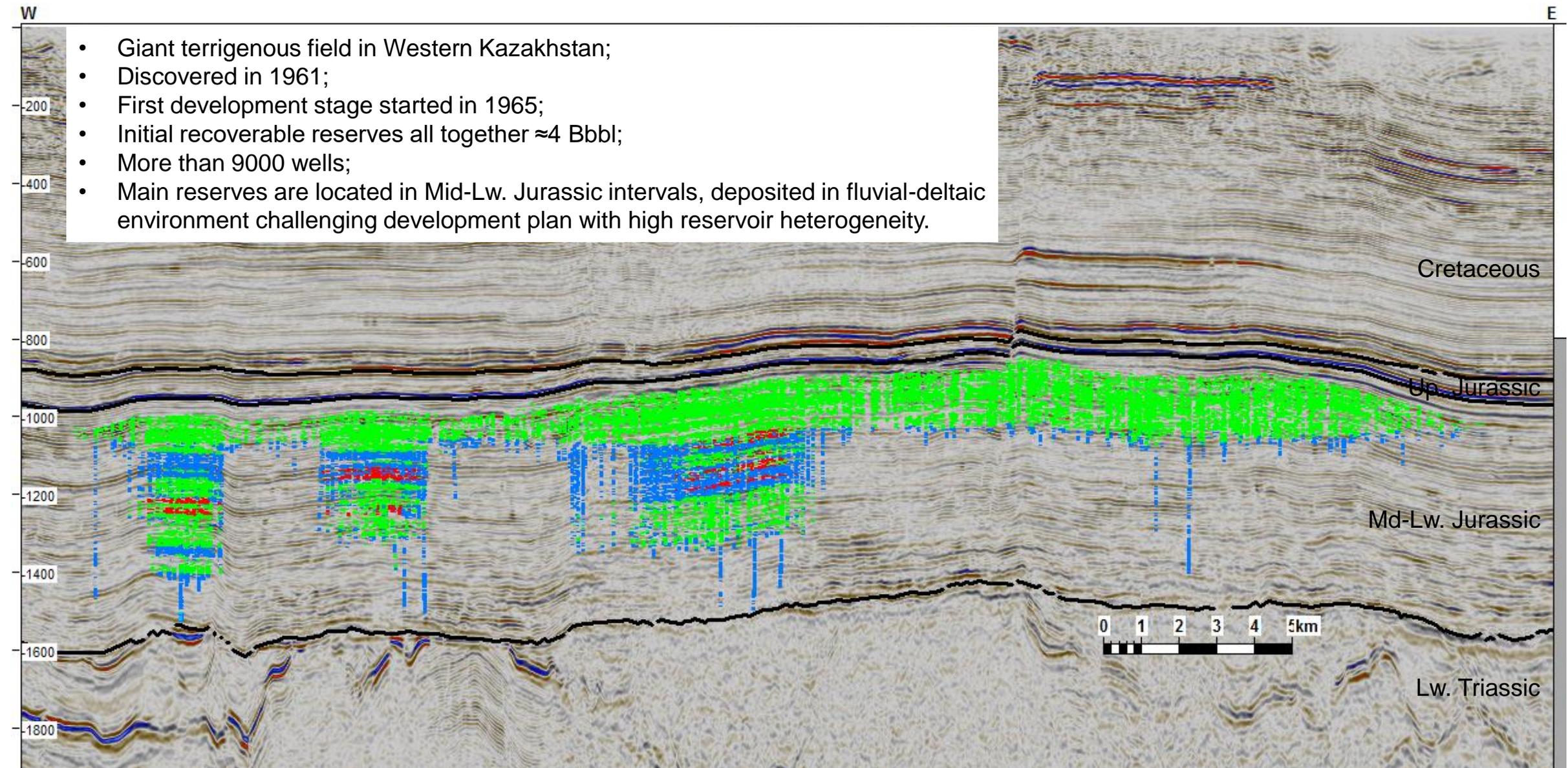
New opportunities for mature oil and gas
exploration and production

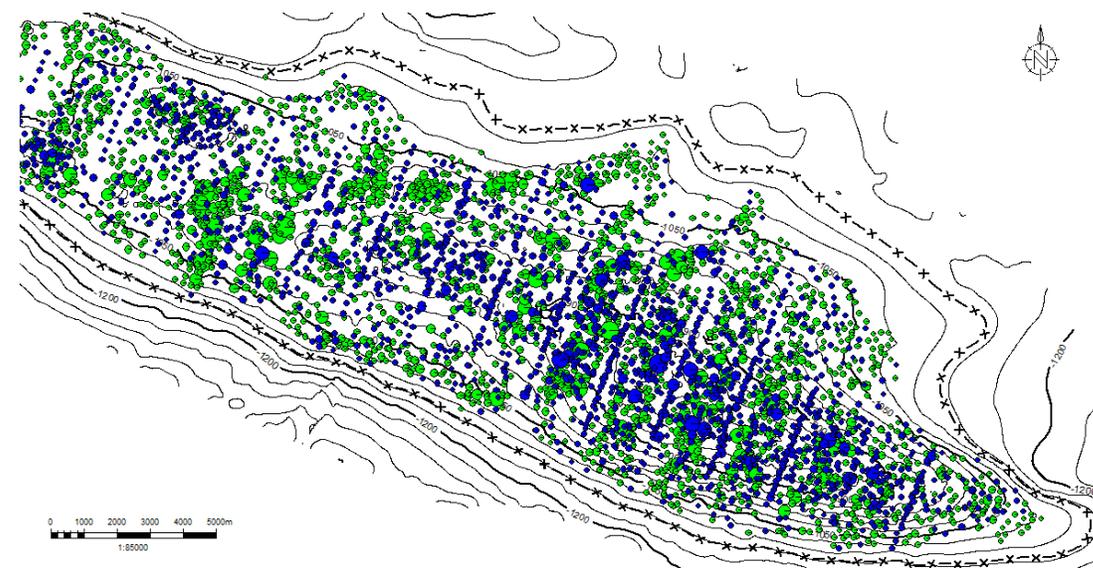
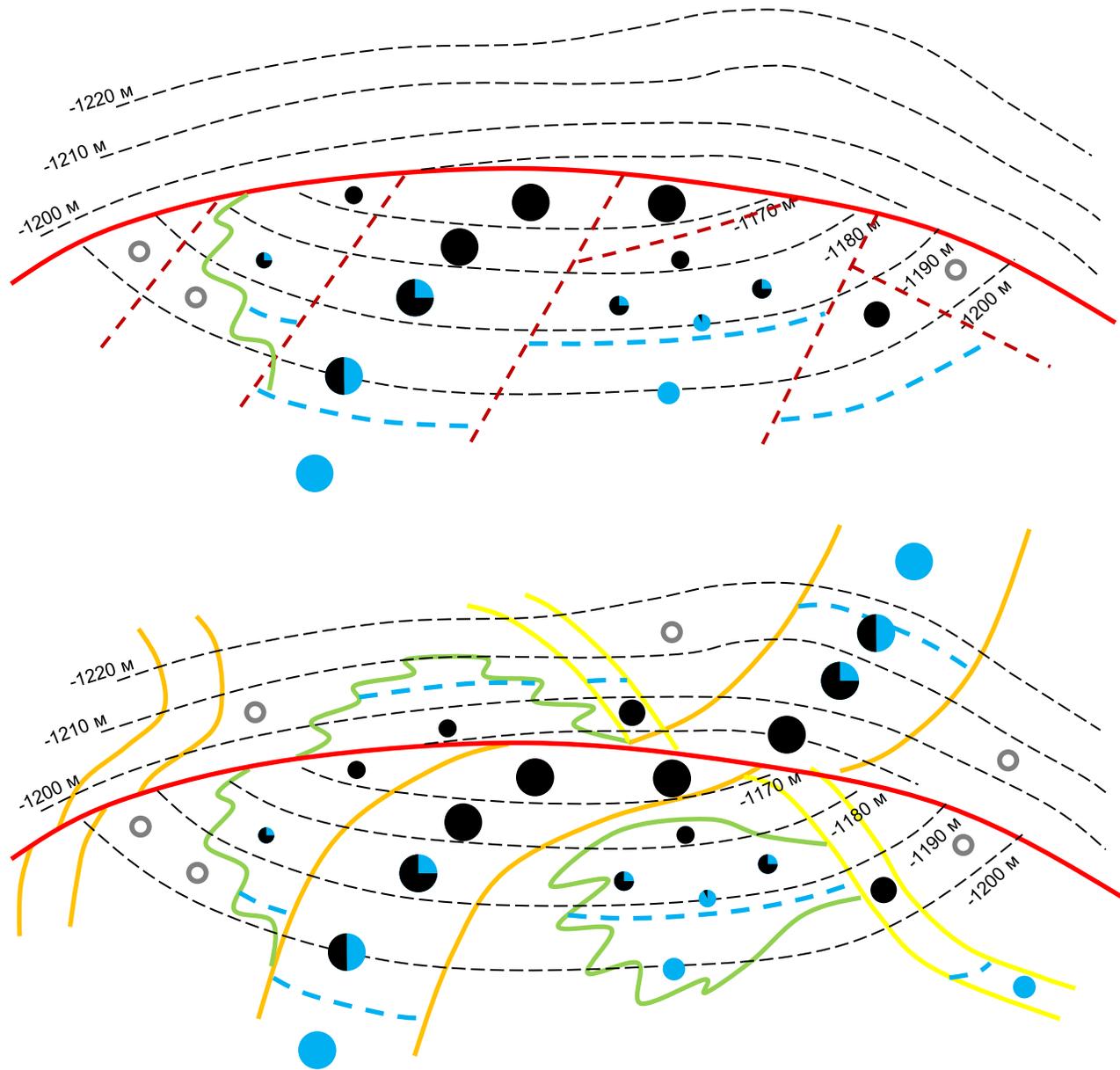
Olzhas Begimbetov
Director of Resource Base Development Department
KMG Engineering LLP

