

Geology study and opportunities and perspective to storage CO2 in Kaliningrad region and Baltic sea shelf (Russian sector)

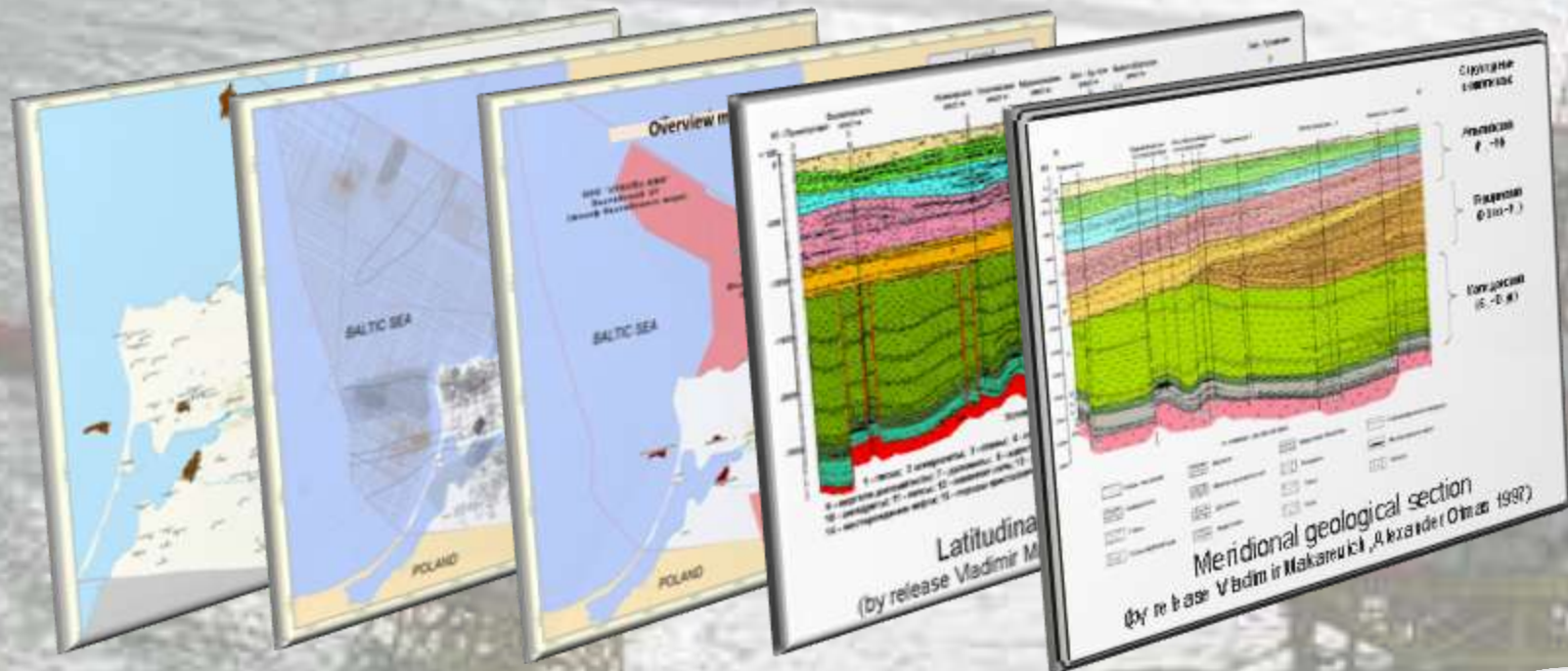
Reporter : Otmas Andrei

23th May 2013 Finland, Espoo

**ALL-RUSSIA PETROLEUM RESEARCH
EXPLORATION INSTITUTE (VNIGRI)**



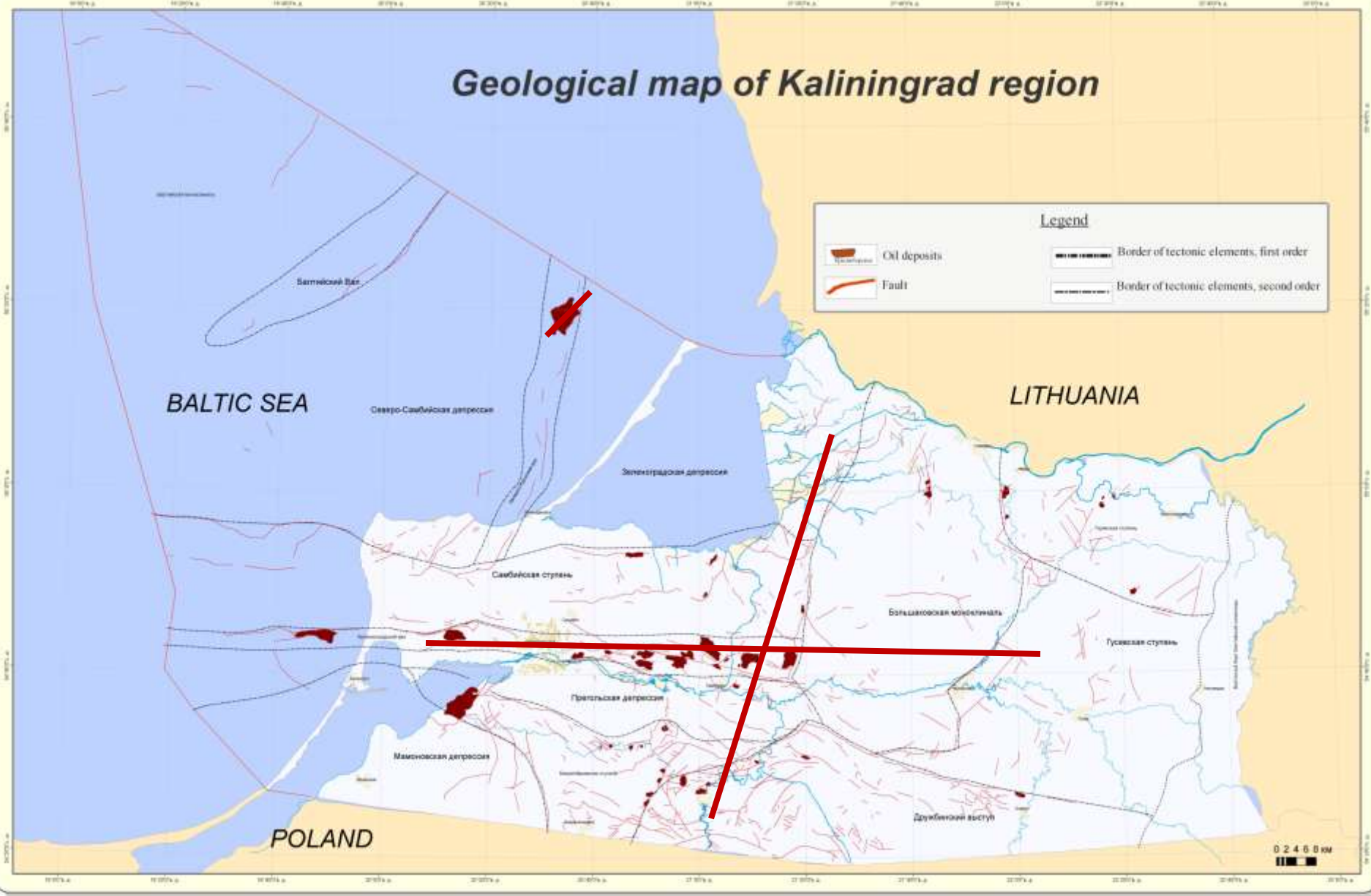
Geological studied of Kaliningrad region and Baltic sea shelf

