

A new level of facies modeling in Algyő field, South East Hungary

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Aims

- To develop a high resolution facies model For the Csongrad Series;
- Identification of by-passed oil bodies by applying high resolution facies modeling;
- Propose locations for new producers



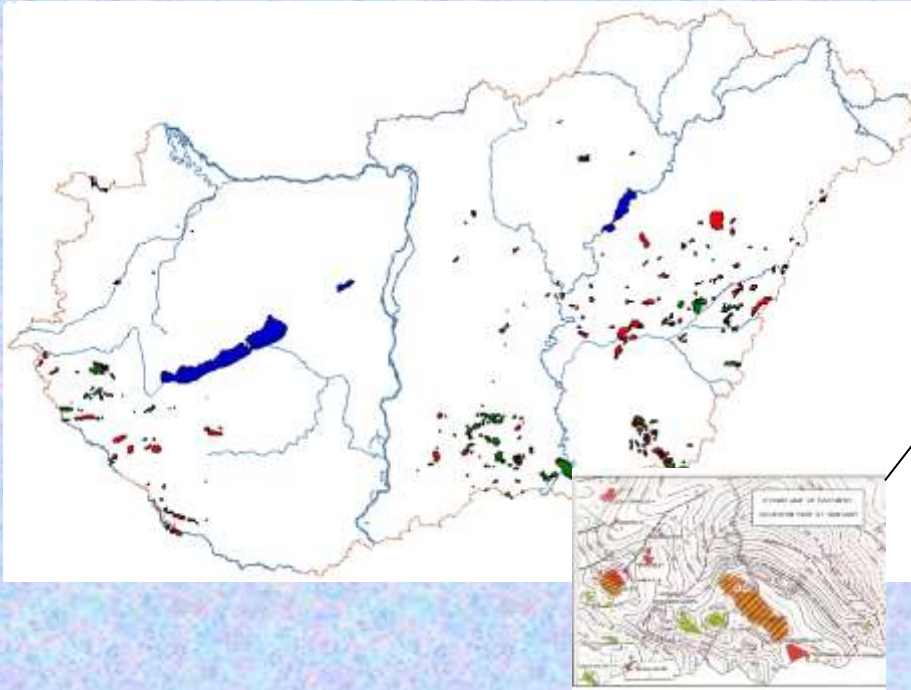
Algyő field



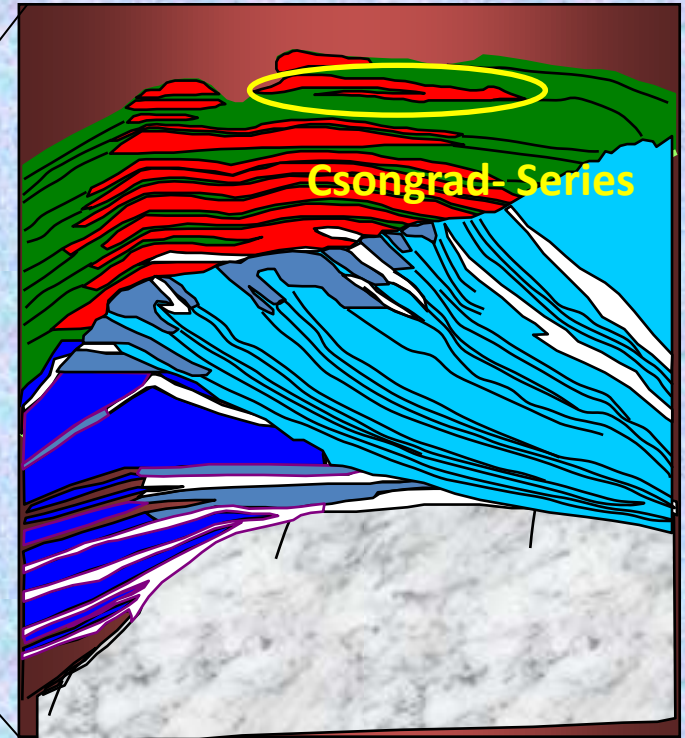
- Oil & Gas production since 1967
- More than 50 deposits with a total cumulative 31.6 mm t oil and 72 763 mm m³ gas production
- Traps are determined by the architecture of a progradational delta system and (syndimentary) faults