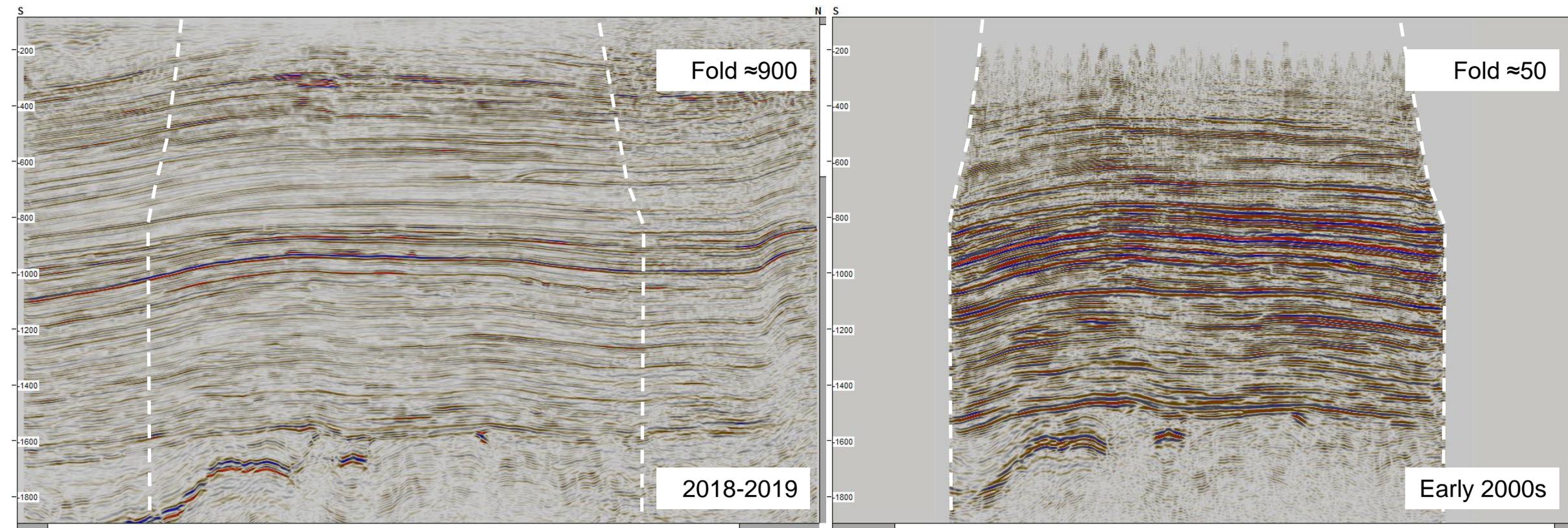
Assylzhan Dauletov
Deputy General Director for Exploration
KMG Engineering LLP

GIANT TERRIGENEOUS MATURE FIELD

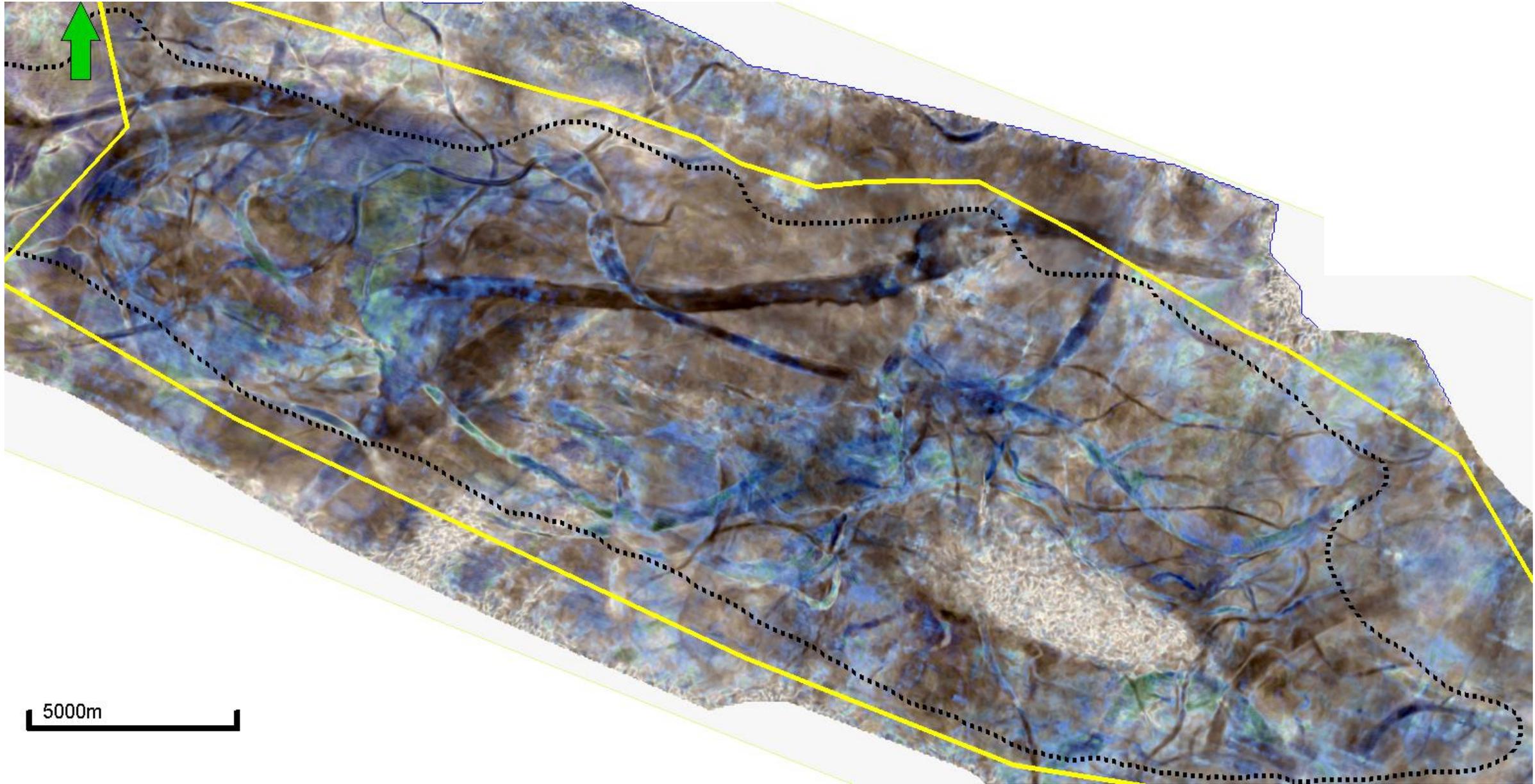
- Giant terrigenous field in Western Kazakhstan;
- Discovered in 1961;
- First development stage started in 1965;
- Initial recoverable reserves all together ≈ 4 Bbbl;
- More than 9000 wells;
- Main reserves are located in Mid-Lw. Jurassic intervals, deposited in fluvial-deltaic environment challenging development plan with high reservoir heterogeneity.

