09. Vrstevní tlaky a přetlaky fluid ve vztahu k hydrostatickému a geostatickému tlaku: srovnání jihokaspické, východoslovenské a vídeňské pánve

J. Francu[1], I. Guliev[2], A. Feyzullayev[2], & M. Abrams[1]

[1] Energy & Geoscience Institute, University of Utah, Salt Lake City, UT 84108, USA

[2] Institute of Geology, AAS, H. Javid pr., 29A, 370143 Baku, Azerbaijan

Acknowledgements

Energy & Geoscience Institute, University of Utah, Salt Lake City, UT 84108, USA

Institute of Geology, AAS, Baku, Azerbaijan

Czech Geological Survey, Brno, Czech Republic

for support during the collaborative research

OBJECTIVES

1. Examine the effect of

- **Burial / sedimentation rate**
- **Temperature**
- **Organic Maturation & HC Generation**

on overpressure build-up and preservation

2. Compare case histories in selected basins with specific pT conditions

Mechanisms of Overpressure Build-up during burial

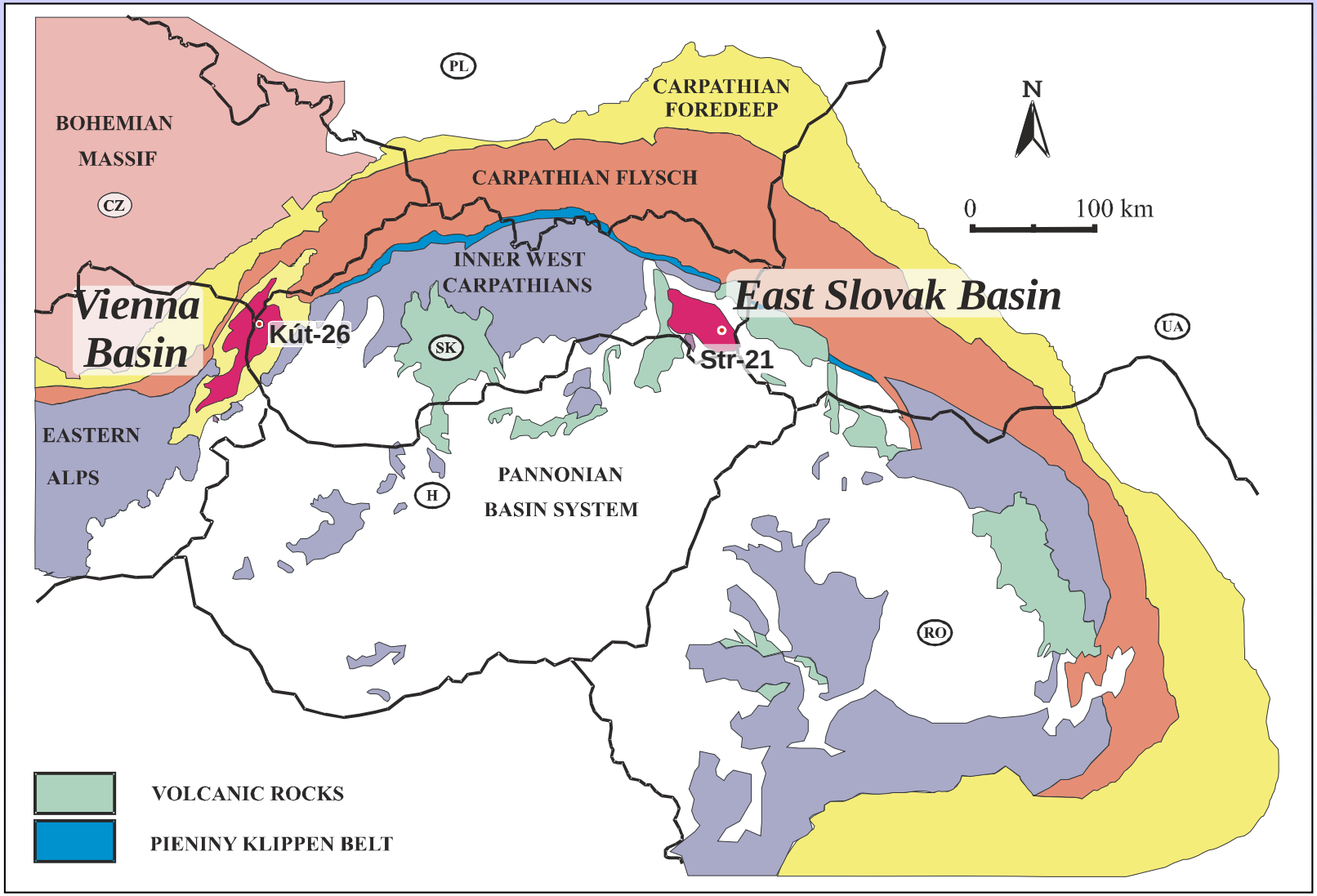
Fluid Pressure Generation

1. Effective Stress => Compaction Disequilibrium
2. Fluid Volume Expansion
    - Heating
    - Diagenesis (Clay Dehydration)
    - Hydrocarbon Geneartion & Cracking to Gas
3. Fluid Migration
    - Hydraulic Head / Osmosis / Buoyancy Load