Study area & Field



Algyő field

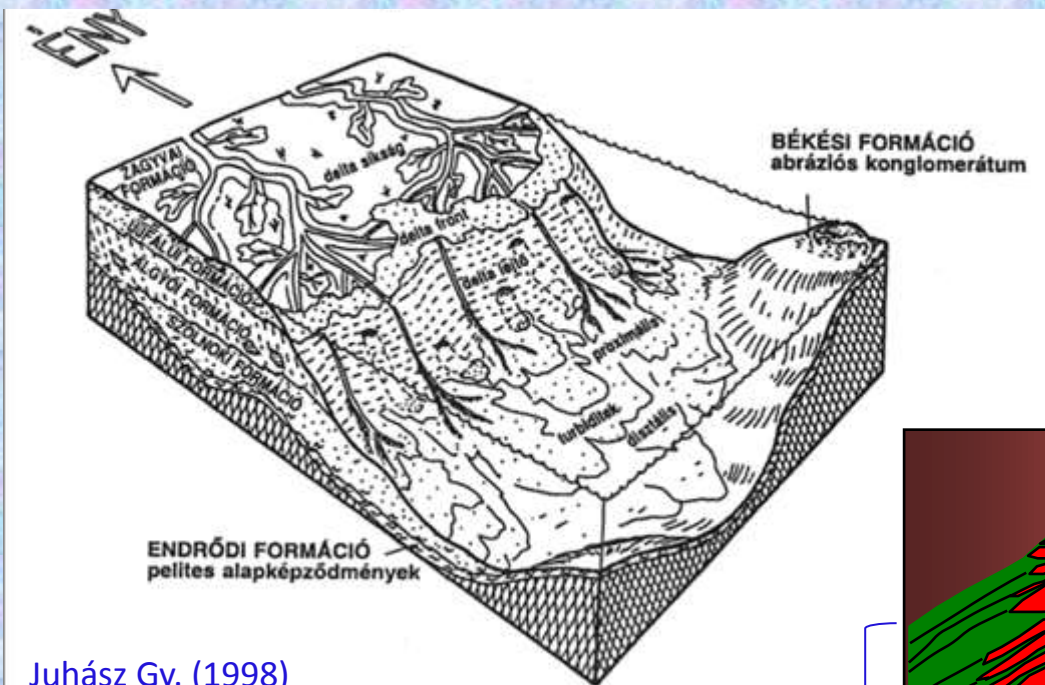


THE CSONGRÁD SERIES IS IN THE final stage of development of delta system

- Újfalu Formation (Csongrad-South-1,-2)
- Zagyva Formation (Csongrad-South-3)

After Mucsi M. (1973), Révész I.(1980), Bérczi I. (1967), Juhász Gy. (1982), Bérczi,& Phillips (1985), Magyar I. (2010)

