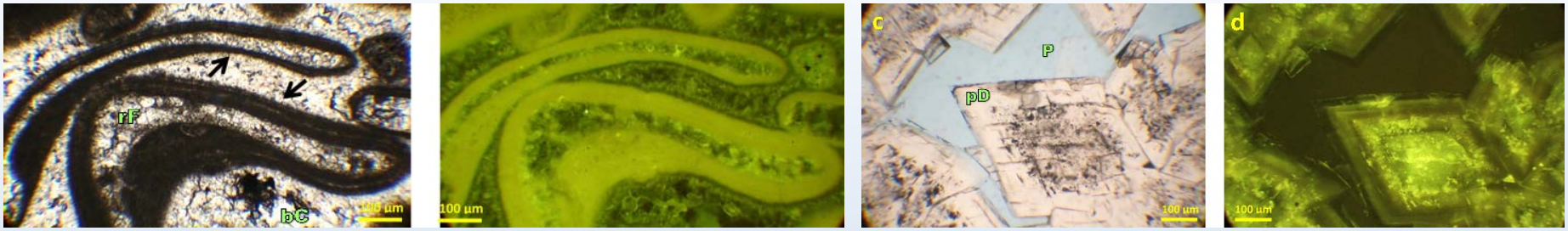
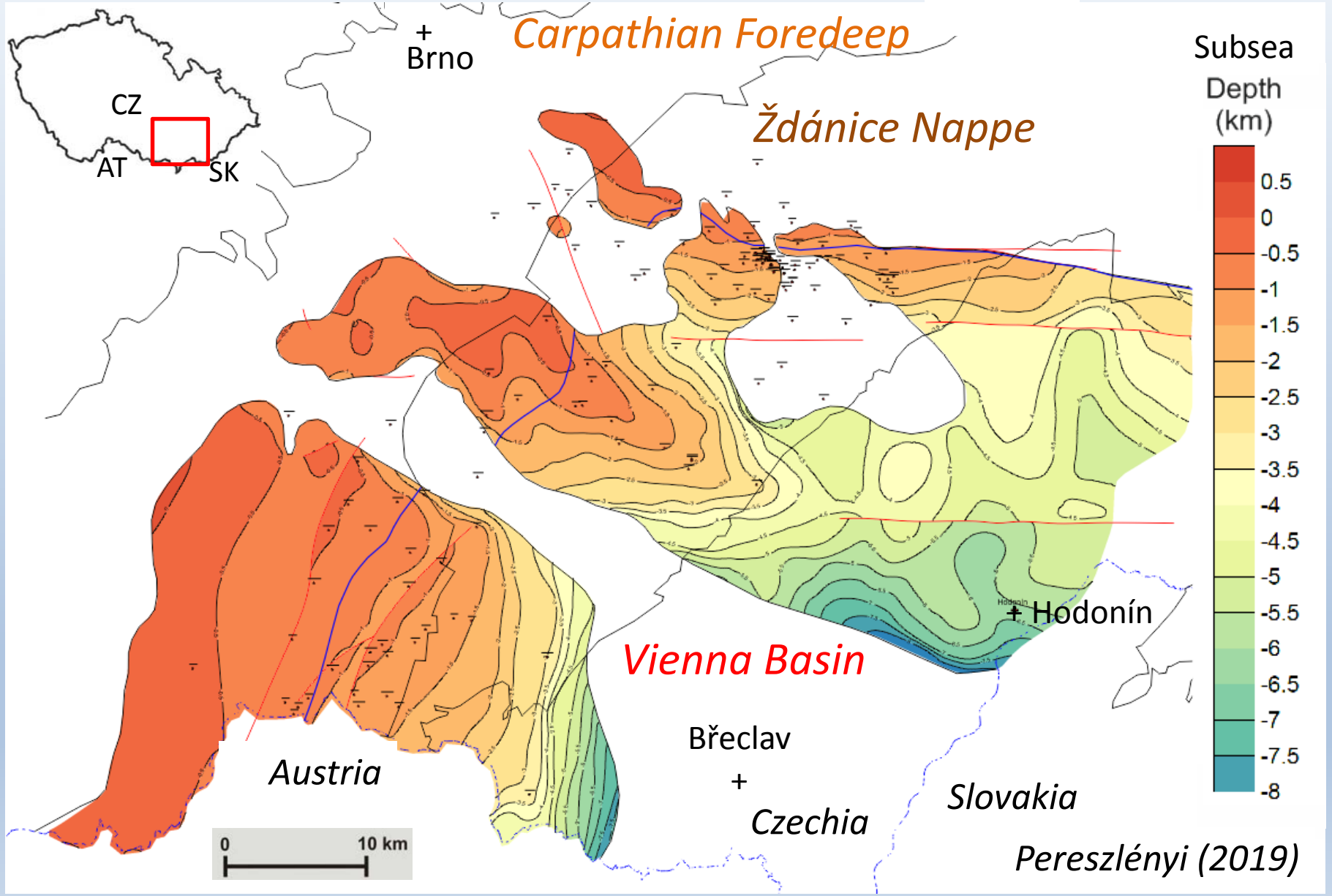