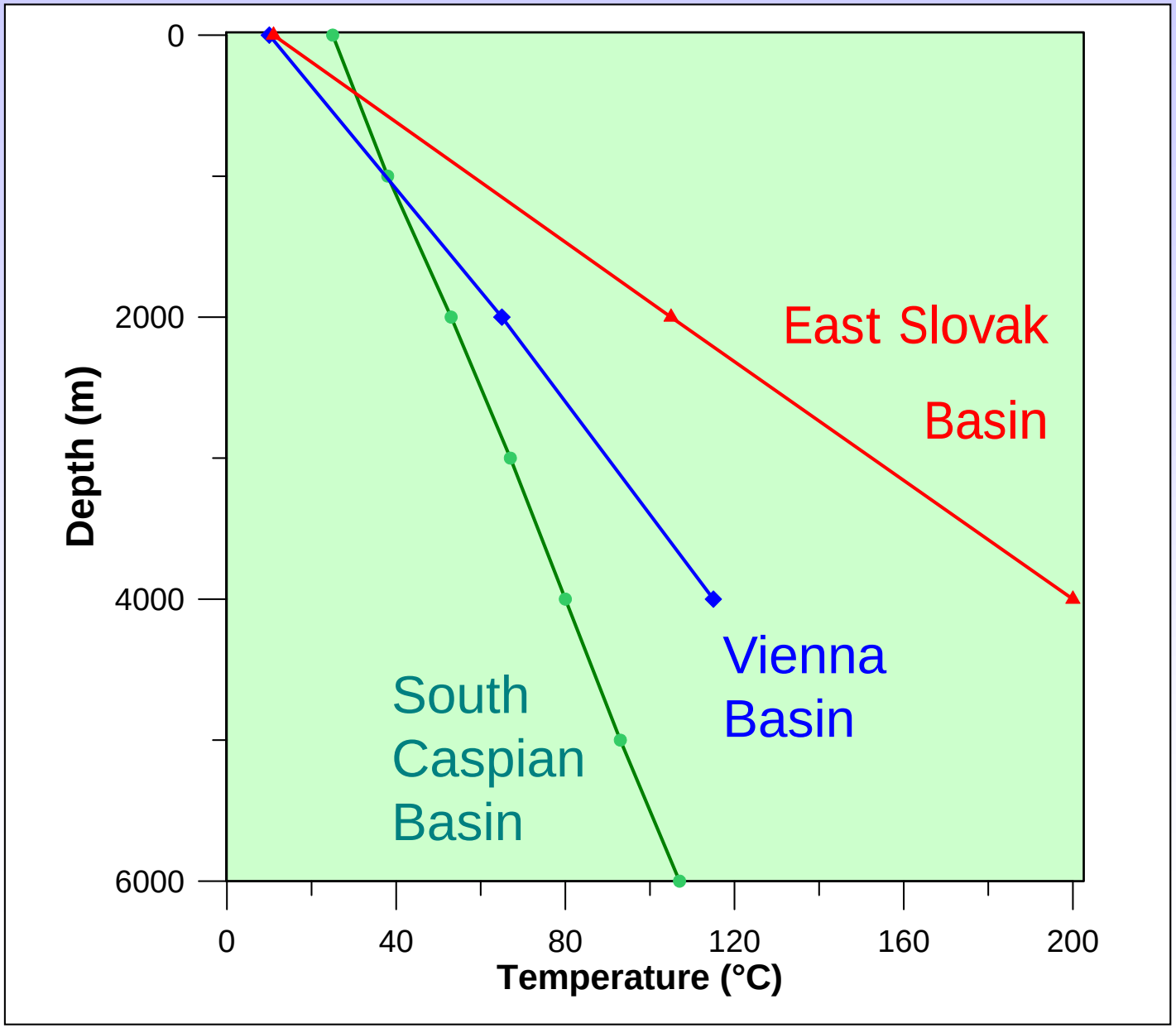
Overpressure Preservation

1. Permeability Barrier - Hydraulically Sealed

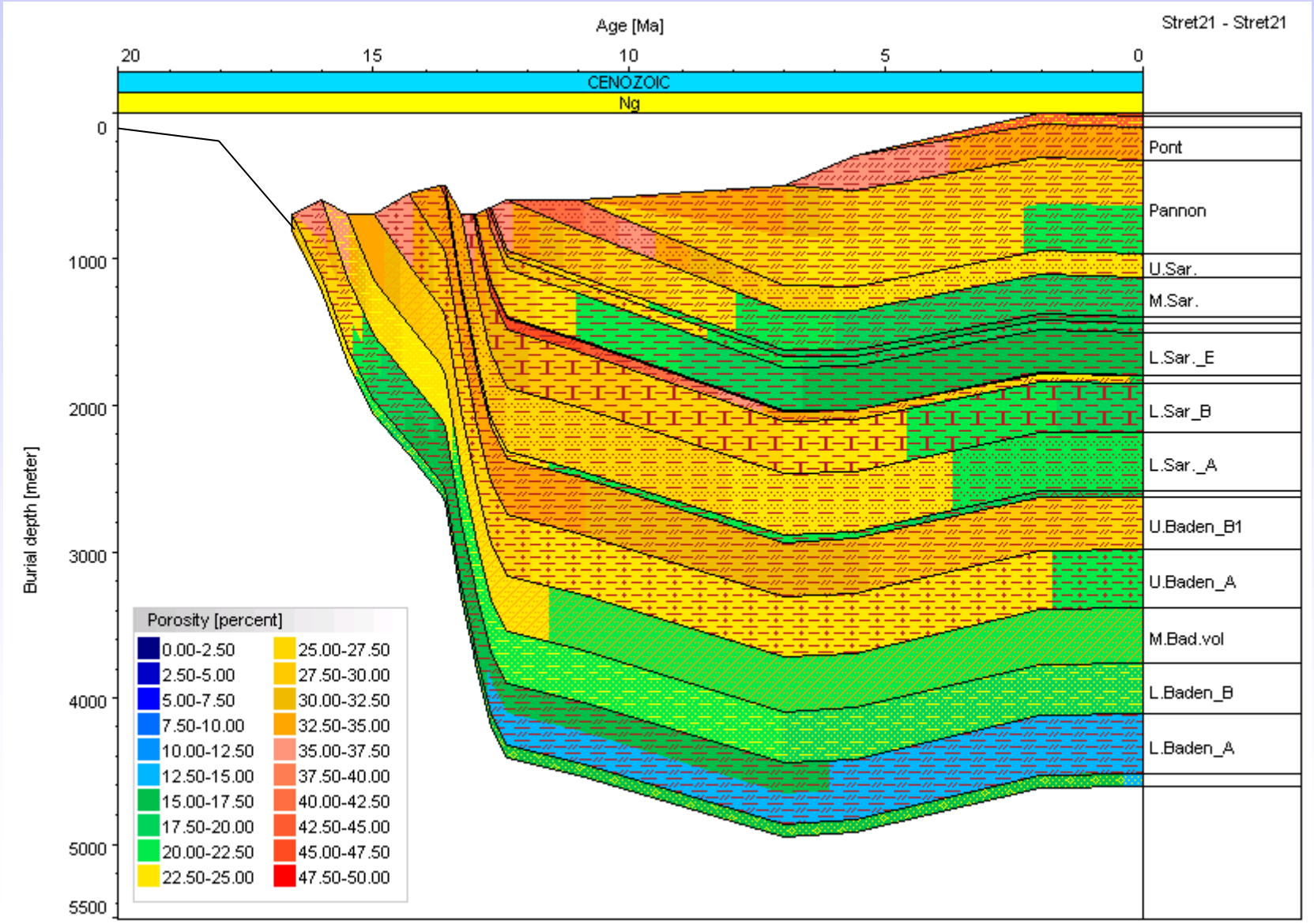
West Carpathians and Pannonian Basins



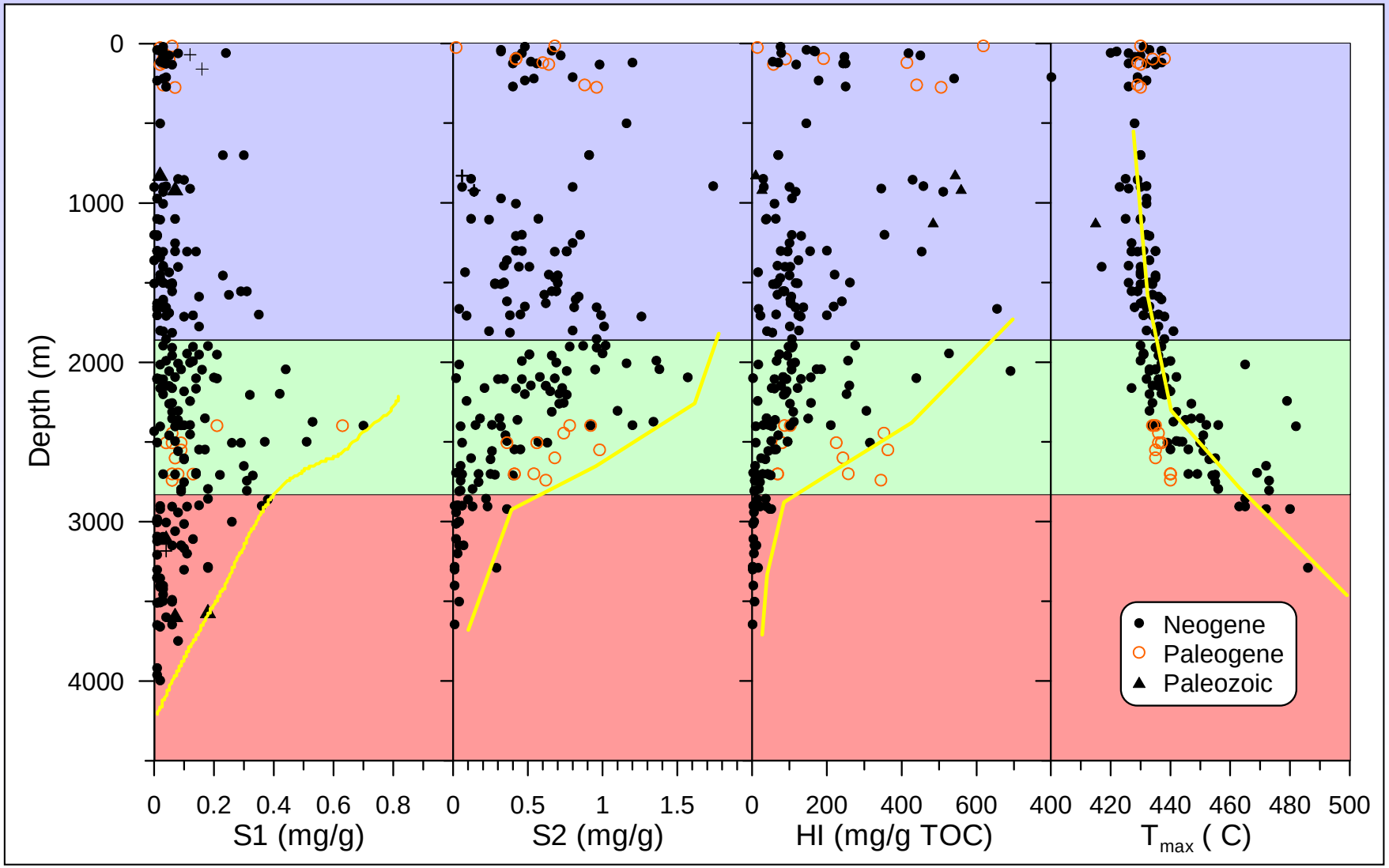
Teplota s hloubkou