The progradational units as seen in Algyő field

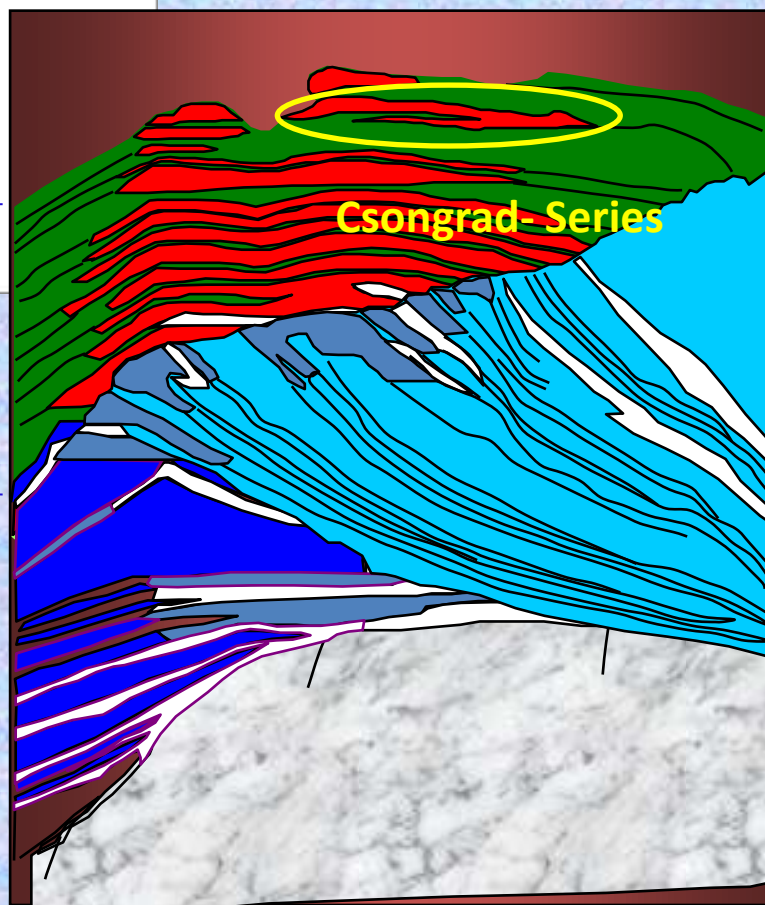


Juhász Gy. (1998)

Algyő field

delta plain

prodelta



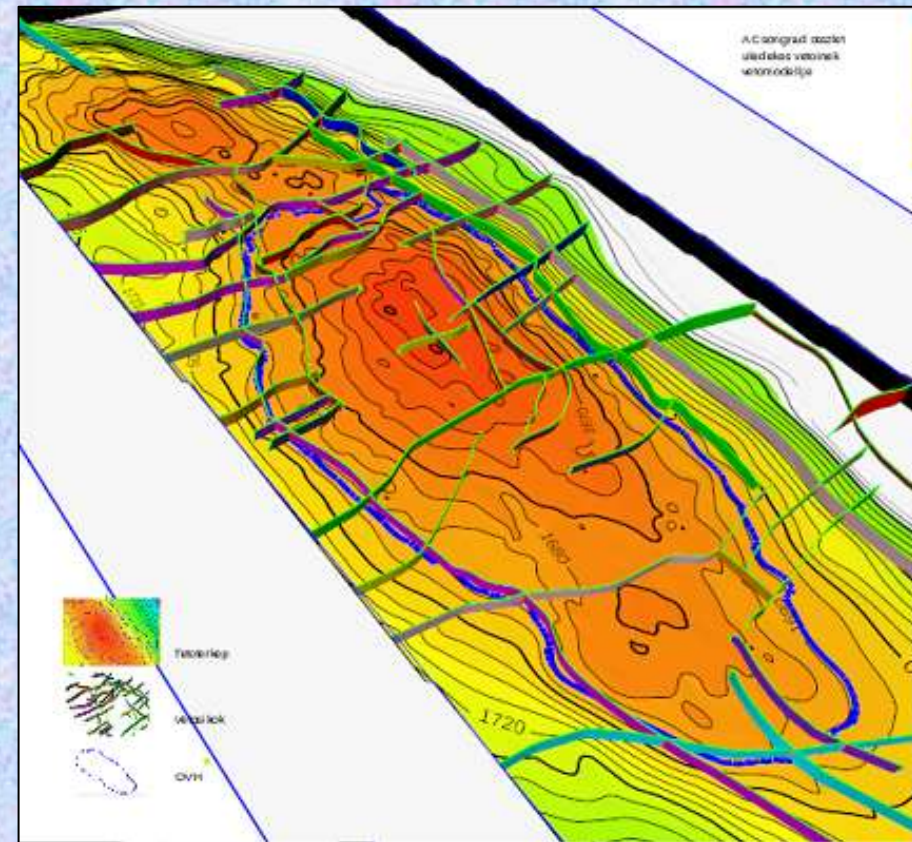
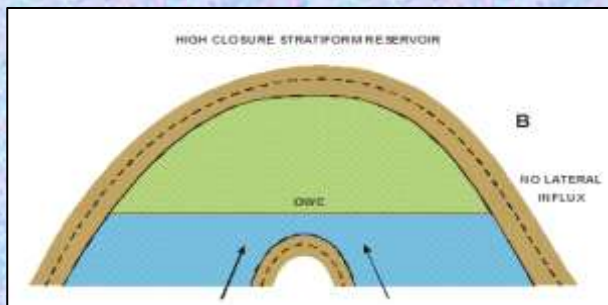
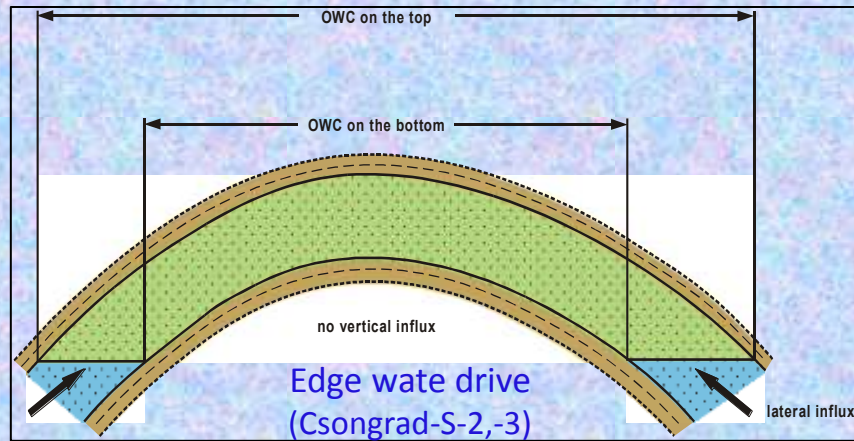
Csongrad- Series