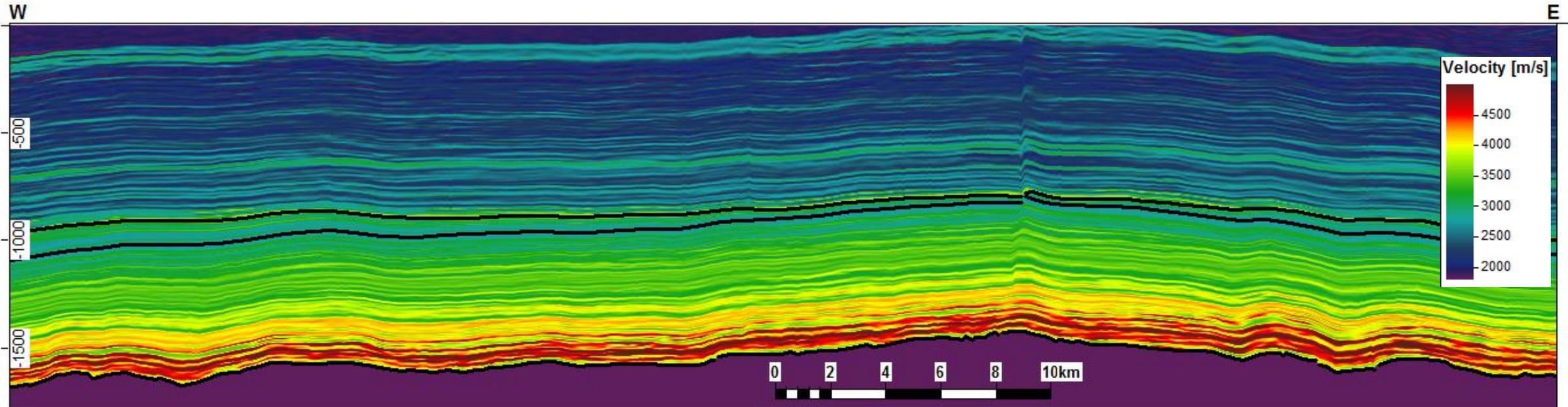






- New high quality and resolution 3D seismic data improved the understanding of reservoir heterogeneity thus upgrading more realistic geological model.
- Field development plan is going to be reconsidered thus improving its production efficiency and recoverable factor.
- Additional increase in reserves was obtained as well as new lithological traps were discovered.





Layered Grid (Time)

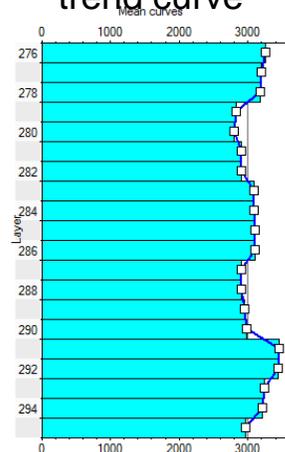
Velocity Well Data (VSP)

Seismic PSTM Data

Trend Modeling
(Classification & Estimation)

Make Seismic cube
(interpolate)

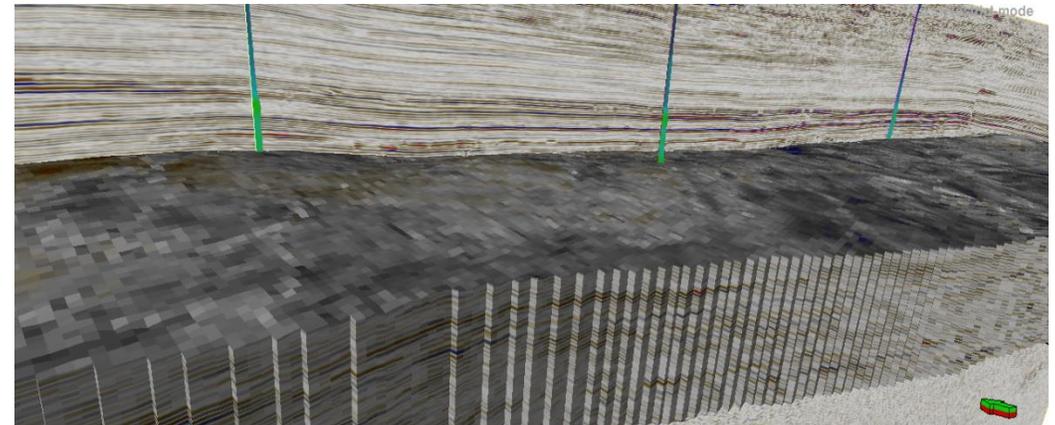
Vertical mean
trend curve

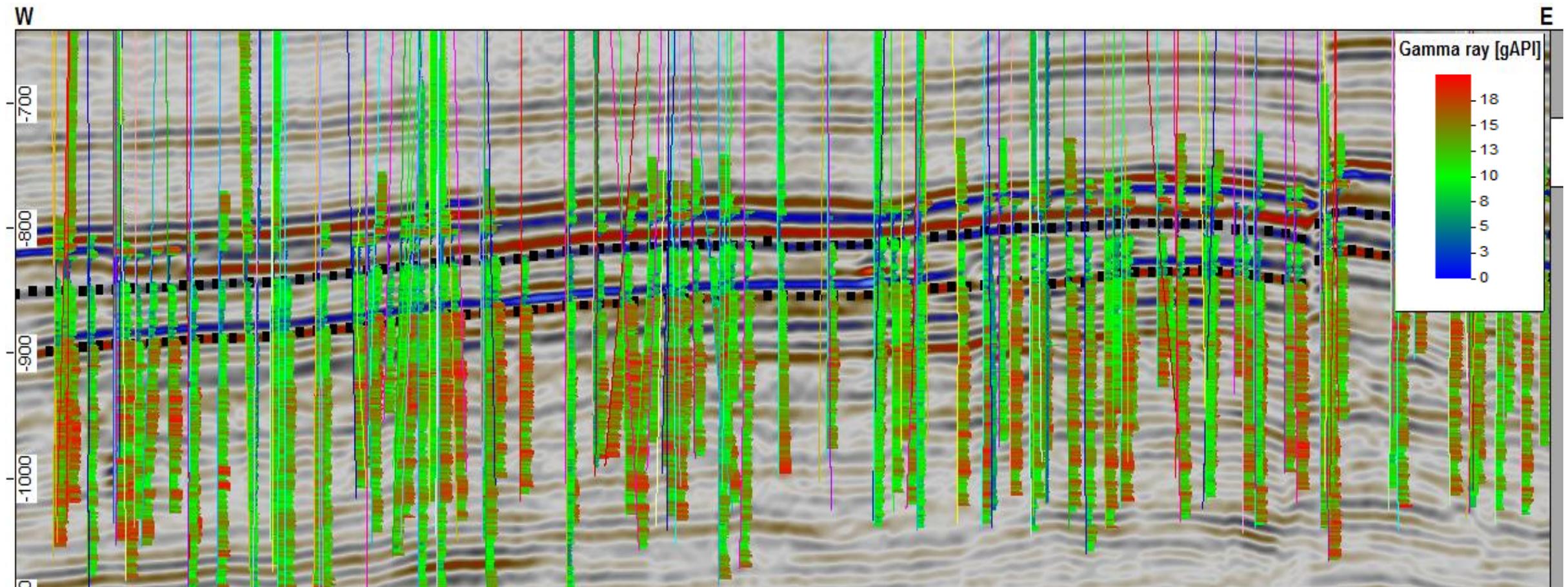


Weighted
multivariable
regression

- Simple method to build relatively detailed thin layered velocity model.
 - Application of Classification and Estimation module