Diagenesis and dolomitization of Jurassic carbonate rocks in the SE Bohemian Massif

Juraj Francu – Lukáš Jurenka – Petr Jirman

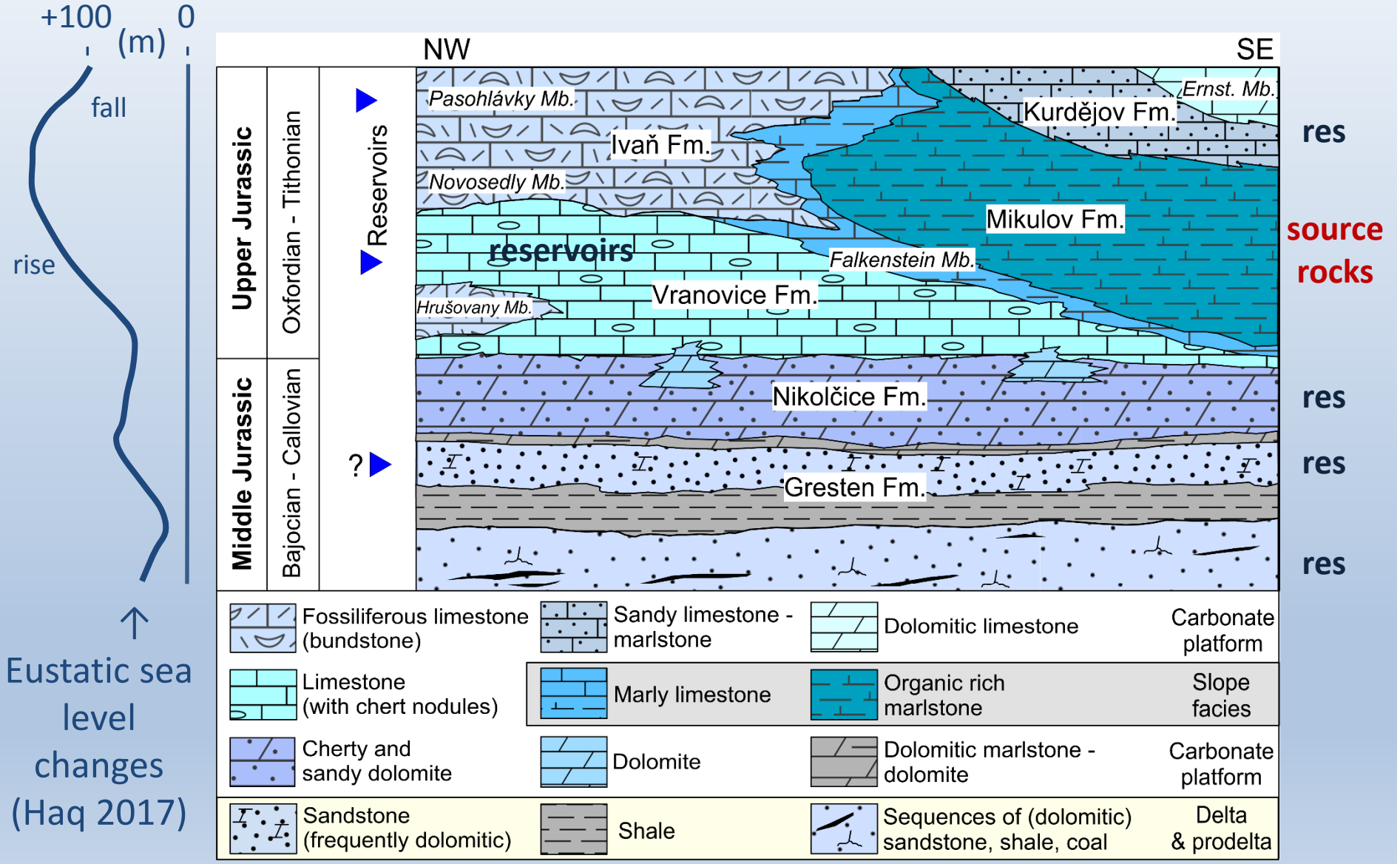
Czech Geological Survey

Jurassic of the SE Bohemian Massif, Czech Republic