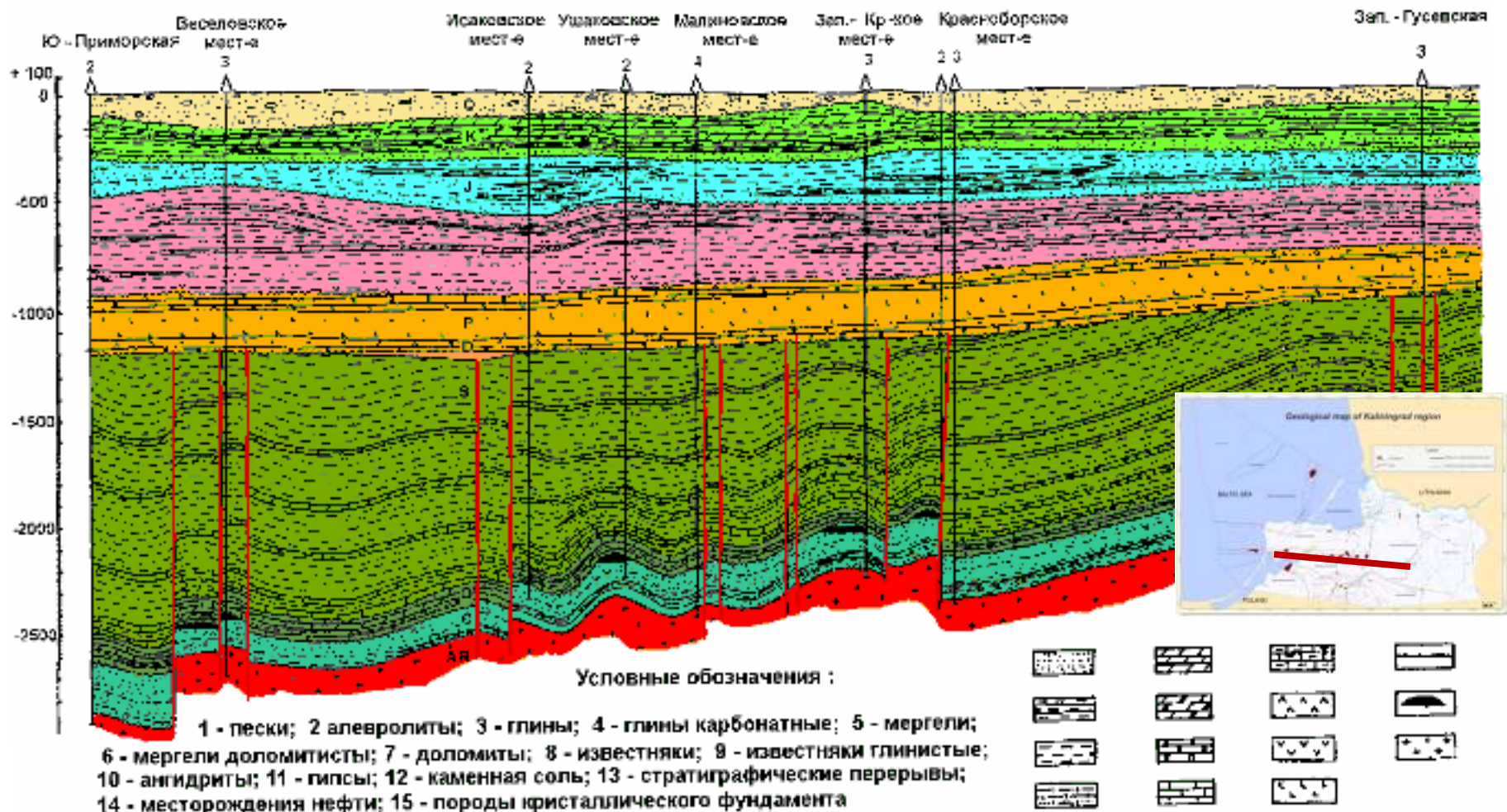


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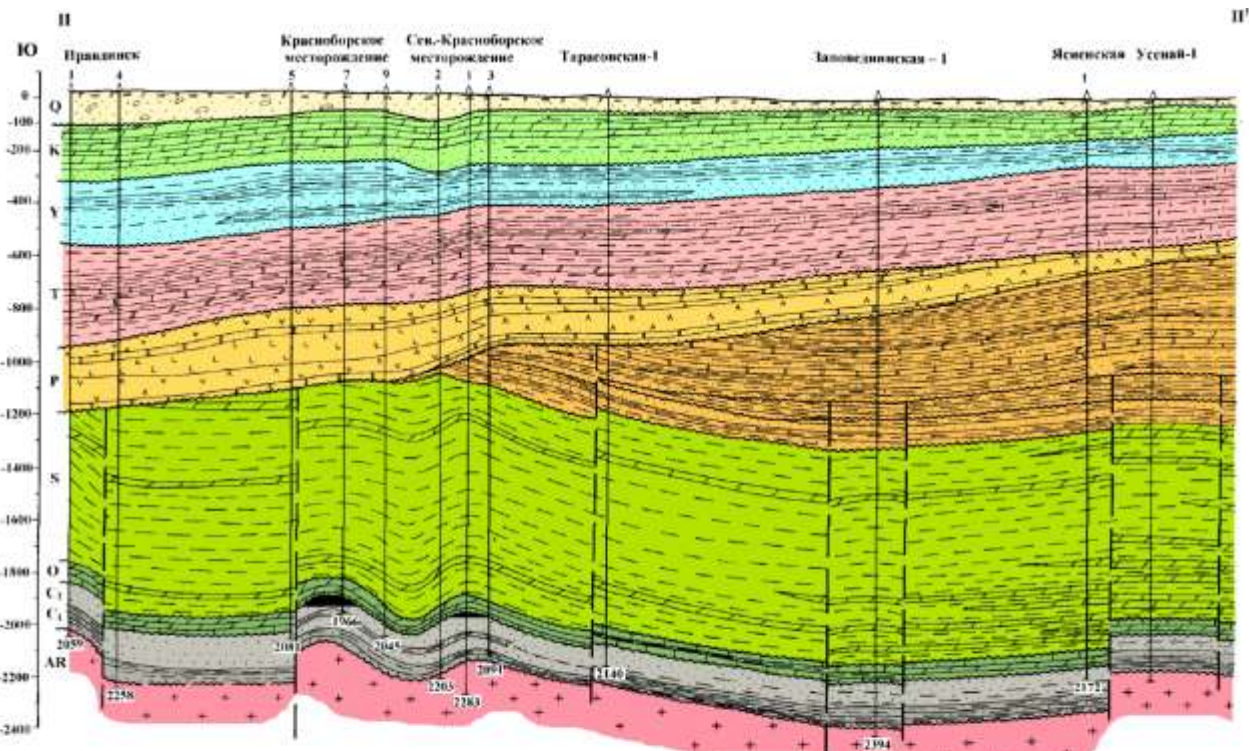
Geological map of Kaliningrad region





Latitudinal geological section

(by release Vladimir Makarevich, Alexander Otmas 1997)



Структурные комплексы:

Альпийский (P₂ - N)

Герцинский (D_{1km} - P₁)

Каледонский (Є₁ - D_{1gr})