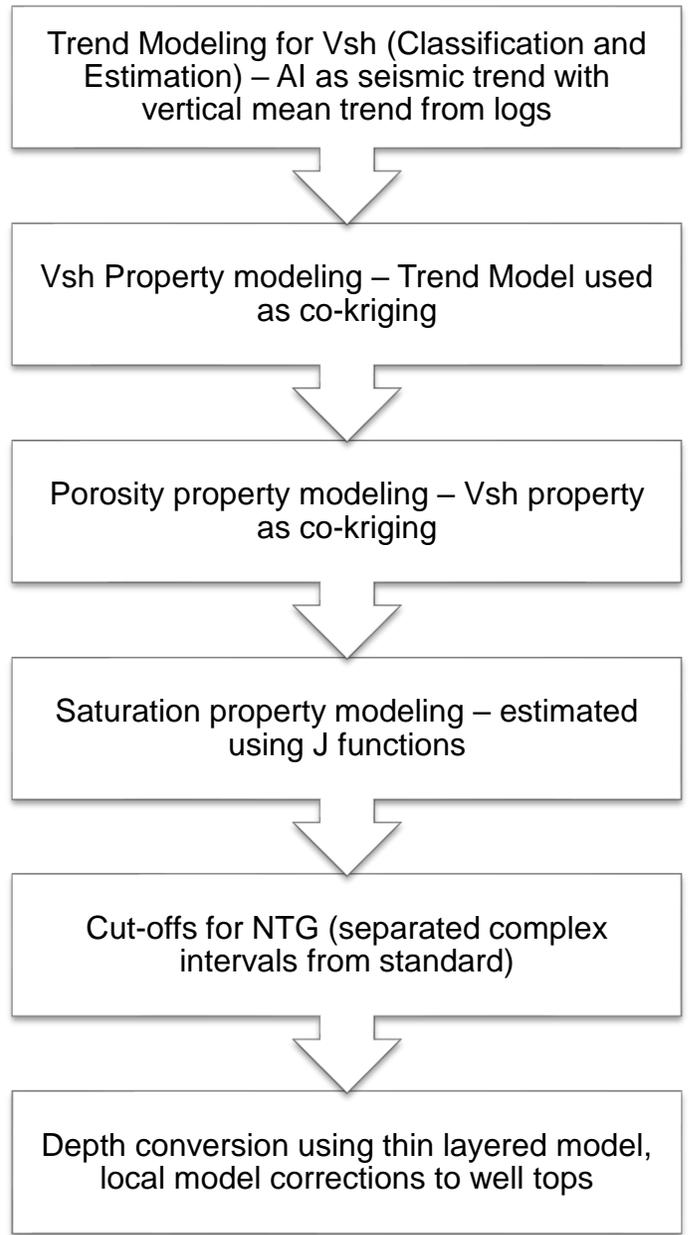
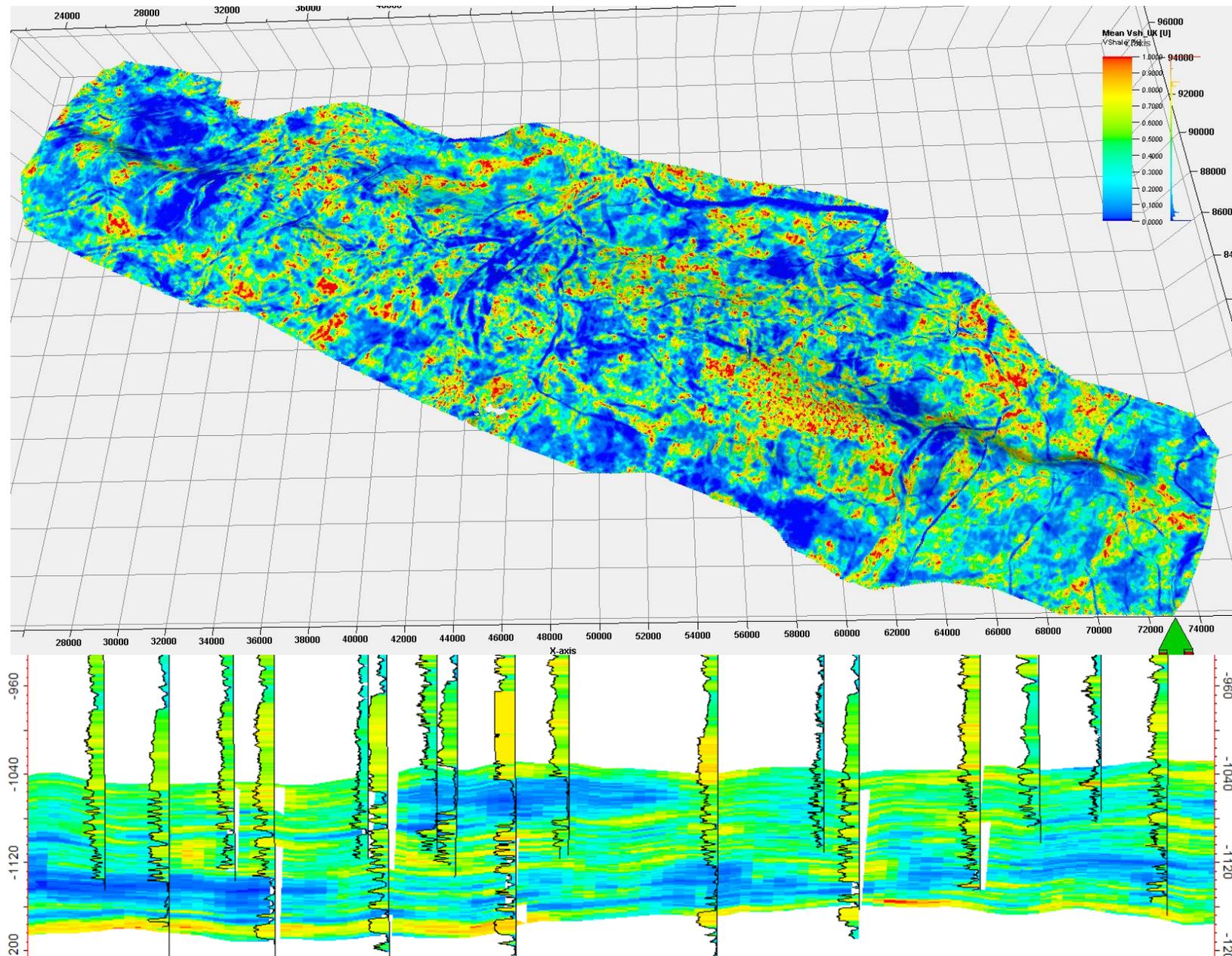
Resampled seismic attribute