Compaction Model - East Slovak Basin

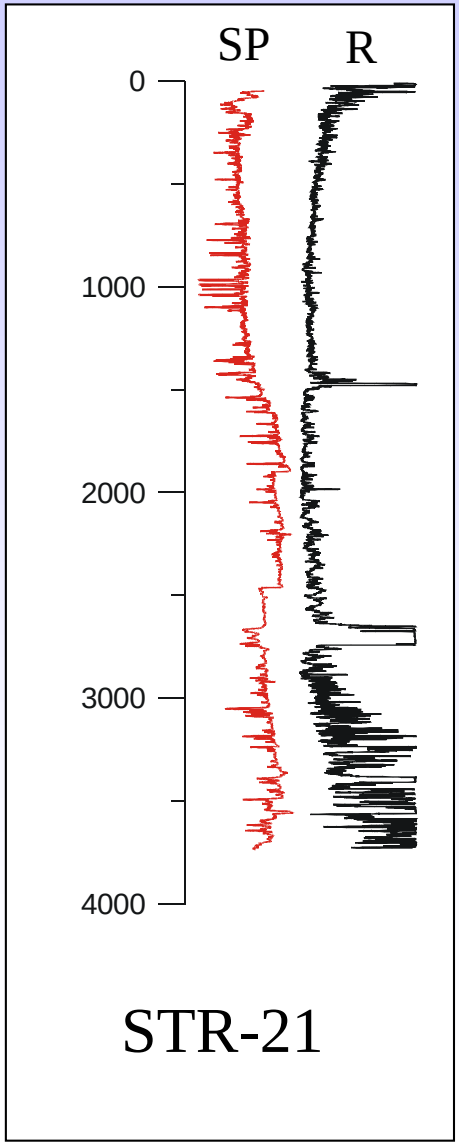


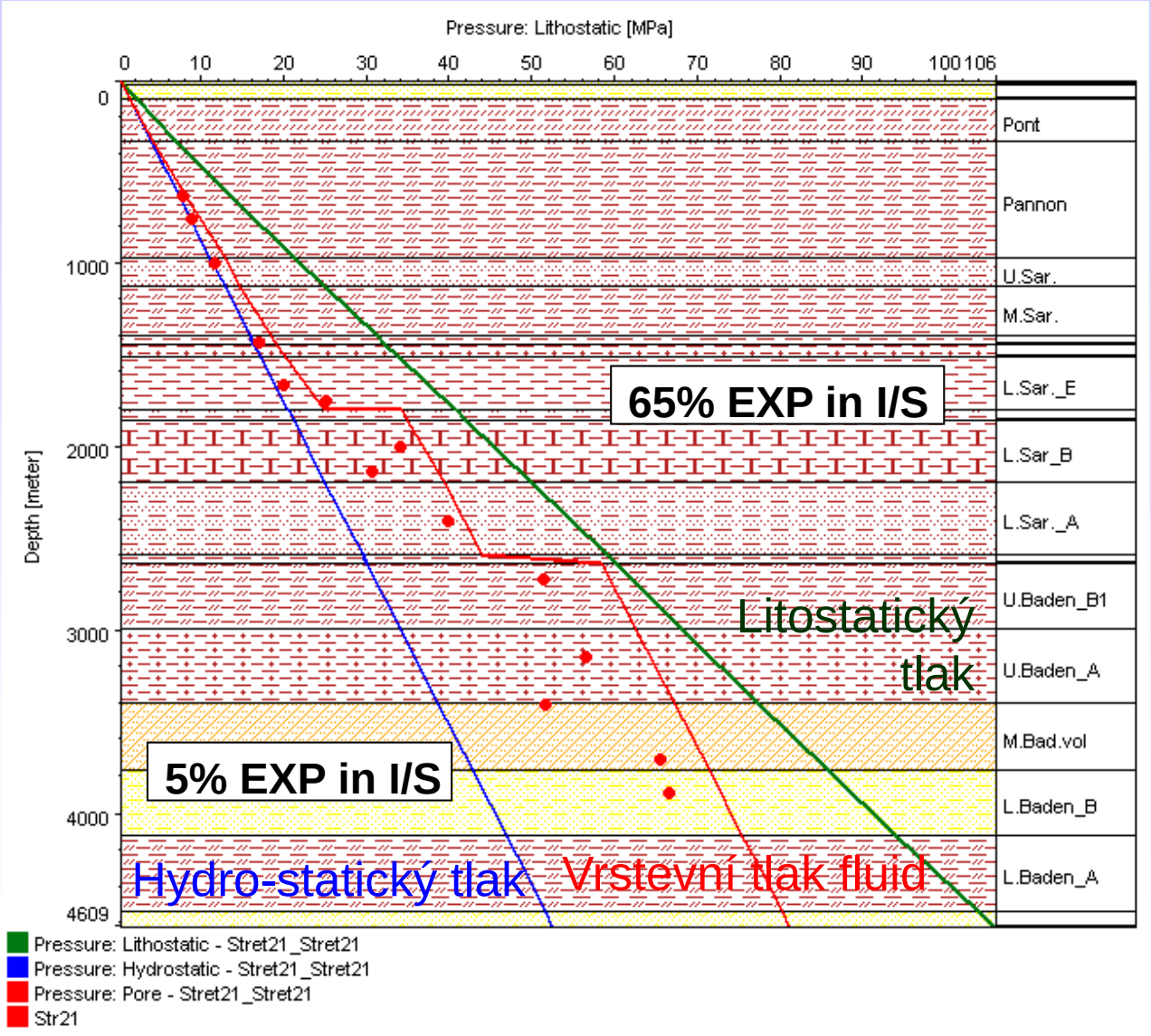
Transcarpathian Basin (East Slovakia)
Rock-Eval Data with Depth



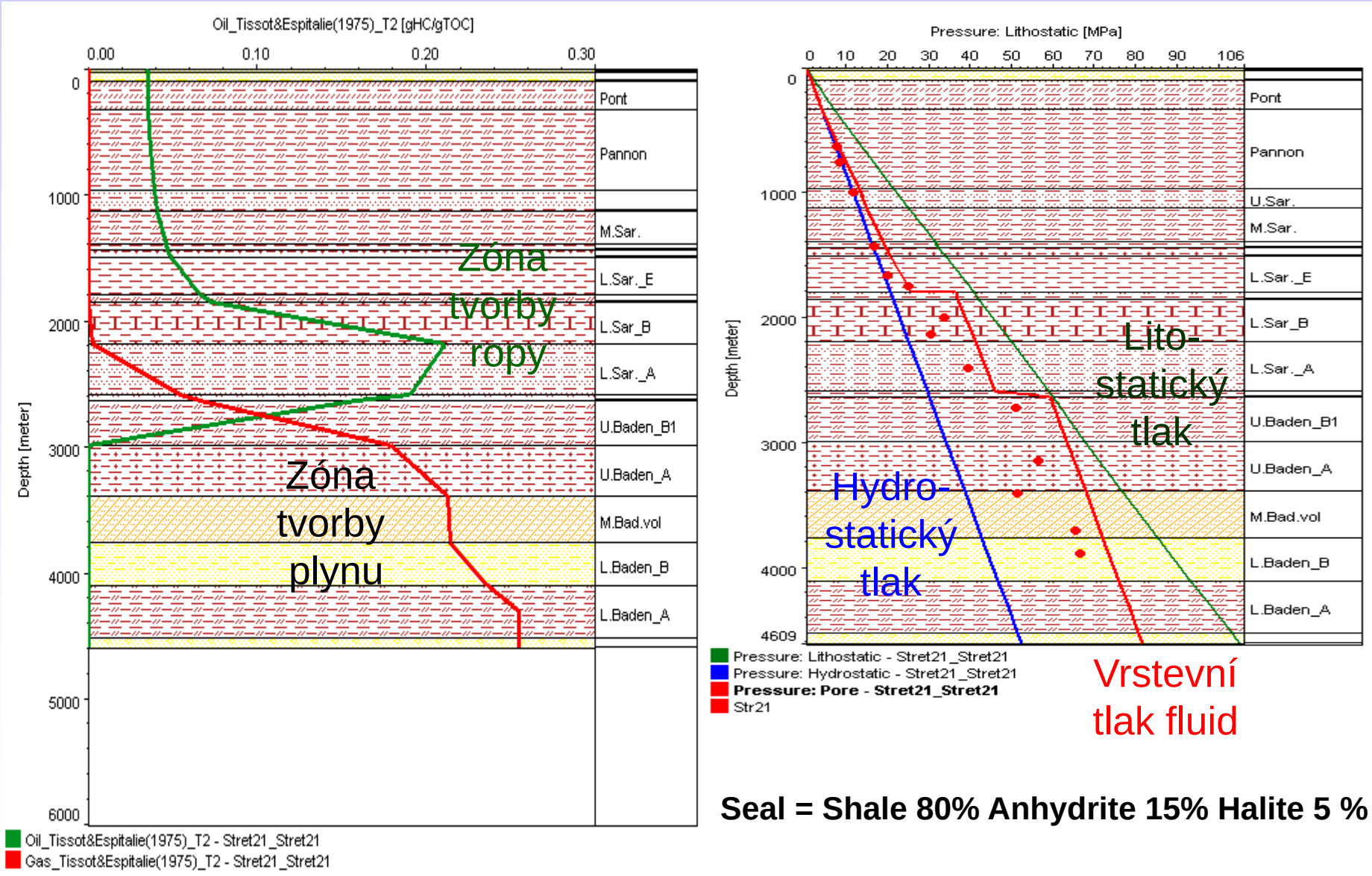
Vrstevní tlaky fluid ve východoslovenské neogenní pánvi