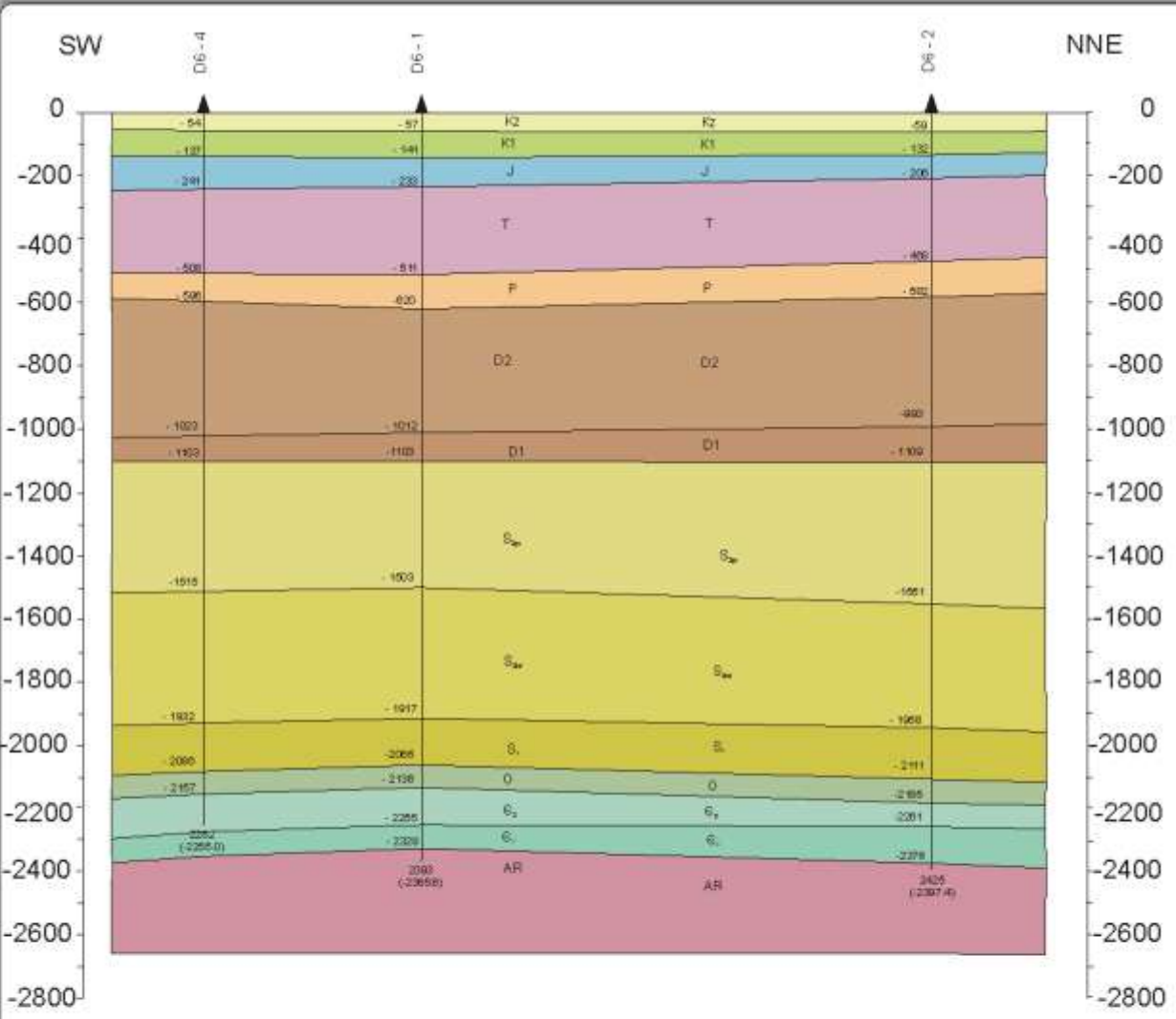
УСЛОВНЫЕ ОБОЗНАЧЕНИЯ

- | | | | |
|-------------------|----------------------|----------------------|----------------------------|
| Пески, песчаники | Мергели | Известняки глинистые | Стратиграфические перерывы |
| Алевролиты | Мергели доломитистые | Ангидриты | Месторождения нефти |
| Глины | Доломиты | Гипсы | Граниты |
| Глины карбонатные | Известняки | Соли | |



Meridional geological section
(by release Vladimir Makarevich, Alexander Otmas 1997)





Масштаб: горизонтальный 1 : 25000
 вертикальный 1 : 10000

D6 Structure. Geological section
 (only for data of drilling, without fault)



Overview map of Kaliningrad region

Legend

Typical licence area:

 LUKOIL-KMN

 Proxima-Oil

 Oil deposits

Scale: 0 2 4 6 8 км

ООО "ЛУКОЙЛ-КМН"
Балтийский ЛУ
(шельф Балтийского моря)

BALTIC SEA

ООО "ЛУКОЙЛ-КМН"
Шельф Балтийского моря
(российский сектор)

LITHUANIA

ООО "ЛУКОЙЛ-КМН"
Северный ЛУ

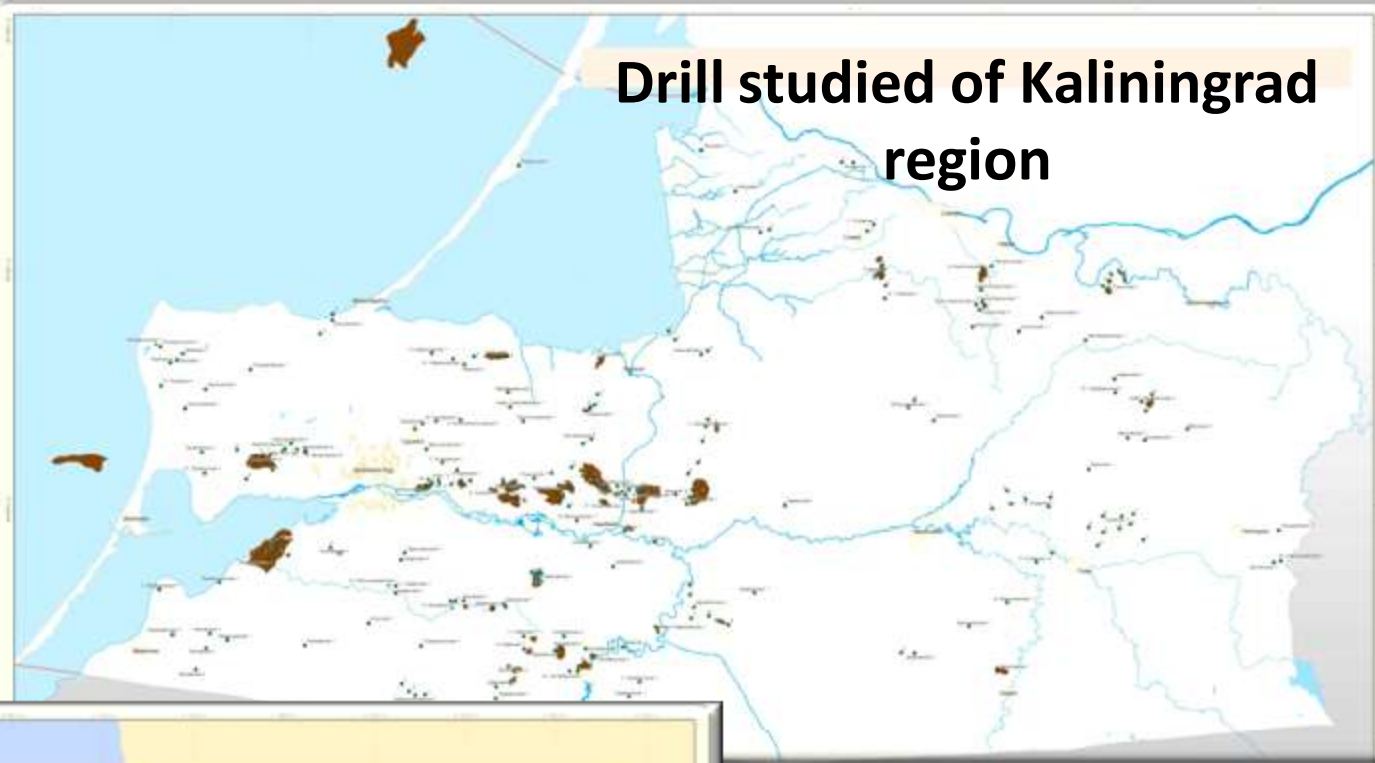
ООО "Проксима-Ойл"
Вост.-Самбийский ЛУ

СФ (Калининградская)