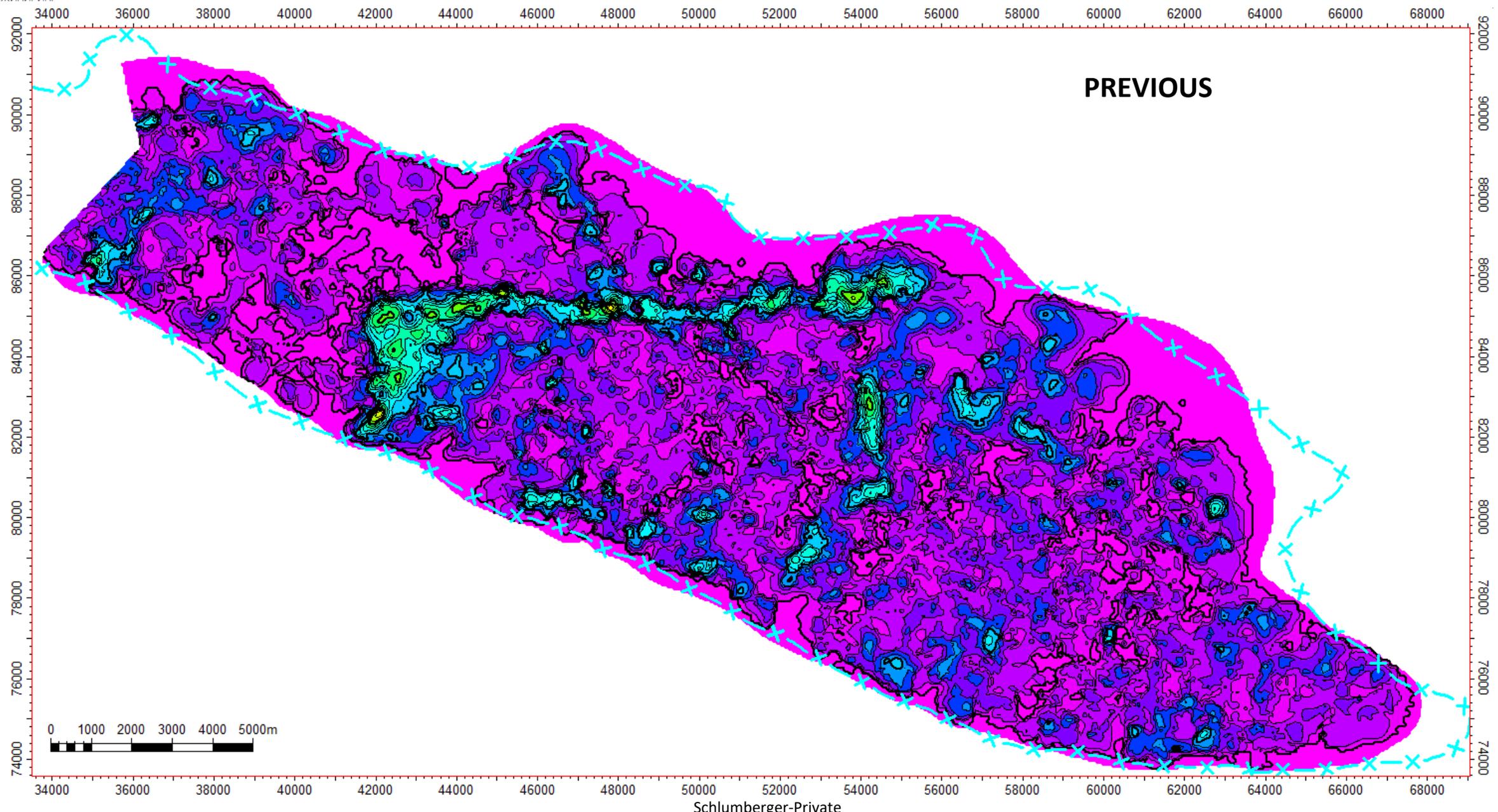


Detailed thin layered velocity model was used in creating time logs for all wells that showed good correlation. Very useful and simple way to tie massive amount of wells. More than 9000 wells in this case. Some corrections may be applied – two/three iterations to reduce uncertainties.

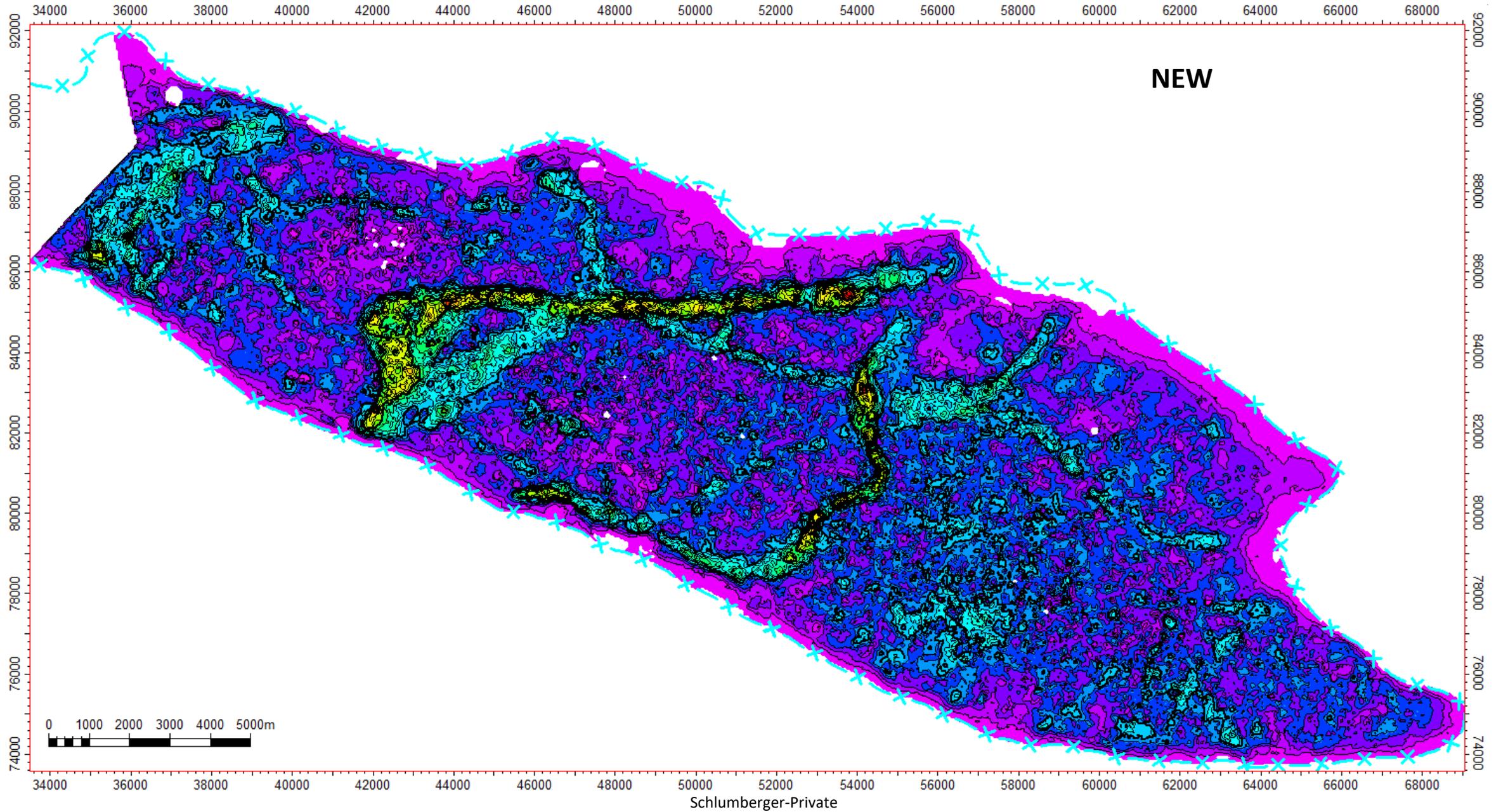
PROPERTY MODELING USING LOGS AND SEISMIC DATA