slope



The reservoir

- Combined structural and lithologic traps with fluid-fluid contacts (Oil Water Contact)
- Oil and saturated oil deposits with gas cap
- Edge water and bottom water drive



Why to reconsider the facies model?

Exploration phase

- Large scale modeling
- Trace of boundaries of hydrocarbon saturation
- Focus on simplified lithology (reservoir or non-reservoir)

Production phase

- Small scale modeling
- Detailed architecture of reservoirs
- Identification by-passed oil bodies



Steps of the modeling

- Review of core descriptions (analogies)
- Identification of the depositional environments (facies) from well logs (Gamma ray (GR), Spontaneous potential (SP), Resistivity logs (R))
→ „electrolog facies” (Krueger, 1968; Serra,1989)
- Classification of wells by facies:
Every facies means different lithology, sedimentary structures and petrophysical parameters
- Facies distribution in the Csongrad series
- Generation seismic attribute map and gross thickness maps



Typical depositional units in delta deposits system

Bay fill



Swamp



(Coleman&Wright, 1971)

Distributary channels



Copper River Delta

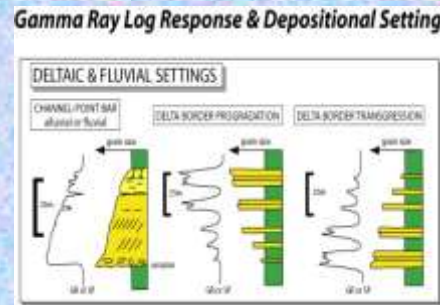


Mouth bar

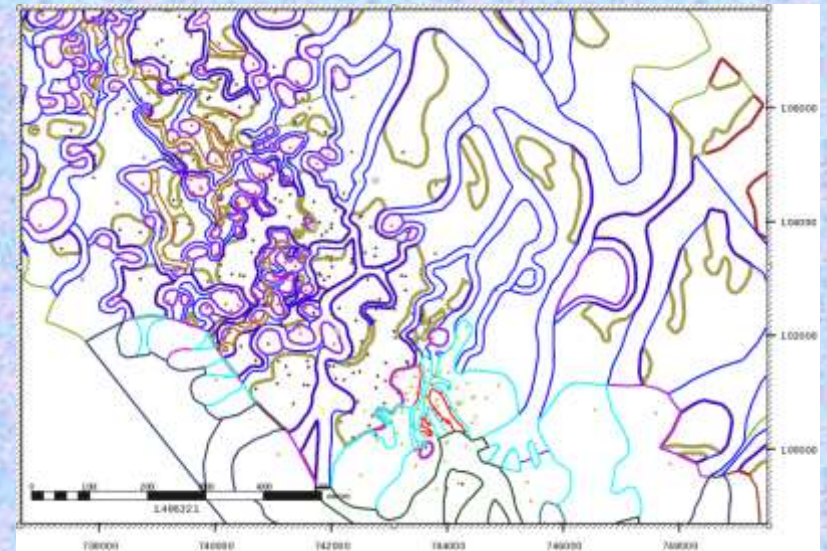
Identification depositional environments from gamma ray and resistivity logs