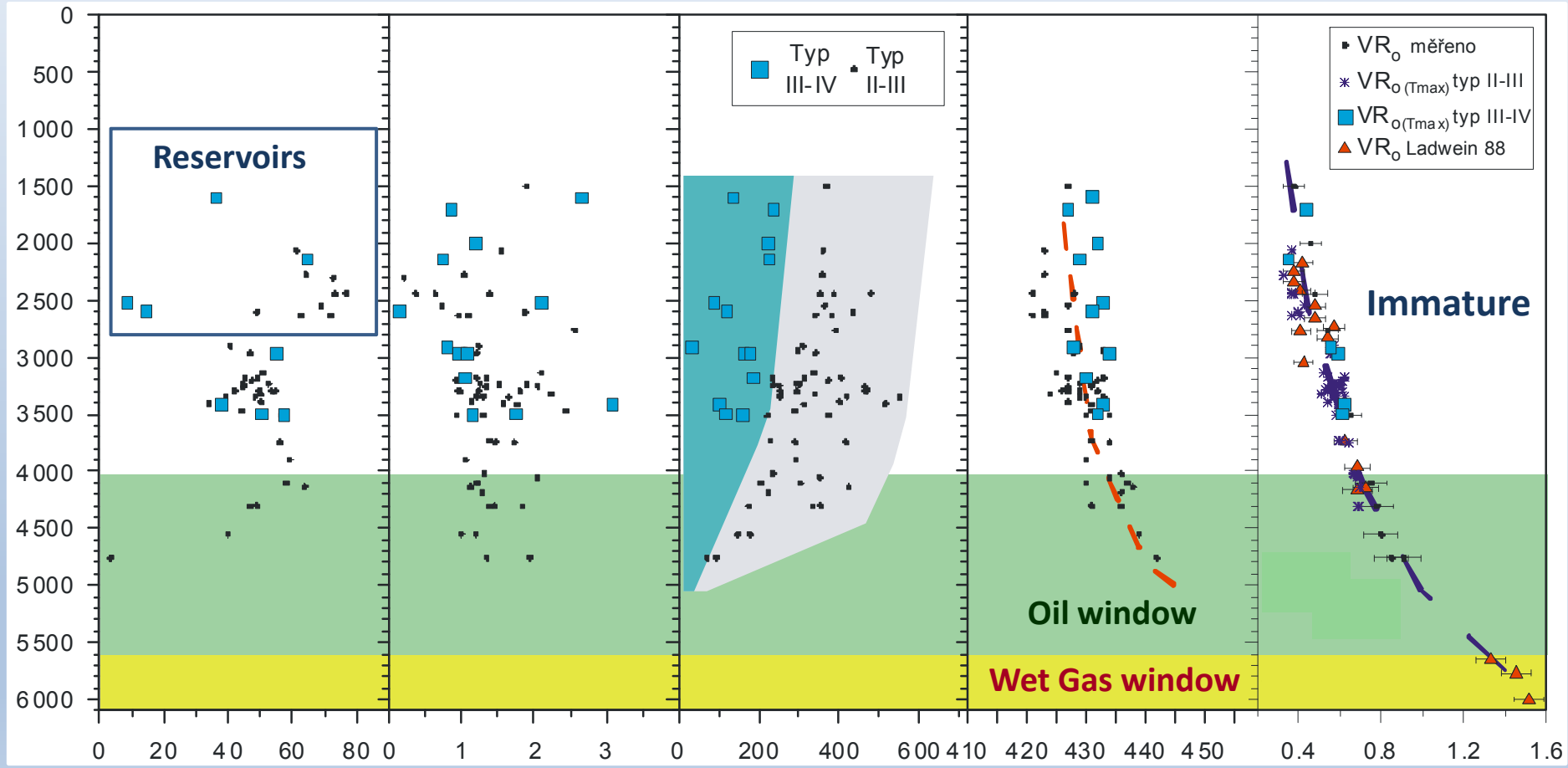
Lithostratigraphy of the Jurassic,

SE Bohemian Massif, Czech Republic



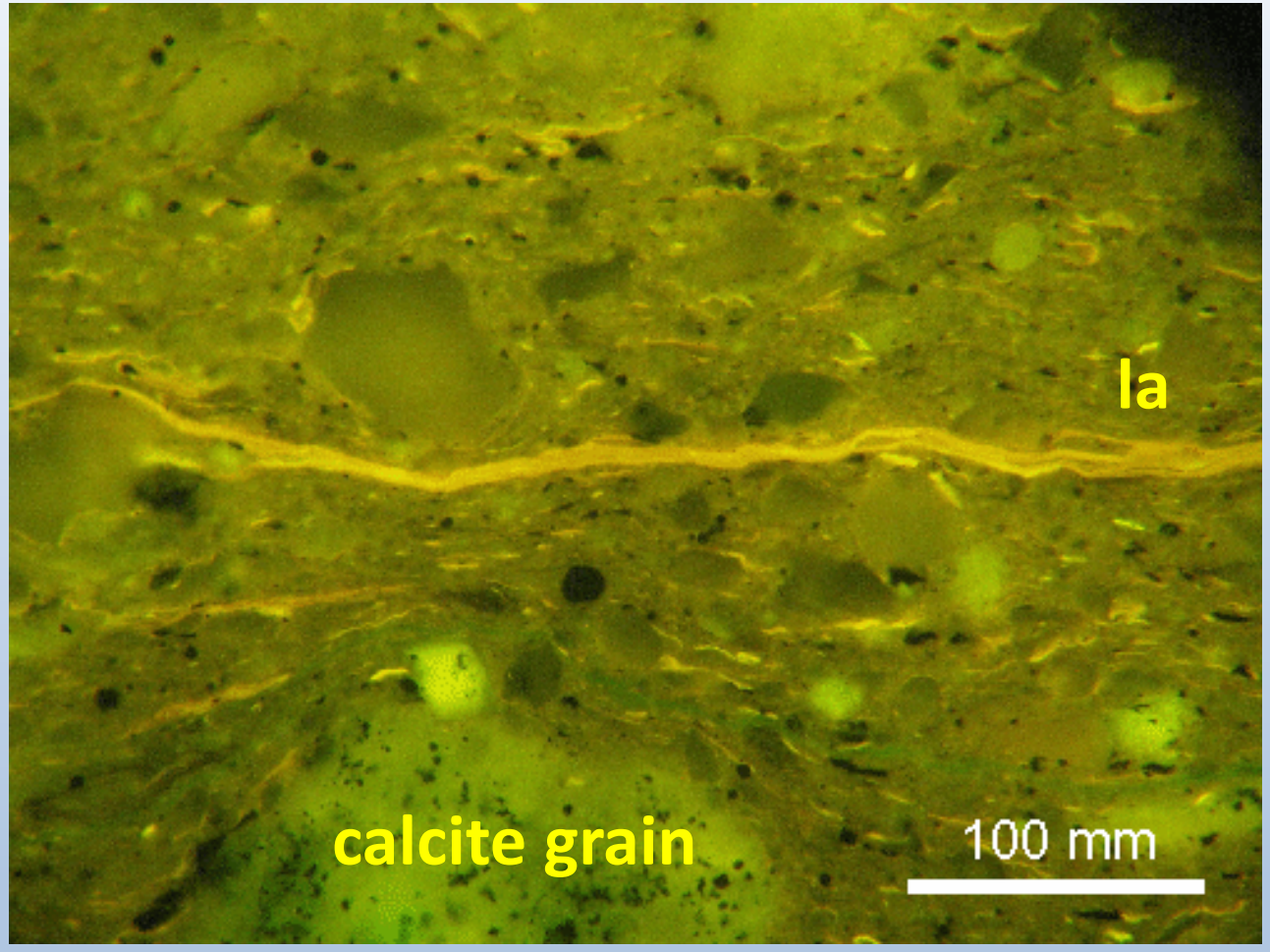
(modified from Ladwein 1988; Eliáš and Wessely 1990 and Adámek 2005)

Jurassic rocks – Diagenesis in depth