Fluid pressure in East Slovak Basin



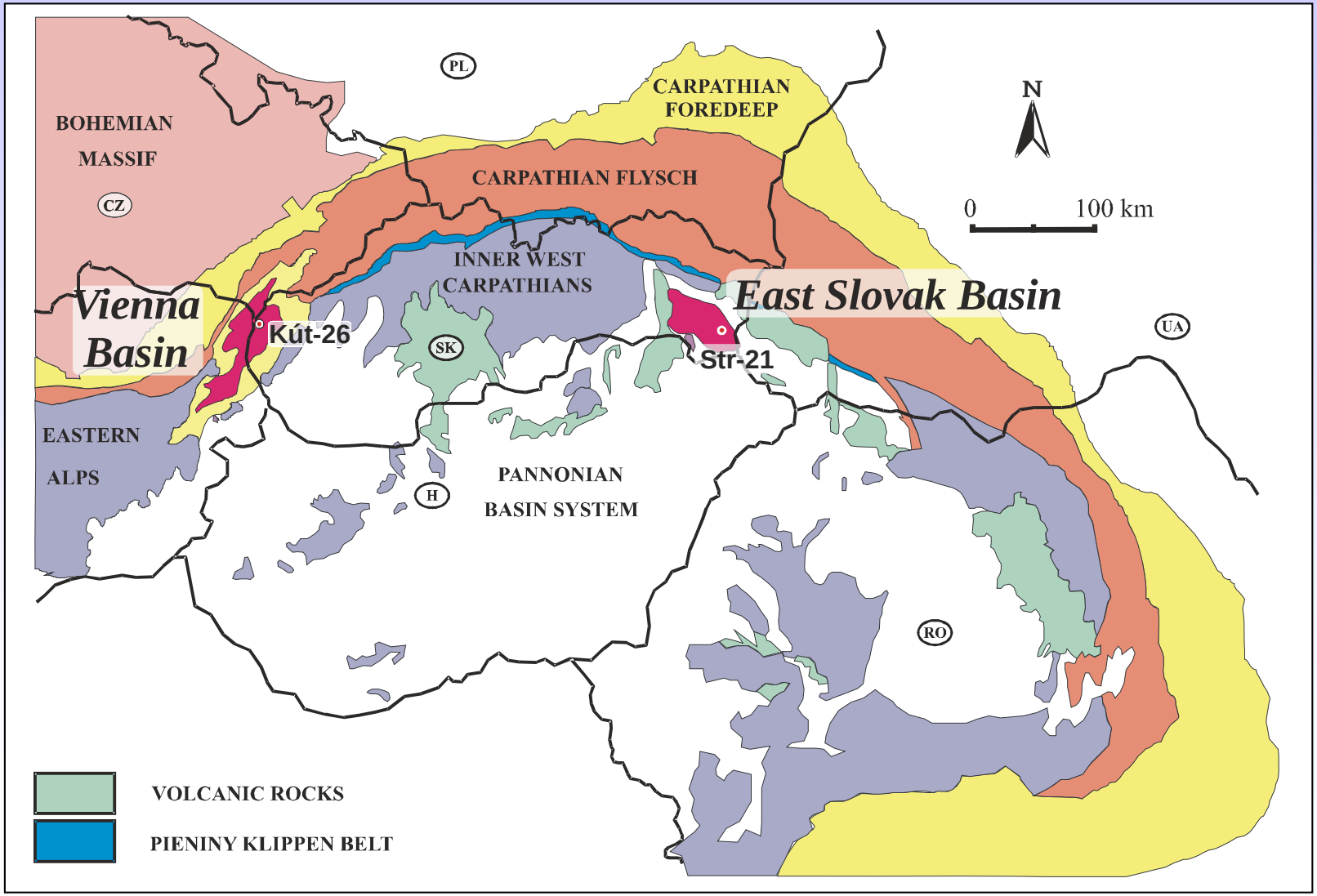


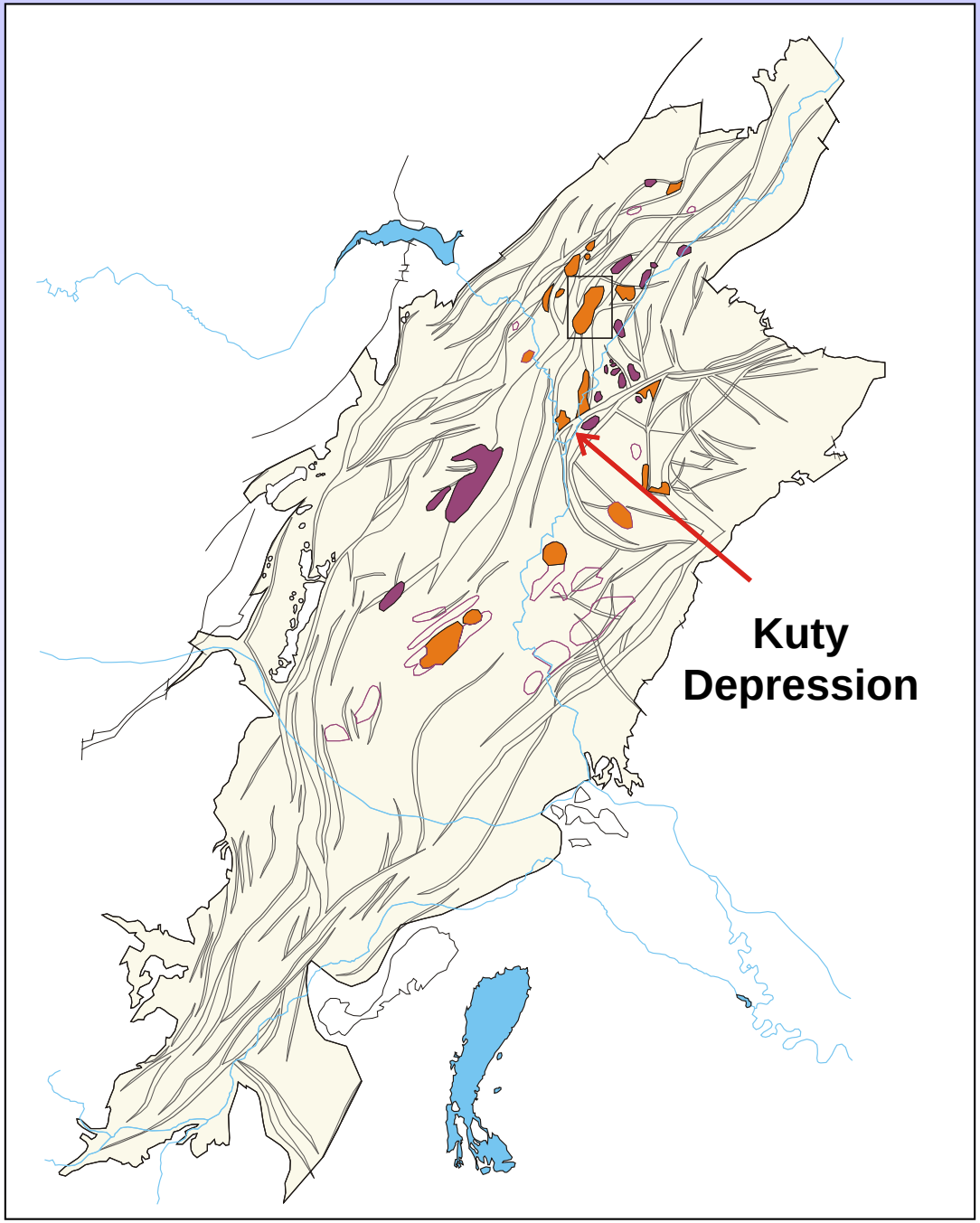
Zóny tvorby ropy a plynu - Vrstevní tlaky