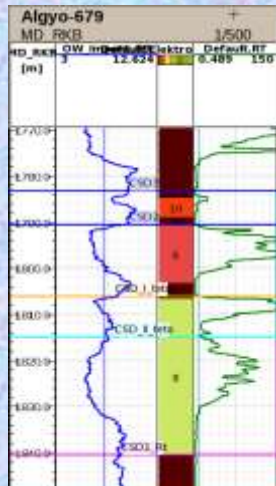
Kendall, 2003 (modified from Malcolm Rider)



Kendall, 2003 (modified from Malcolm Rider)

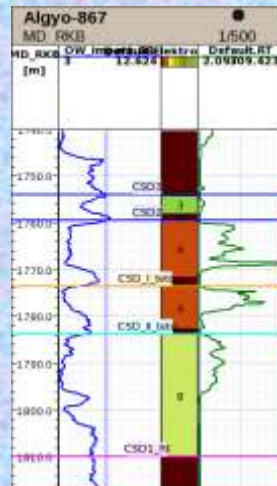


Contours of facies in the area after well log interpretation



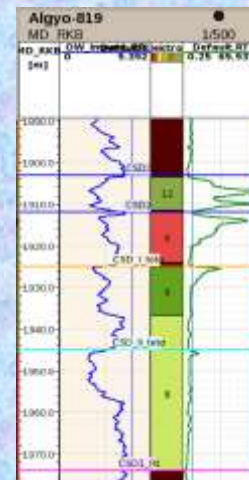
point bar
+ channel
mouth bar

progressive
mouth bars
and channels



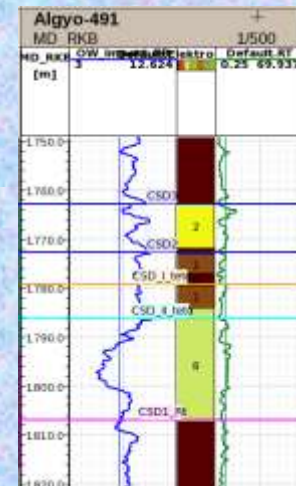
channel
channel
+ mouth bar

progressive
mouth bars
and channels



sheet sand
mouth bar
„serrated sand
bodies“

progressive
mouth bars
and channels



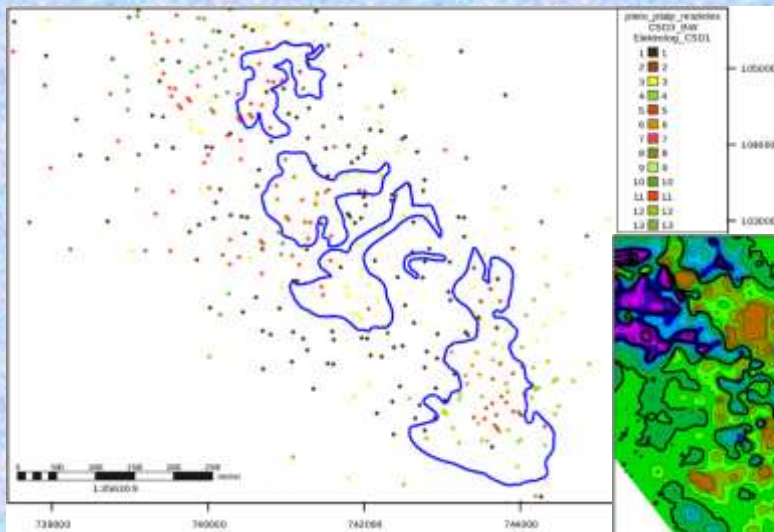
channel-levee
swamp

progressive
mouth bars
and channels

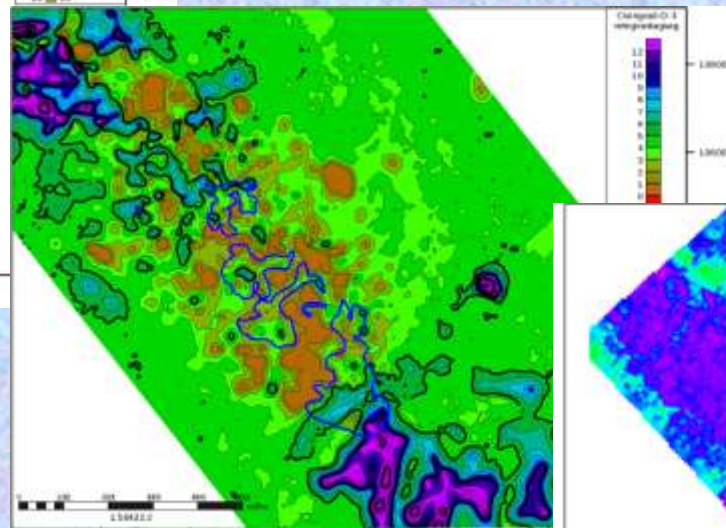
Gamma ray and resistivity response in Csongrad- South deposits