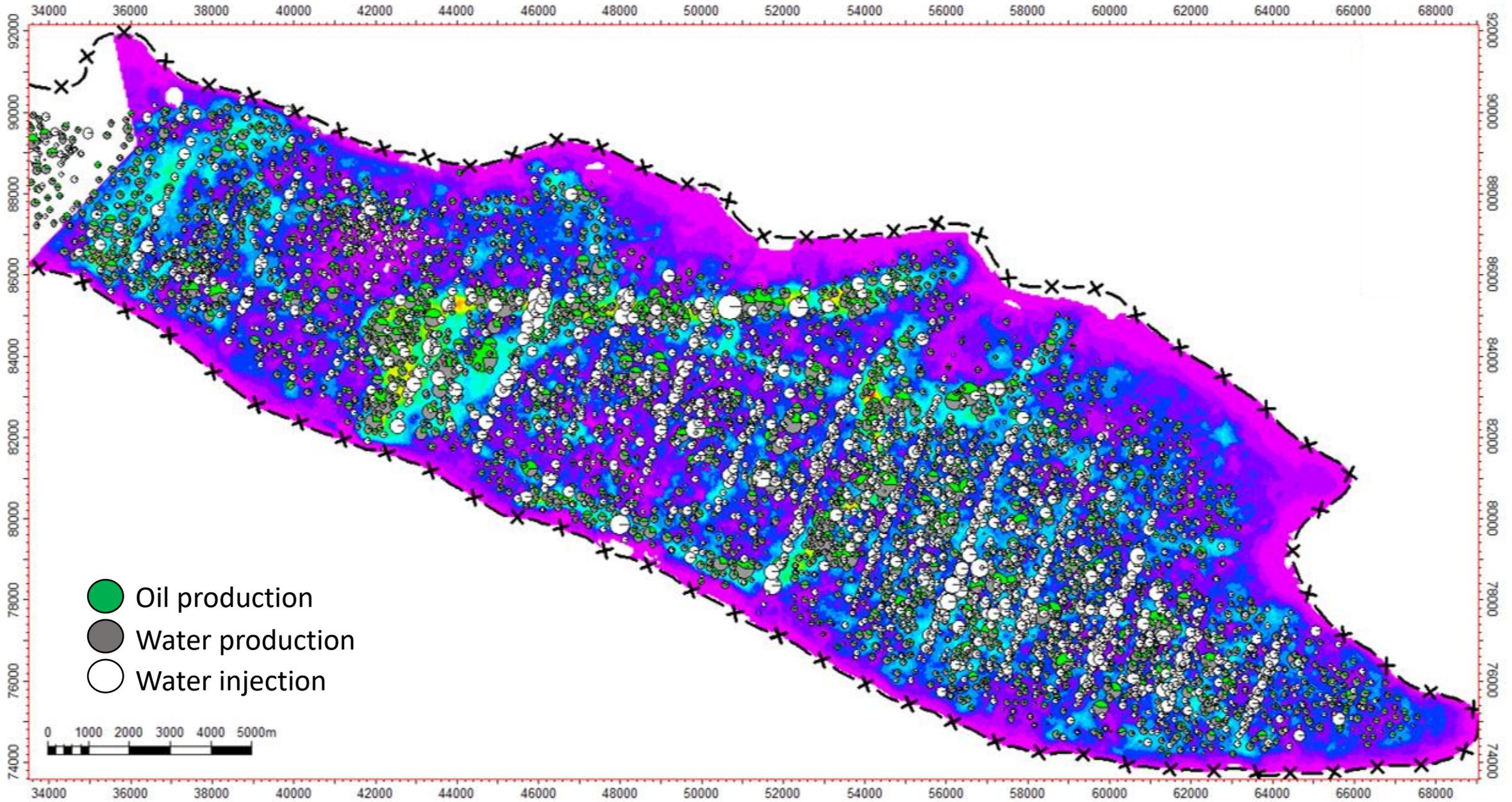
HC RESERVES OF ONE PRODUCTION HORIZON



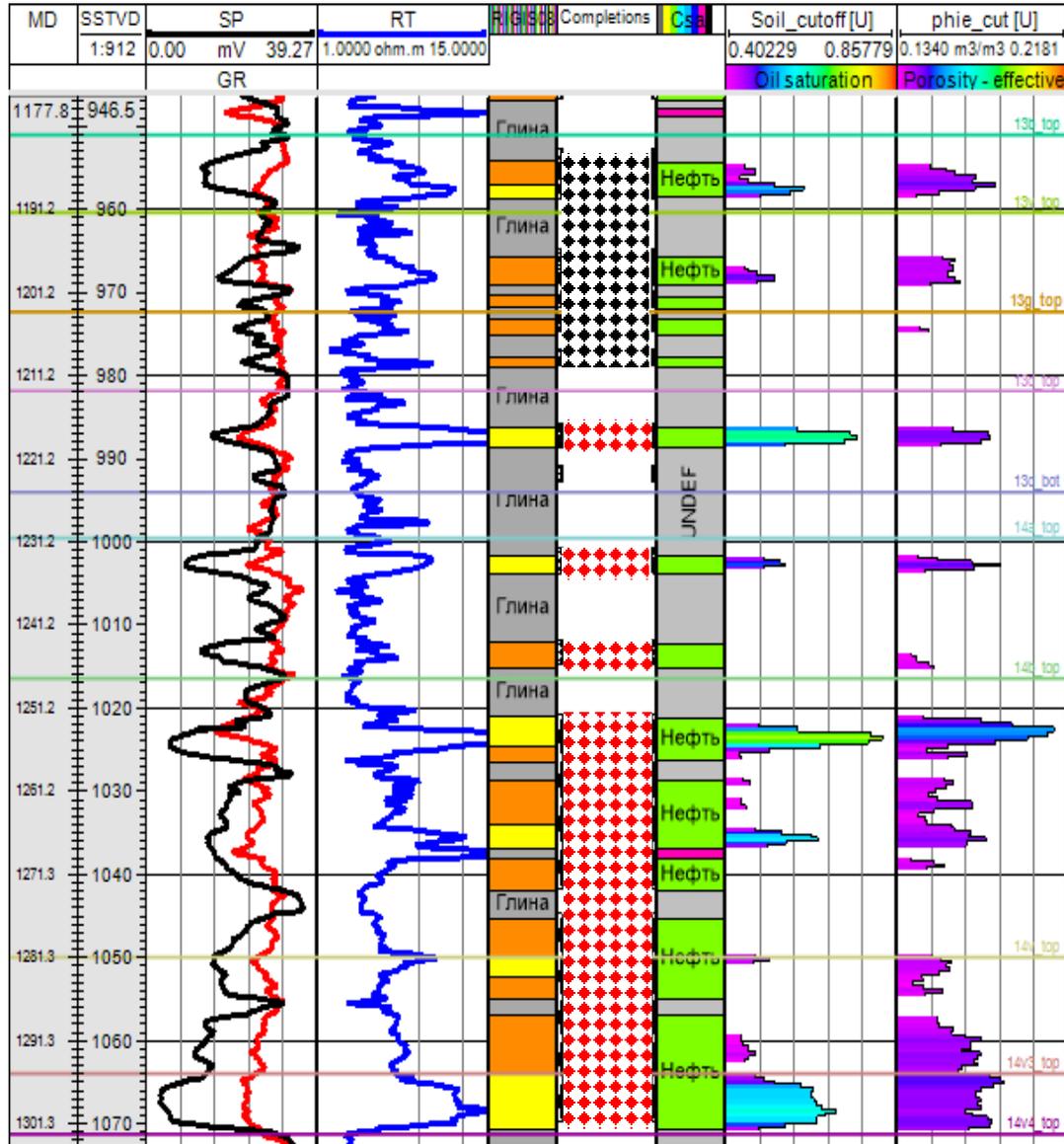
HC RESERVES OF ONE PRODUCTION HORIZON



HC RESERVES OF ONE PRODUCTION HORIZON

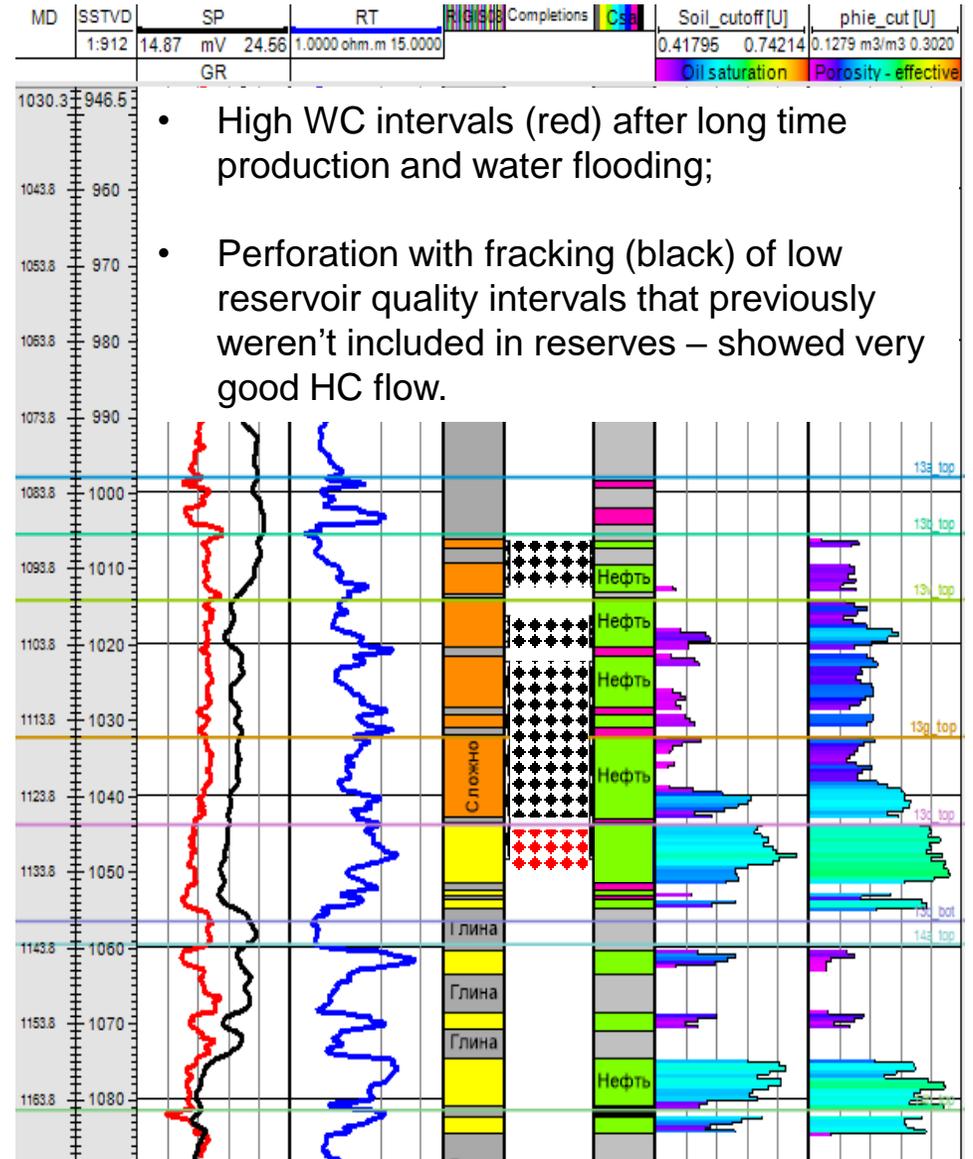


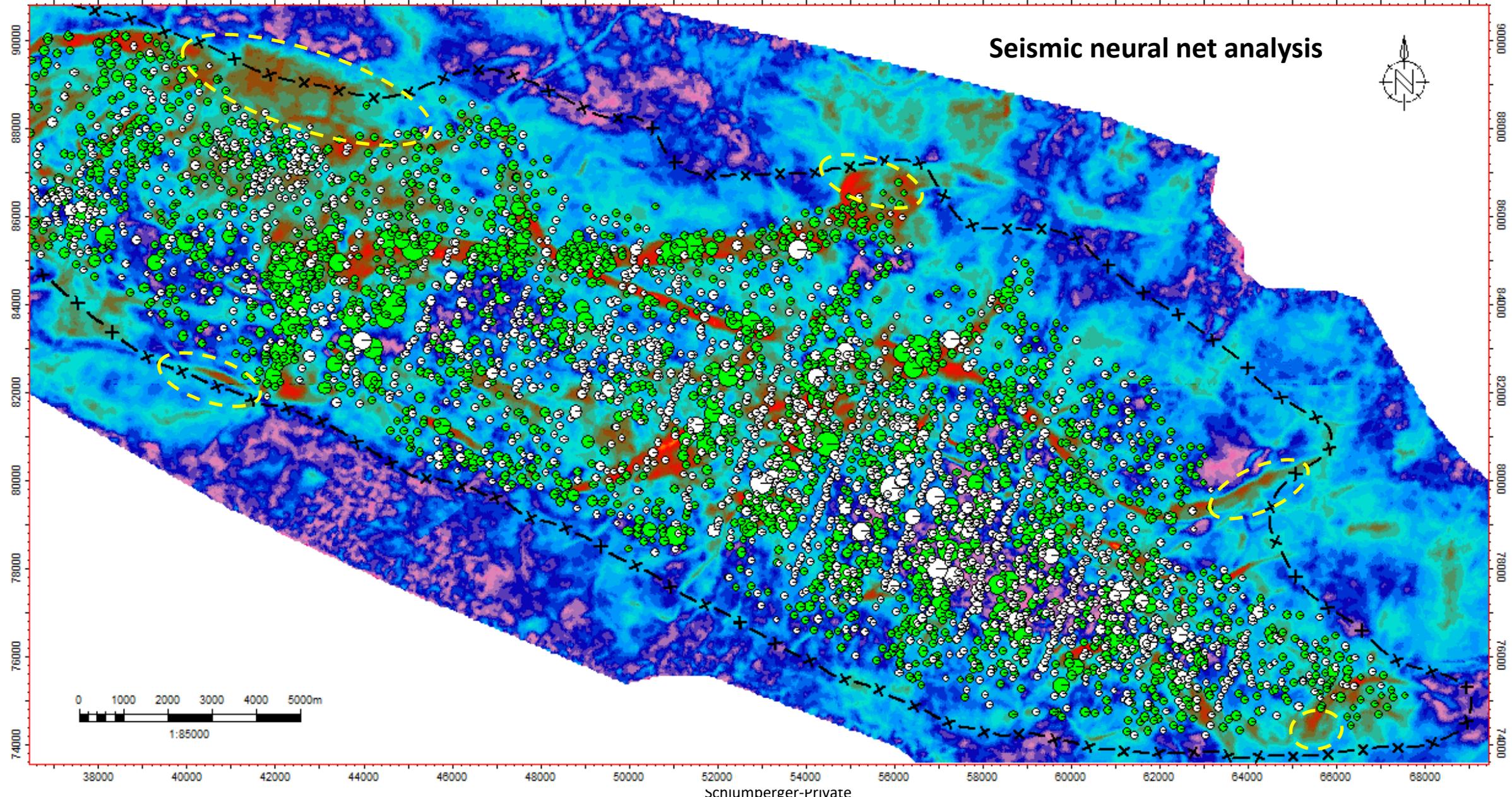
ADDITIONAL LAYERS – COMMERCIAL HC FLOW AFTER FRACKING



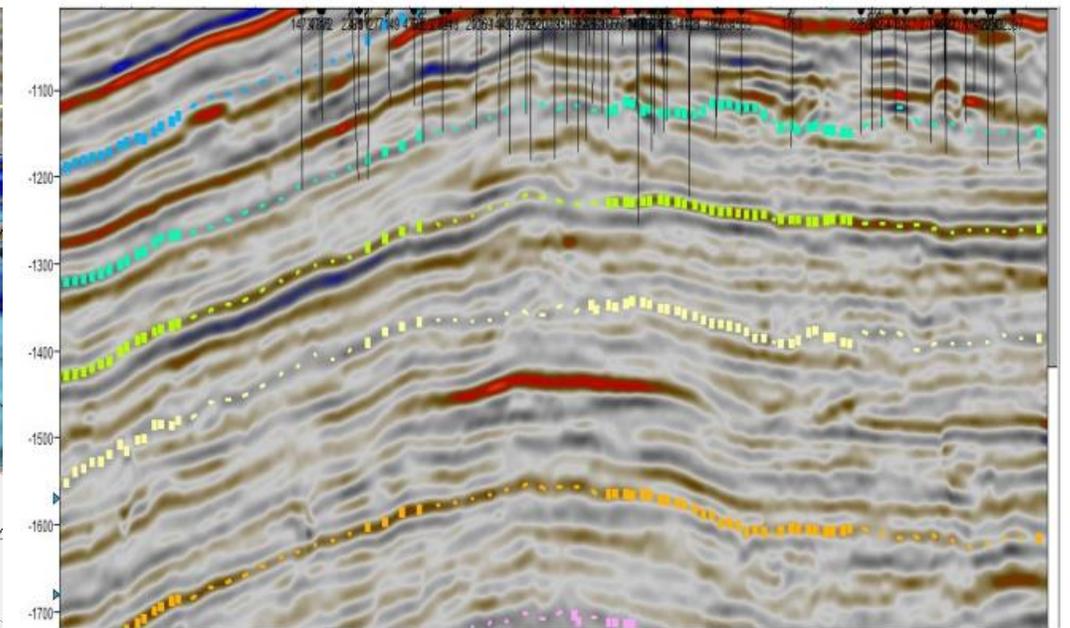
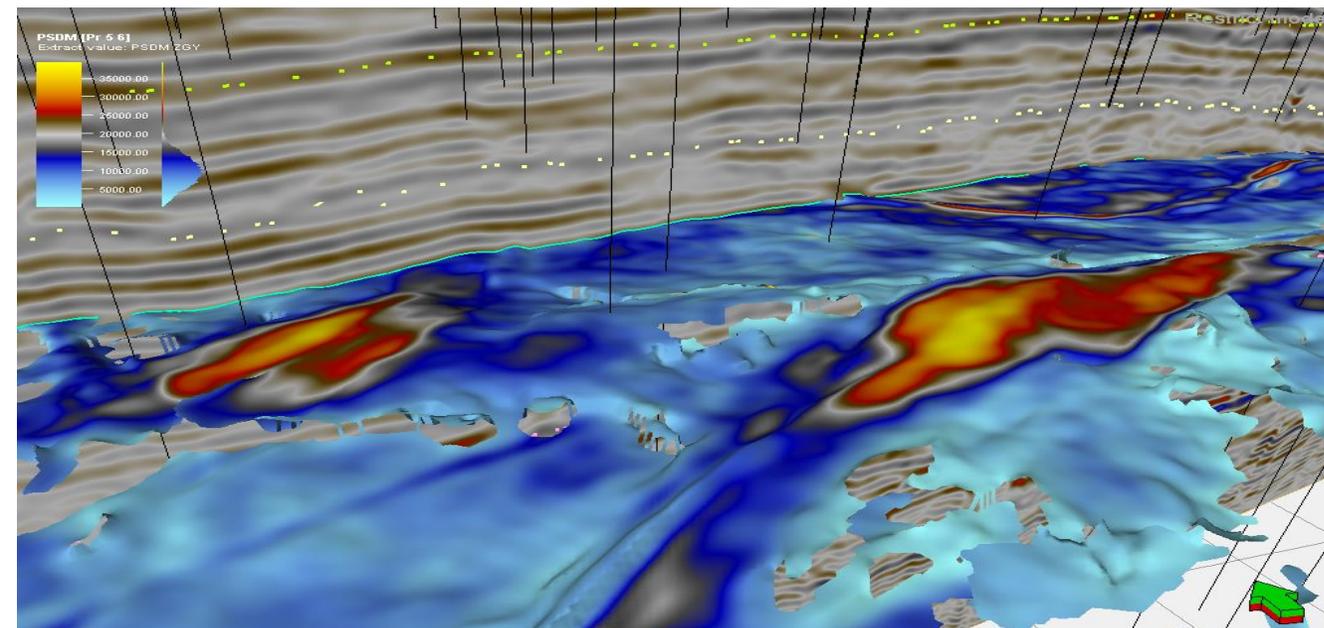