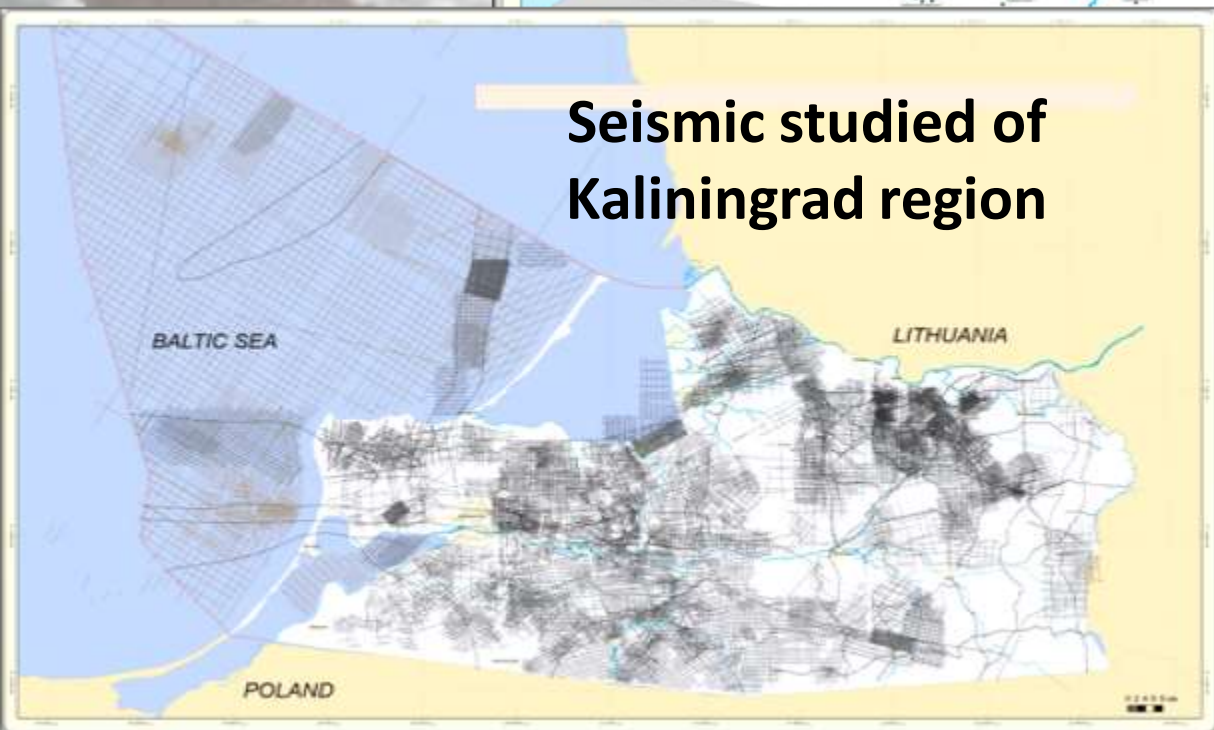
POLAND

ООО "ЛУКОЙЛ-КМН"
Южный ЛУ

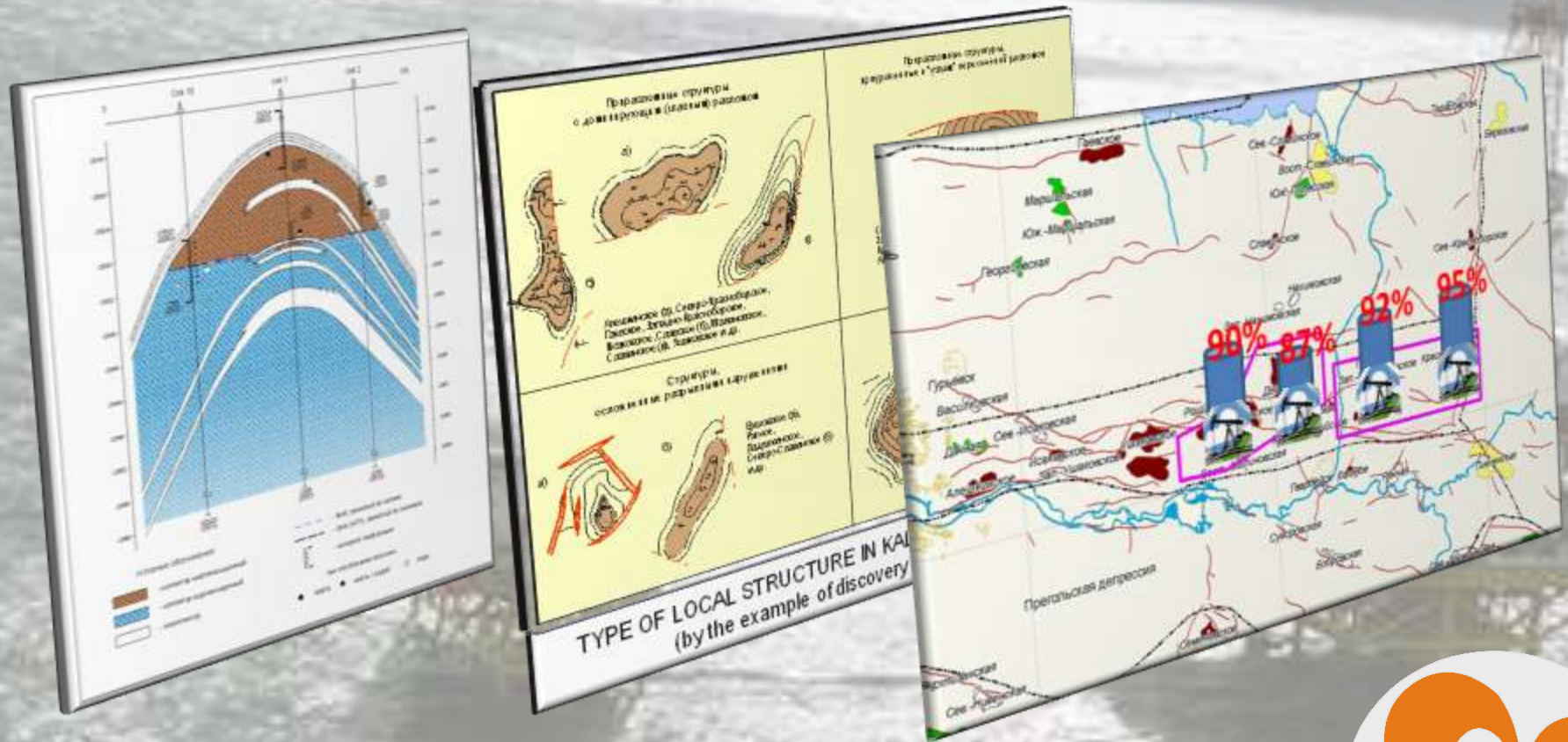
Drill studied of Kaliningrad region



Seismic studied of Kaliningrad region



Opportunities and perspective to storage CO2 in Kaliningrad region and Baltic sea shelf



Overview map of Kaliningrad region and fund of perspective structures

The main parametrs of local strucrure

Square

0.1-0.3 sq.m - 27-33 sq.m. (структуры D6 и D2)

Amplitude

5-10 m - 80-90

Depth of occurrence

-1300 m - -2700 m