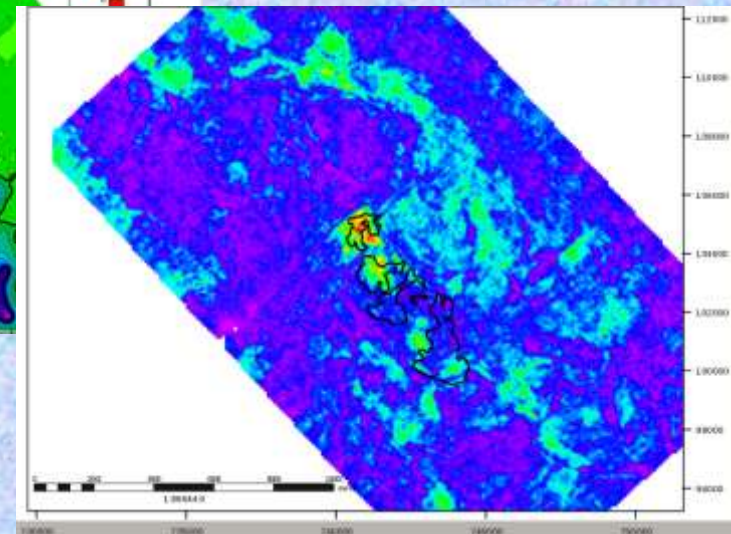
Input data of the modeling (Csongrad-South-3)



Facies distribution
From well logs
(GR, SP, RT)