Seal = Shale 80% Anhydrite 15% Halite 5 %

West Carpathians and Pannonian Basins



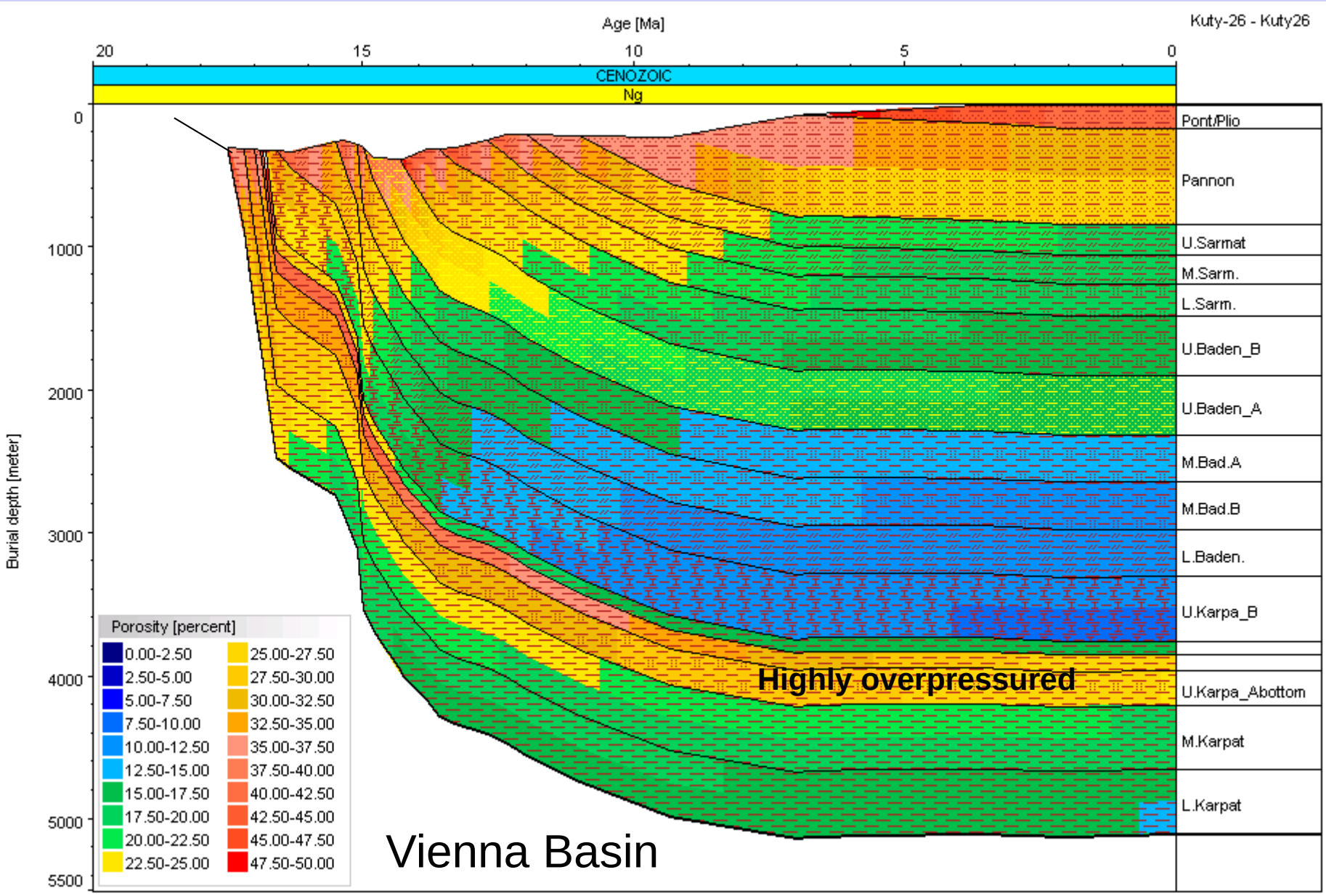


Vienna Basin

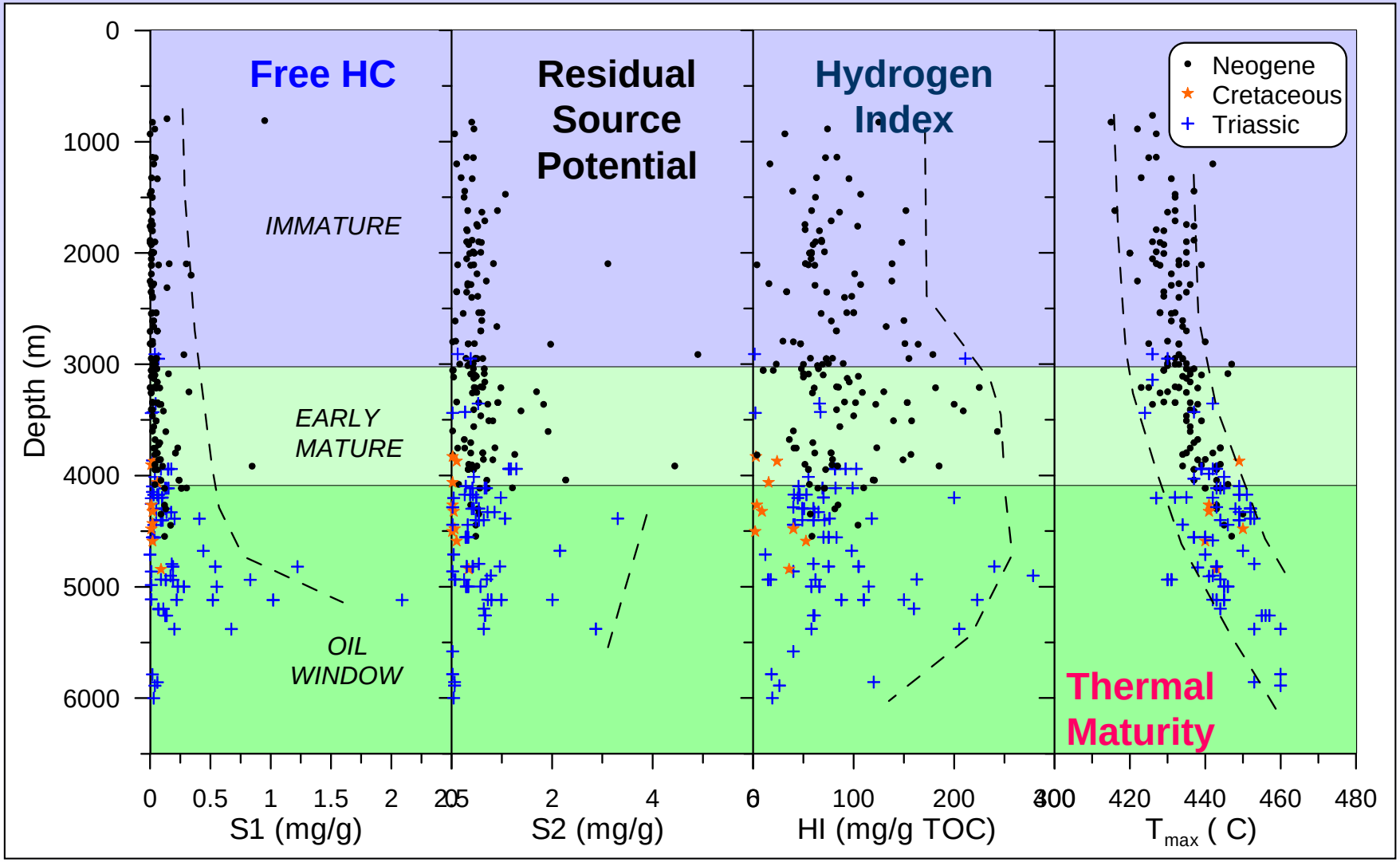
Neogene & Quaternary
< 5.5 km

Heat Flow
45 - 63 mW/m^2

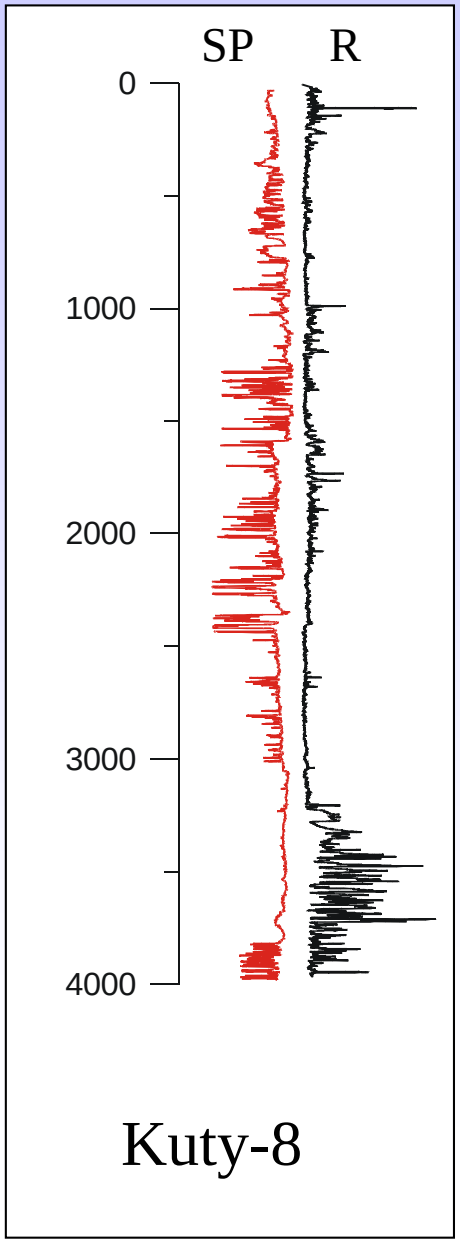
Porosity Reduction with Time & Depth

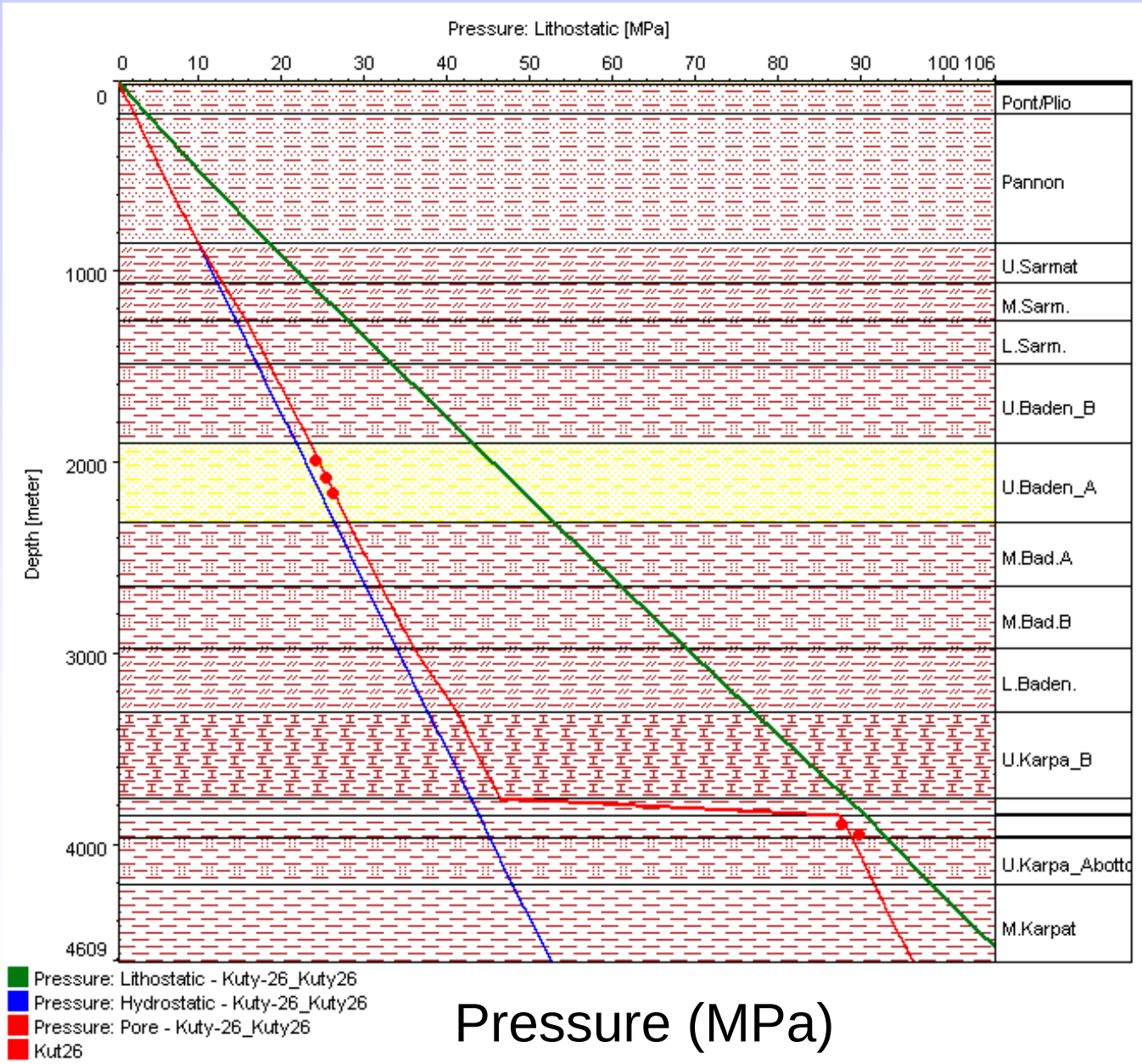


Northern Vienna Basin
Rock-Eval Data with Depth