Балтийское море

ПОЛЬША

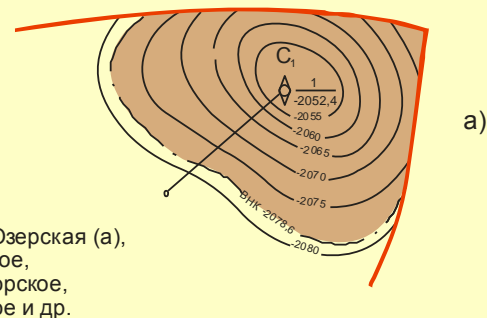
Условные обозначения

- Исторические памятники
 - Граница геологической провинции I периода
 - Граница геологической провинции II периода
 - Подводный канал и глубинная структура
 - Палеозойские структуры (D1-ж)
 - Структуры, связанные с глубинными структурами с отрицательной рельефом
 - Прогнозируемые месторождения нефти, газа и конденсата СГ
- Масштаб: 1:100 000

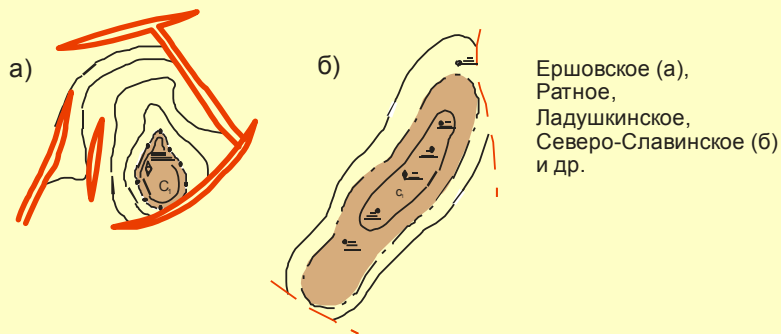
Приразломные структуры
с доминирующим (главным) разломом