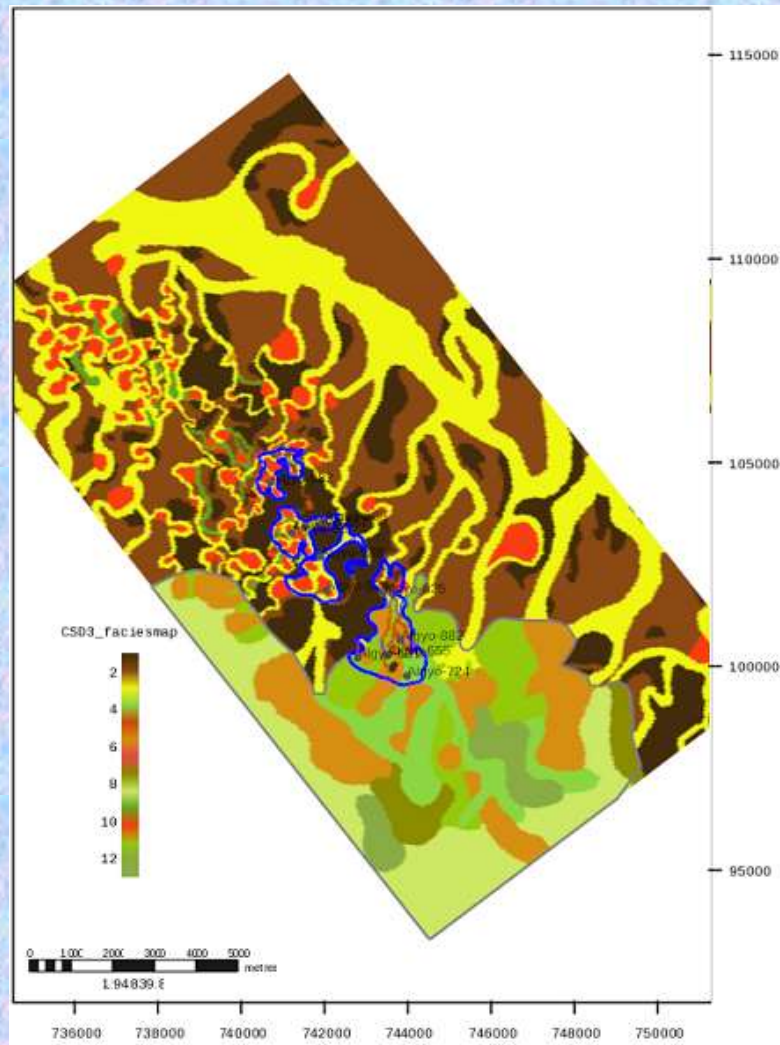
Gross thickness
From well picks



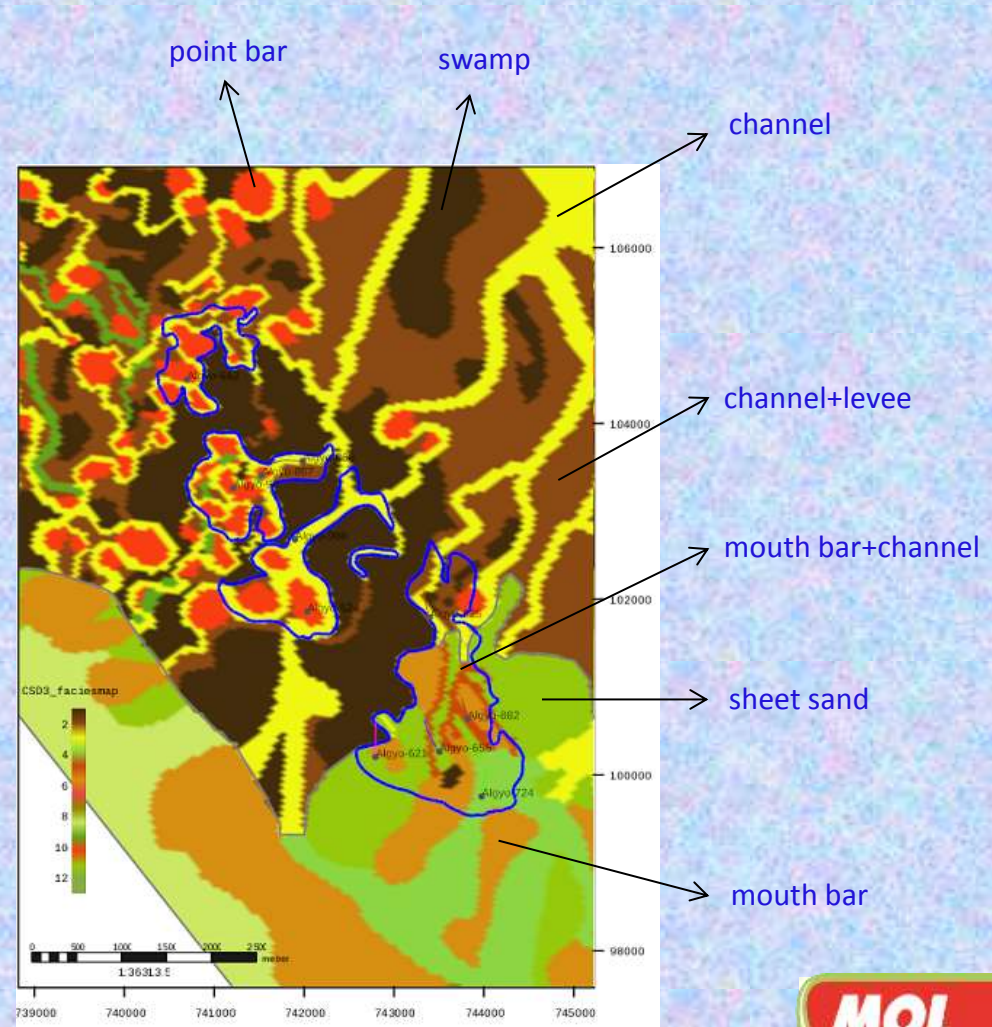
Seismic attribute



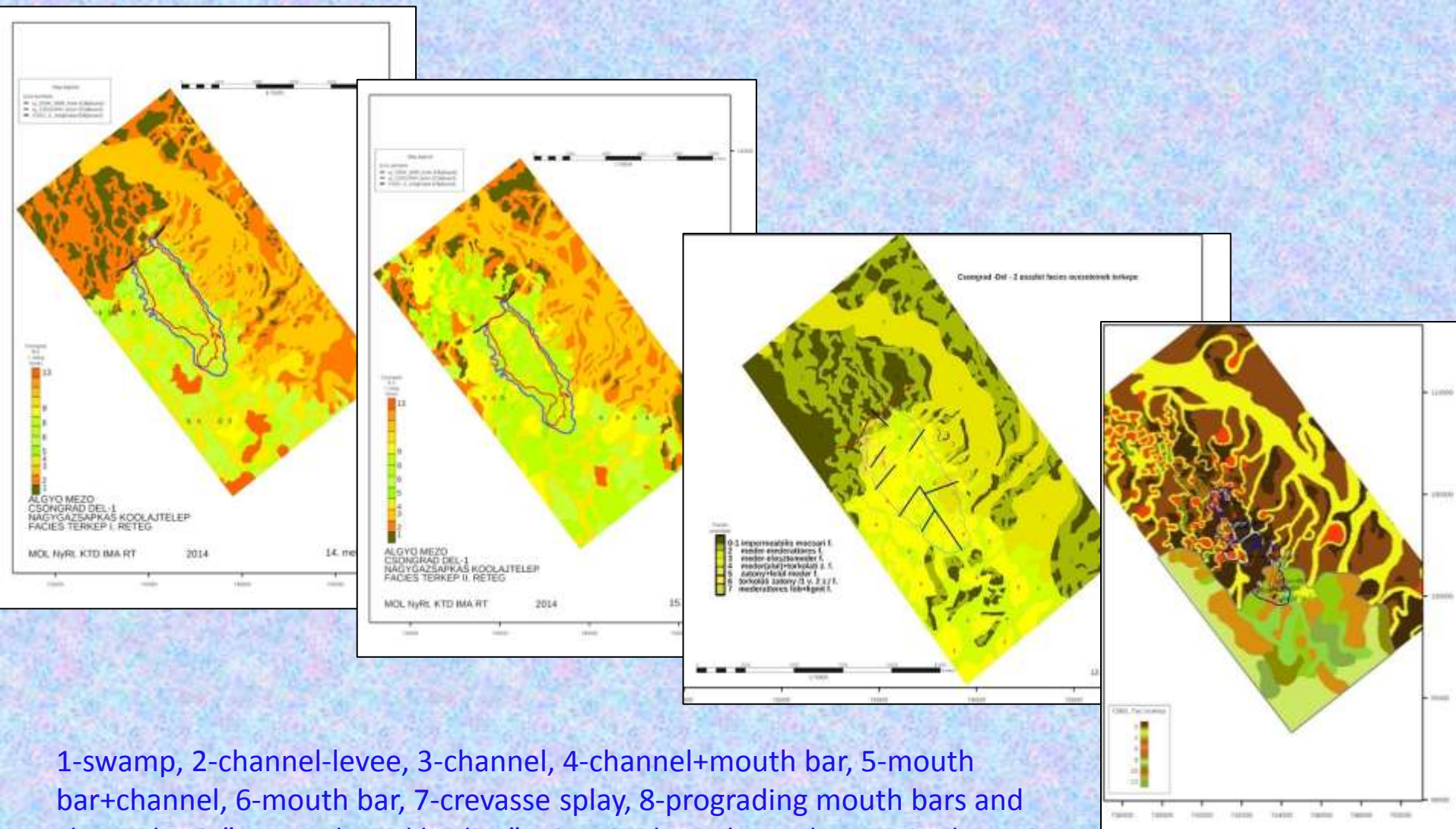
FACIES IN THE CSONGRÁD-SOUTH 3 DEPOSIT



Facies map of Csongrad-South-3 deposit



Time slices of the Csongrad-South Series



1-swamp, 2-channel-levee, 3-channel, 4-channel+mouth bar, 5-mouth bar+channel, 6-mouth bar, 7-crevasse splay, 8-prograding mouth bars and channels , 9-"serrated sand bodies", 10-point bar+channel, 11-point bar, 12-sheet sand, 13-gravity flow

Recommendations

- **Conduct further studies to fined reservoir compartments with by-passed oil**
- **Validate the facies model against the production parameters**
- **Improve the model by focusing on reservoir quality**



References

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Thank you for your kind attention!