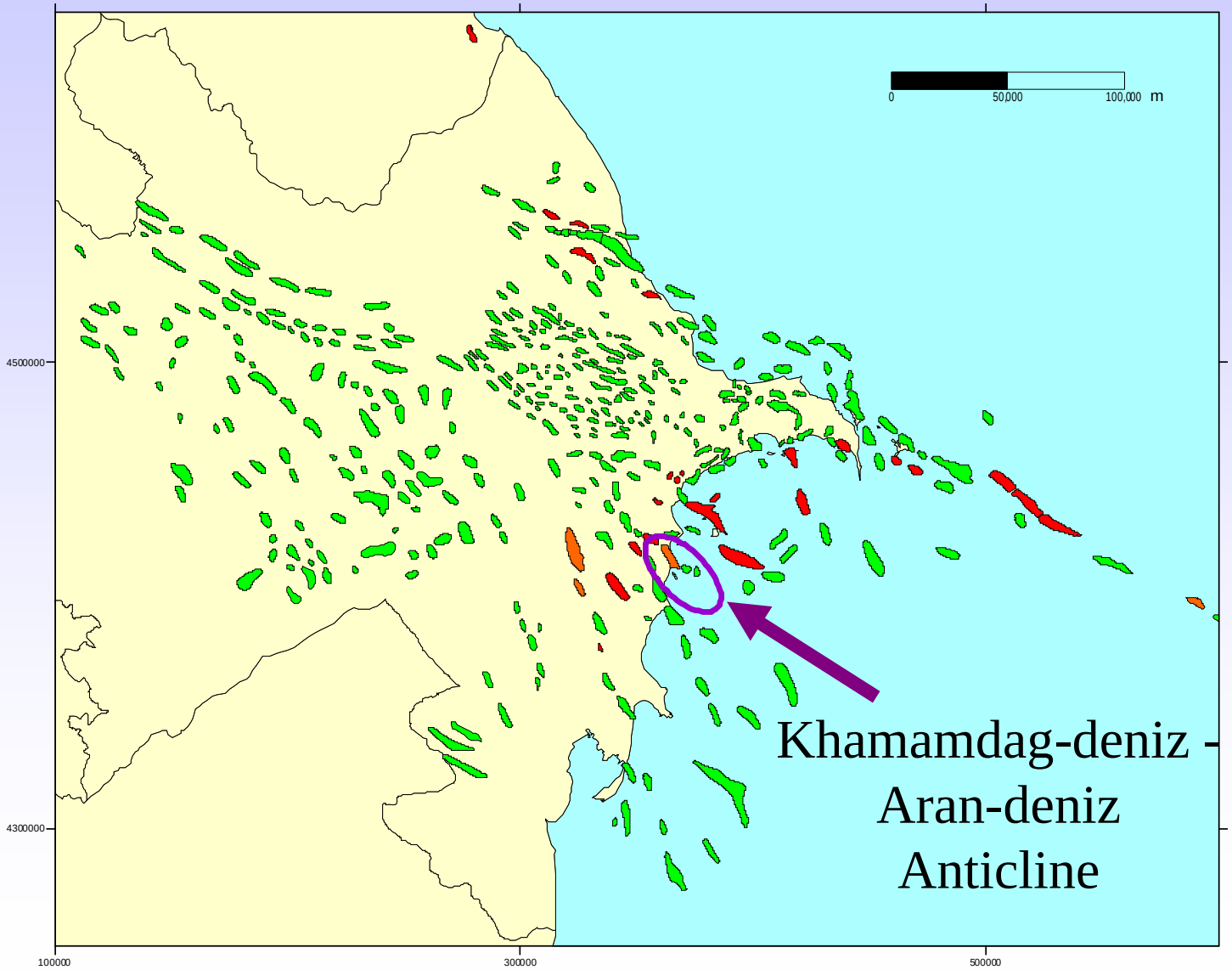


Fluid pressure in Vienna Basin

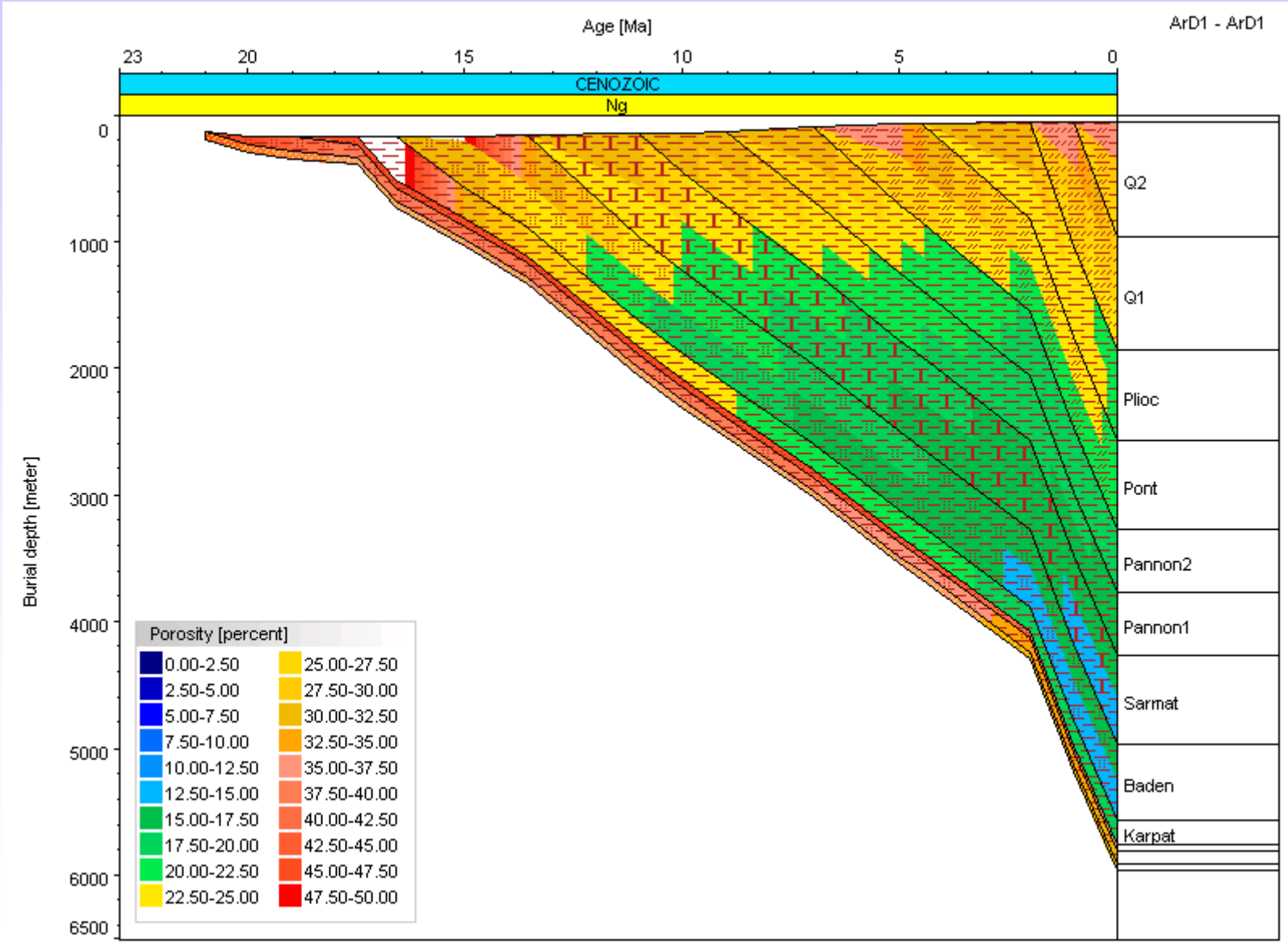




South Caspian Basin
Oil & Gas Fields

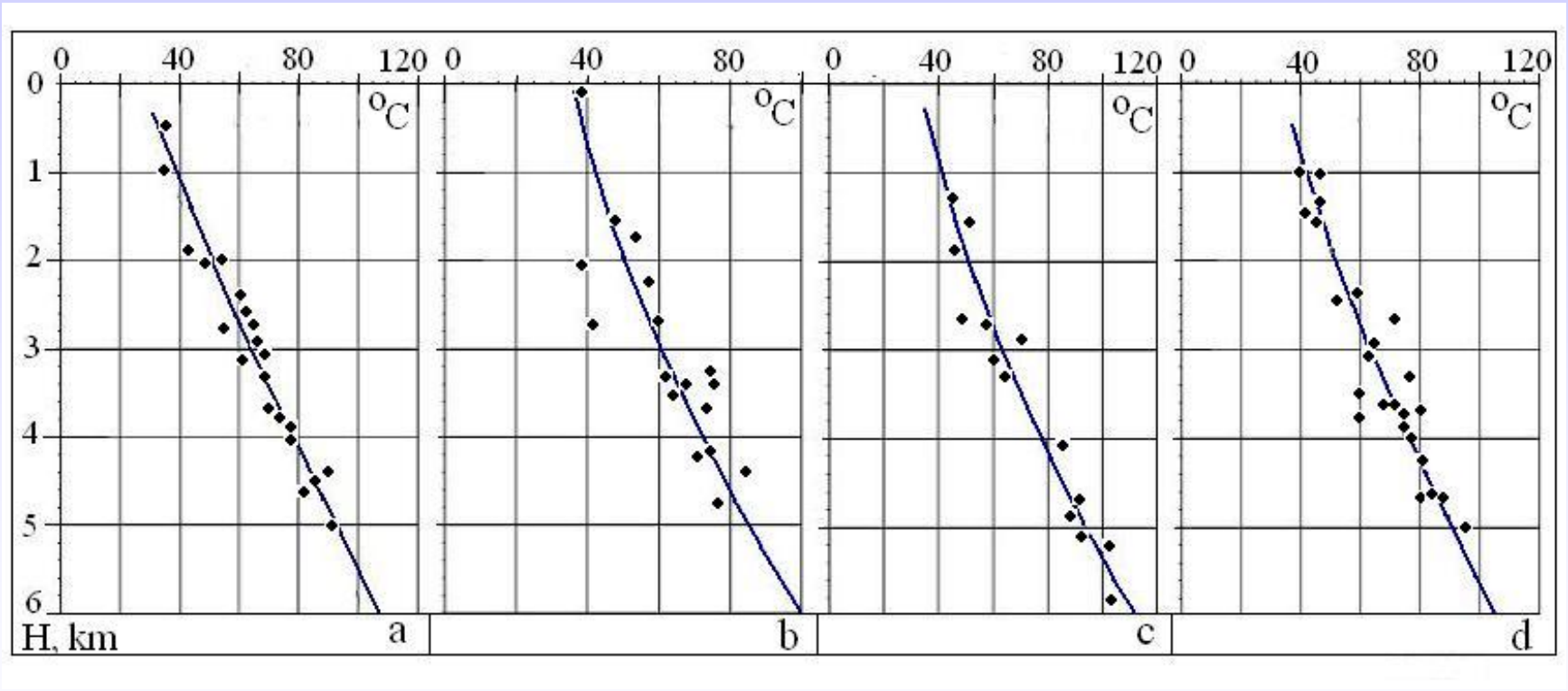


Burial & Compaction History
South Caspian Basin



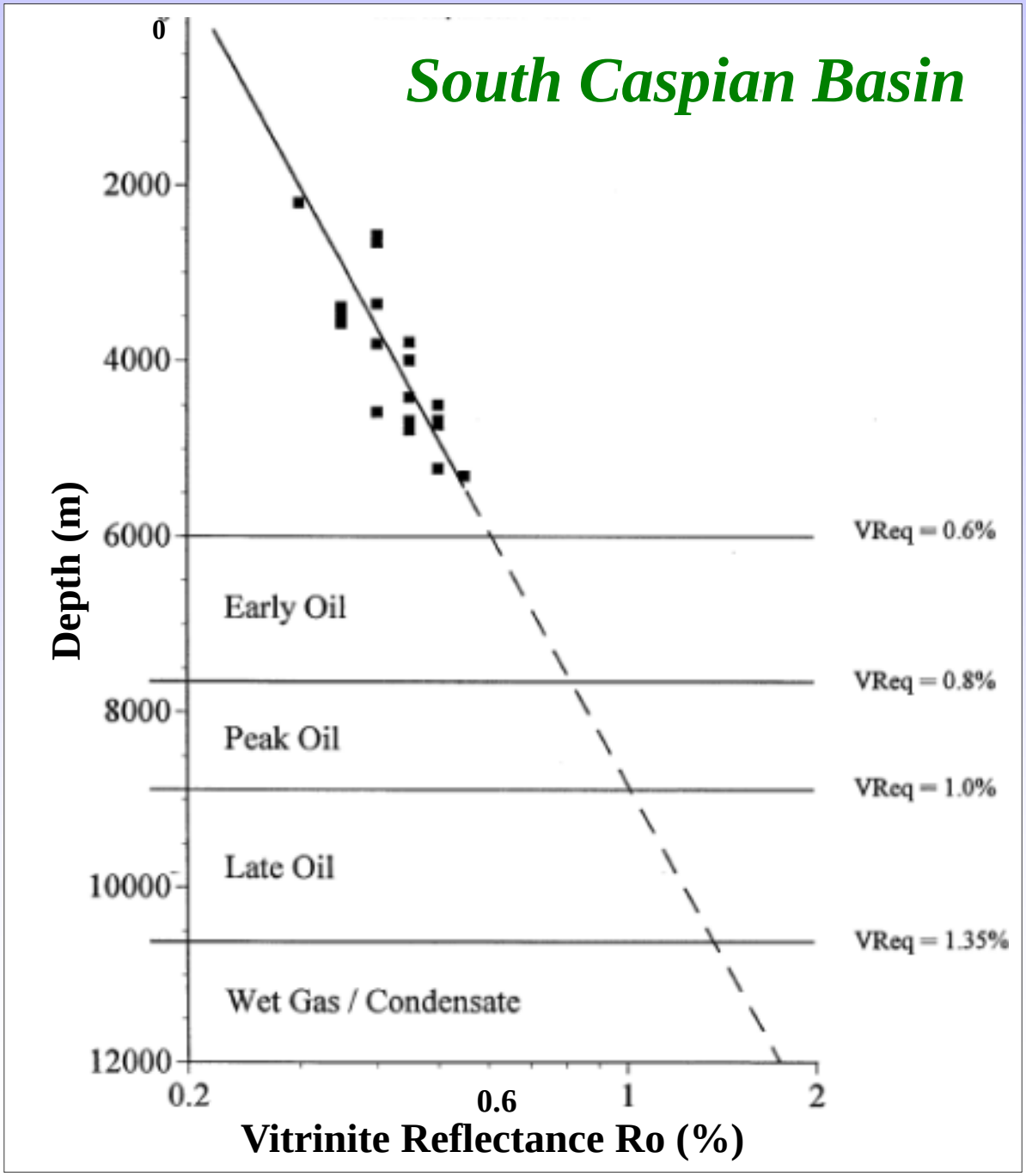
GIA

Temperature with Depth in the South Caspian Basin



Aran-deniz Khamamdag-deniz Garasu Sangi-Mugan