Приразломные структуры,
приуроченные к "узлам" пересечений разломов



Структуры,
осложненные разрывными нарушениями

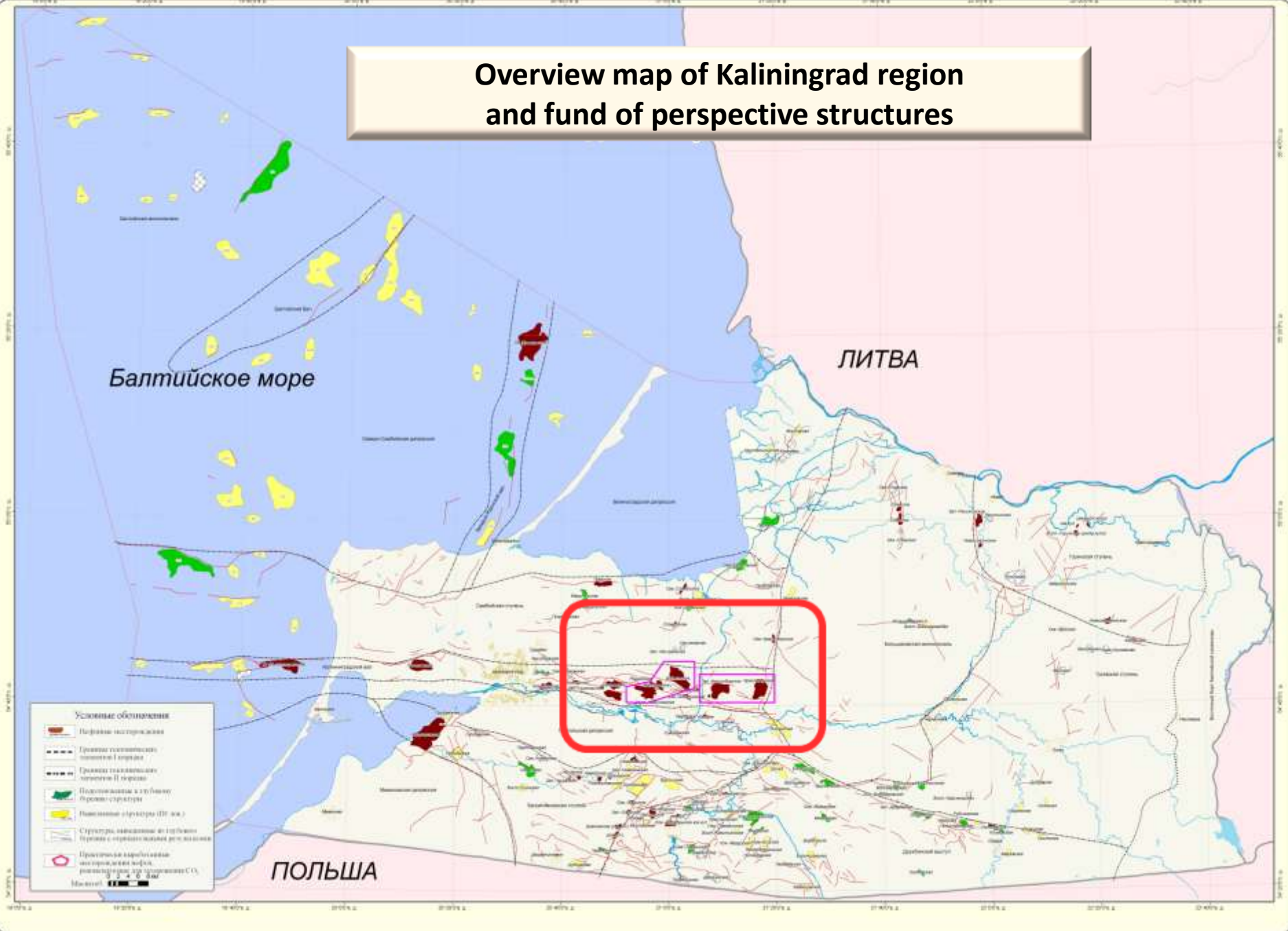


Структуры,