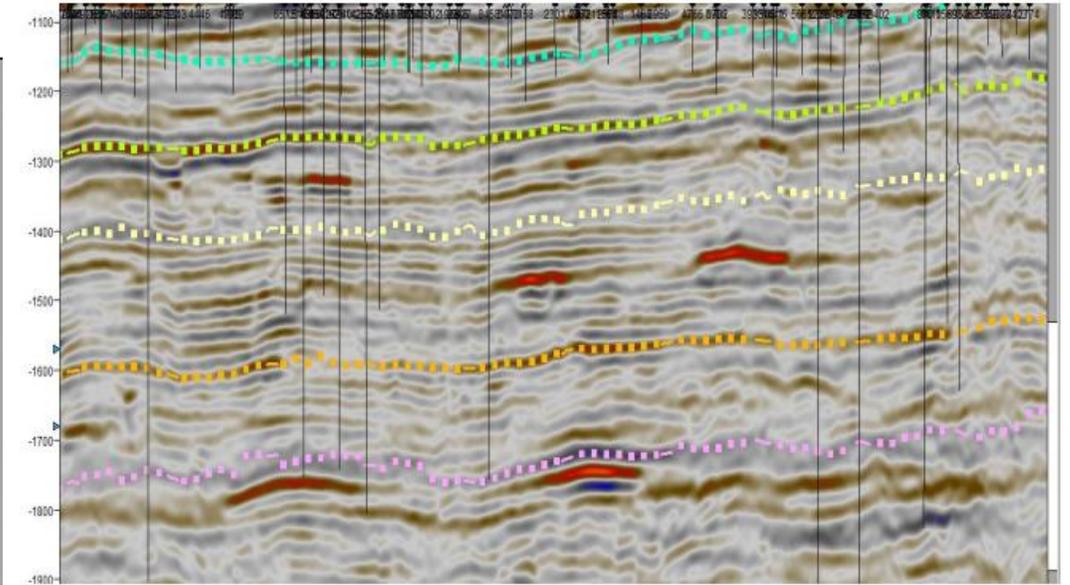
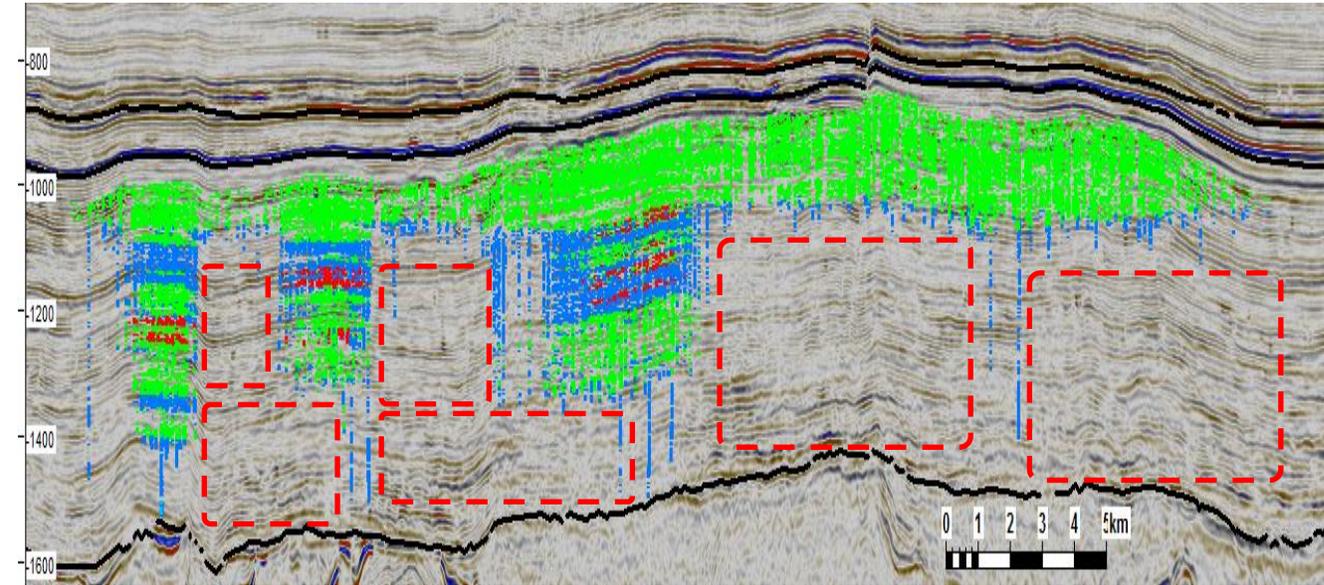
Restudy of more than 9000 wells using Techlog

+300 Mbbl recoverable reserves increase





NUMEROUS LITHOLOGICAL TRAPS BELOW MAIN HORIZONS



- High resolution 3D seismic data with application of Schlumberger modern methodologies and algorithms in Petrel and Techlog allowed to restudy a massive dataset with more than 9000 wells in a relatively short period of time to better understand reservoir uncertainties and heterogeneities;
- This work resulted in reserves growth up to 300 Mbbbl (end of 2021);
- Numerous additional prospects discovered;
- New reservoir development plan is under consideration based on the achieved geological studies;
- Such an old mature field still has a good potential for exploration and improved production.

ACKNOWLEDGMENT

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