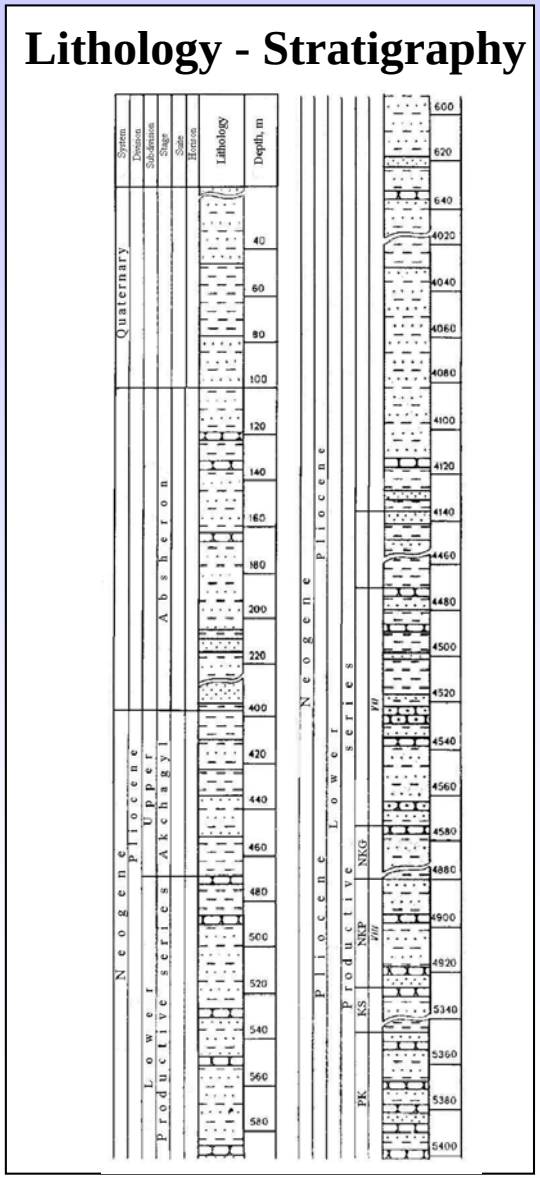
100-110 °C at 6 km

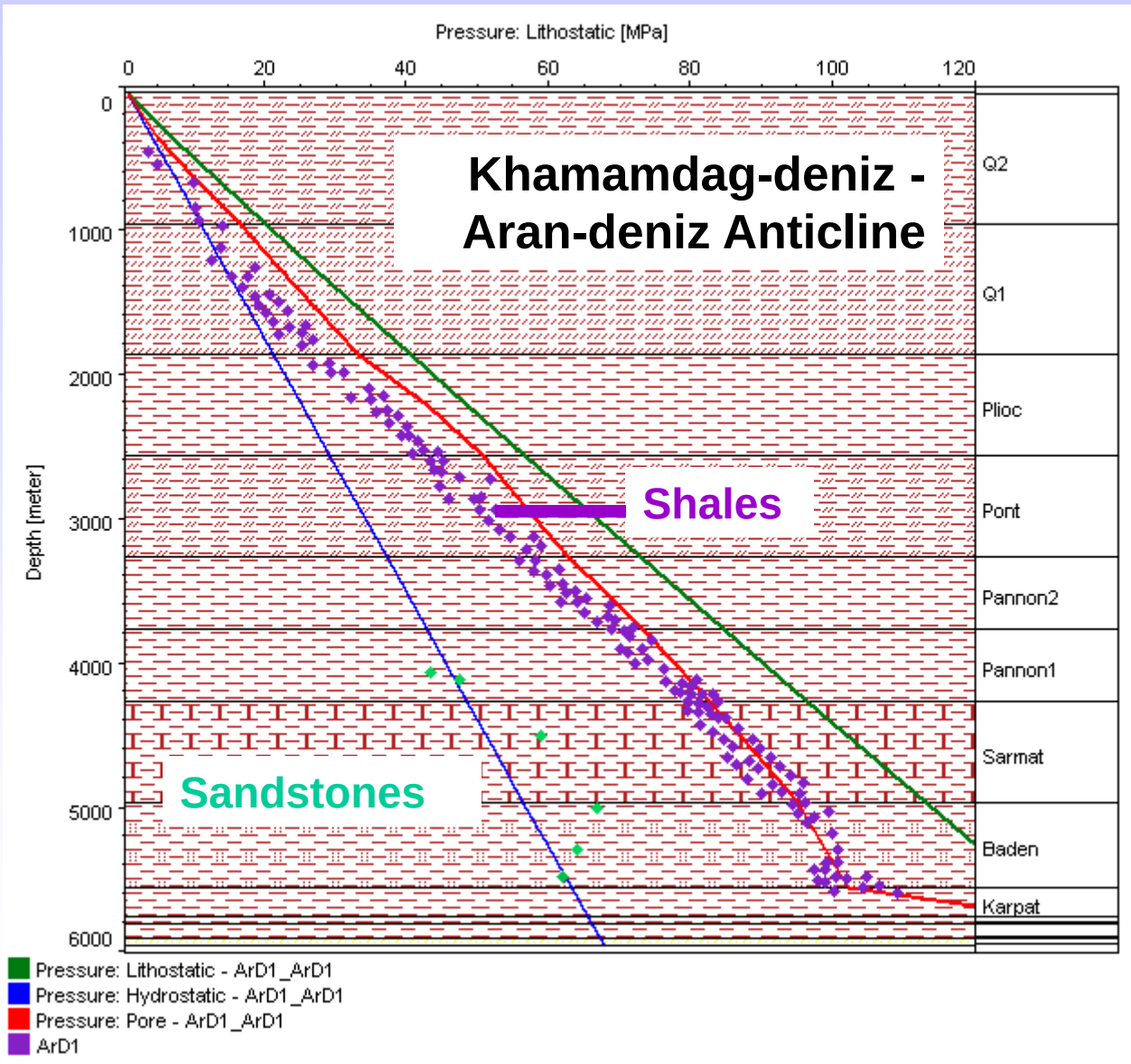


Maturation with Depth
&
Oil and Gas Generation Zones

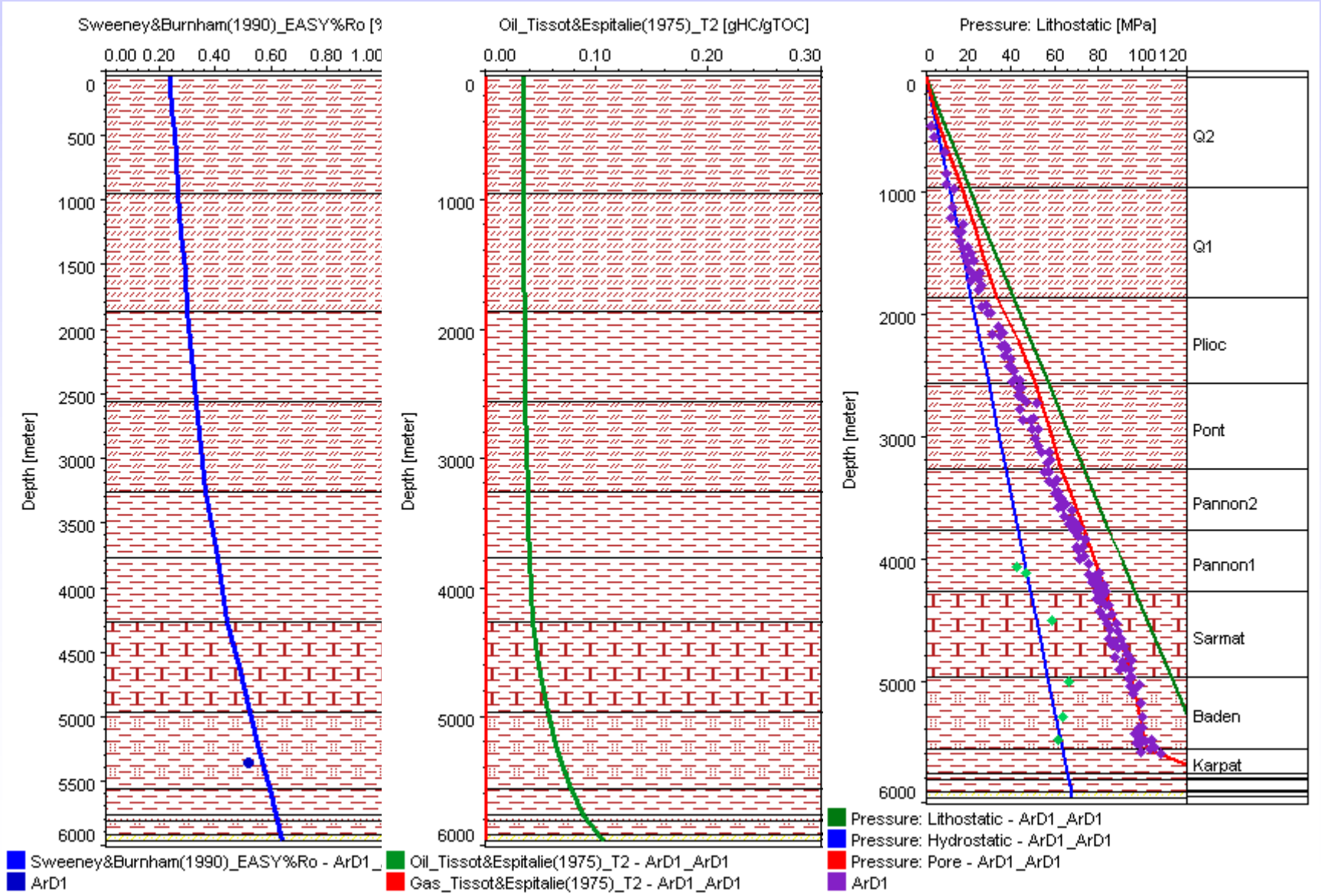
GIA

Fluid pressure in South Caspian Basin





South Caspian Basin
Thermal Maturity - HC Generation - Overpressure



CONCLUSIONS

Effect of Temperature and Sedimentation Rate on Overpressure

1. Overpressure occurs at variable level or organic maturation
- Hot Basin - within the oil and mainly gas gener. w.
- Cold Basins - fairly above oil window

2. Hydraulical Seal is a prerequisit for overpressure preservation
- simplified modeling with barrier lithology
Shale (80-85 %) Anhdrite (15-10%) Salt (5%)
3. Sedimentation/Burial rate is the principal variable in the applied modeling