не осложненные разрывной тектоникой



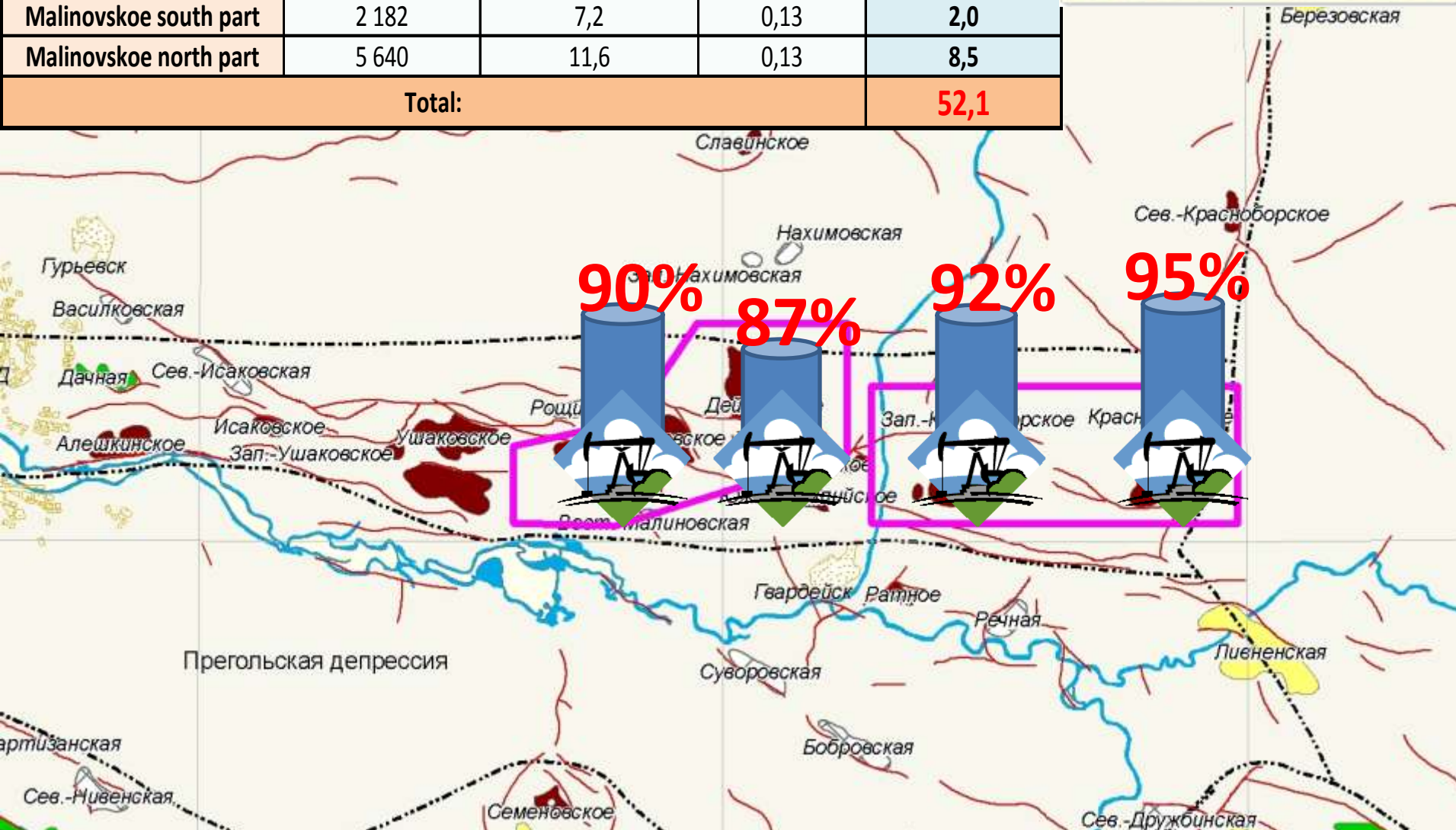
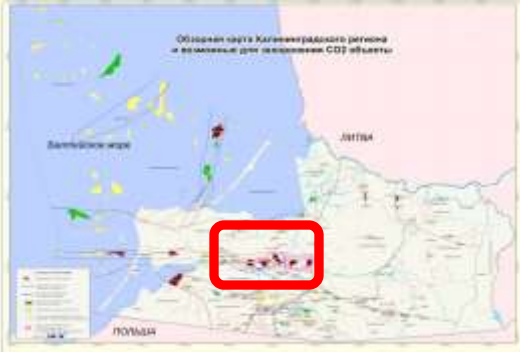
TYPE OF LOCAL STRUCTURE IN KALININGRAD REGION
(by the example of discovery of deposit)

Overview map of Kaliningrad region and fund of perspective structures



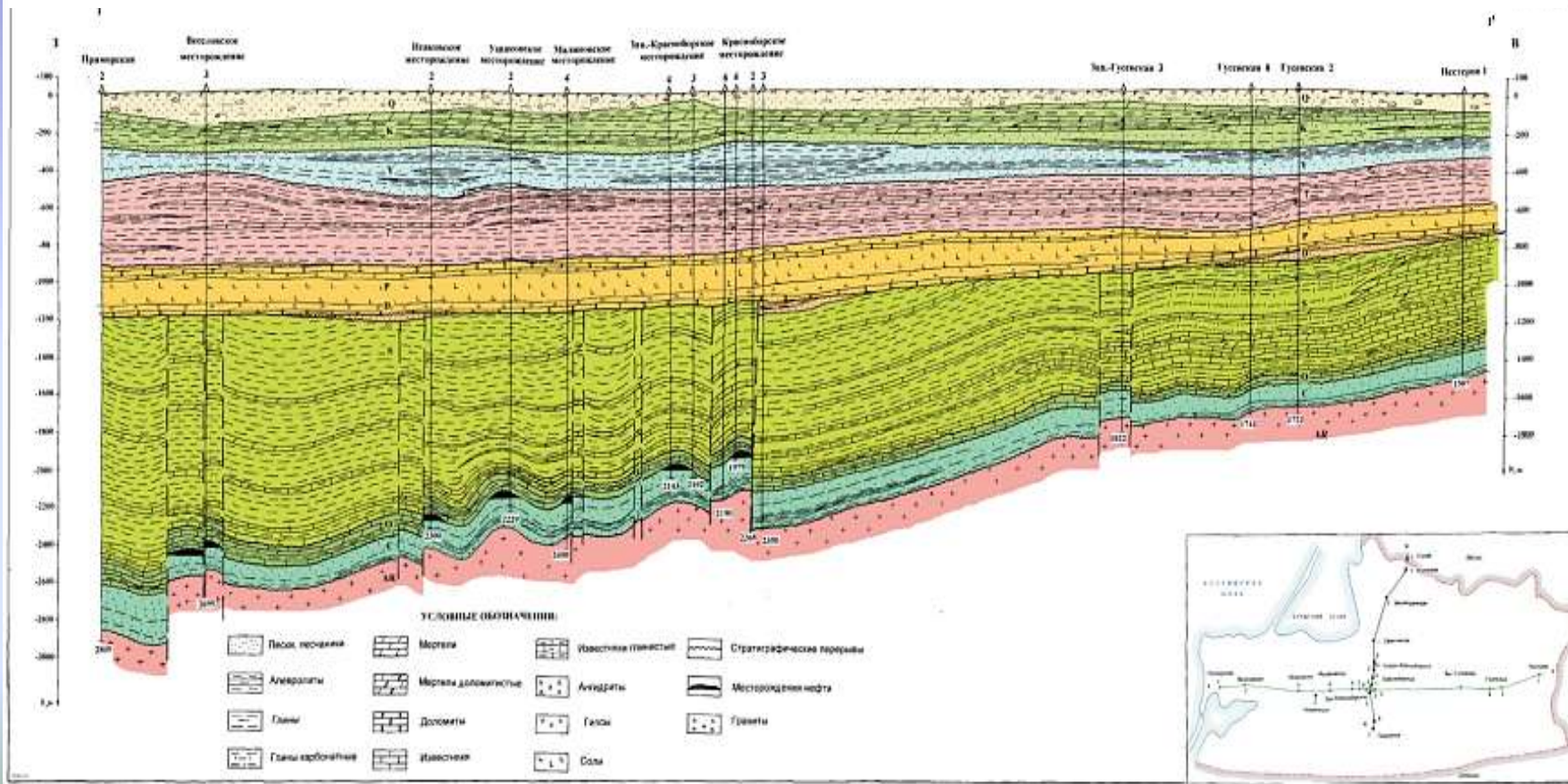
Volume of poral area in extract objects

| Deposit | Oil-bearing area th. m ² | Oil-contain depth (effective), m | Exposed porosity | Volume of poral area, mln m ³ |
|------------------------|--|-------------------------------------|---------------------|---|
| Krasnoborskoe | 8 887 | 16,4 | 0,14 | 20,4 |
| Zapadno-Krasnoborskoe | 7 136 | 16,2 | 0,14 | 16,2 |
| Deiminskoe | 5 403 | 8,3 | 0,11 | 4,9 |
| Malinovskoe south part | 2 182 | 7,2 | 0,13 | 2,0 |
| Malinovskoe north part | 5 640 | 11,6 | 0,13 | 8,5 |
| Total: | | | | 52,1 |



Methods and opportunities to storage CO₂ in Kaliningrad region

In salt bed (stratum) of upper permian complex



Expected results from cooperation with VNIGRI

1. Structural maps - top of the main oil-bearing complexes and basement.
2. Tectonical and oil-geological map of the Kaliningrad region and the Baltic Sea shelf (Russian sector).
3. Analysis and summary of well test results, hydrogeological data and oil-gas-water manifestations within the region.
4. Data on permeability, porosity, physical and chemical characteristics of oils and dissolved gases.
5. The data on the morphology of structures.
6. Structural zonation and morphological characteristics of structures on the scale 1:200 000 with the aim to identify potentially promising areas for CO₂ storage , determination of the structures that are recommended for the possible storage of CO₂.
7. The data for evaluation of the pore space of potential objects for CO₂ storage and determination of the possible extent of storage .
8. Geological and environmental consequences.
9. Geological and economic evaluation of the possible storage .
10. Alternative uses of CO₂.
11. Additional geological data obtained in the course of work.

Thank you for your attention!

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We open for cooperation