Mikulov Fm. - **oil & gas source rocks** – Thermal maturation

Jurassic rocks – Flurescence Light Microscopy



Mikulov Fm. - **oil & gas source rock**

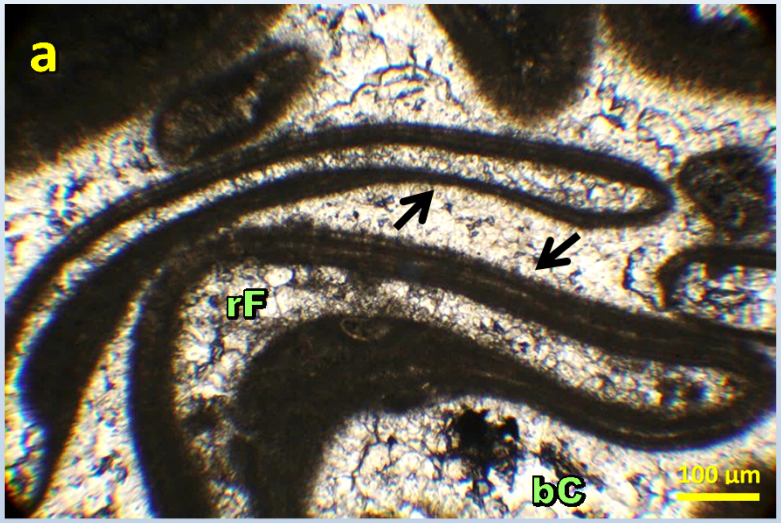
Organic petrology:

la – lamalginite (bright yellow fluorescence)

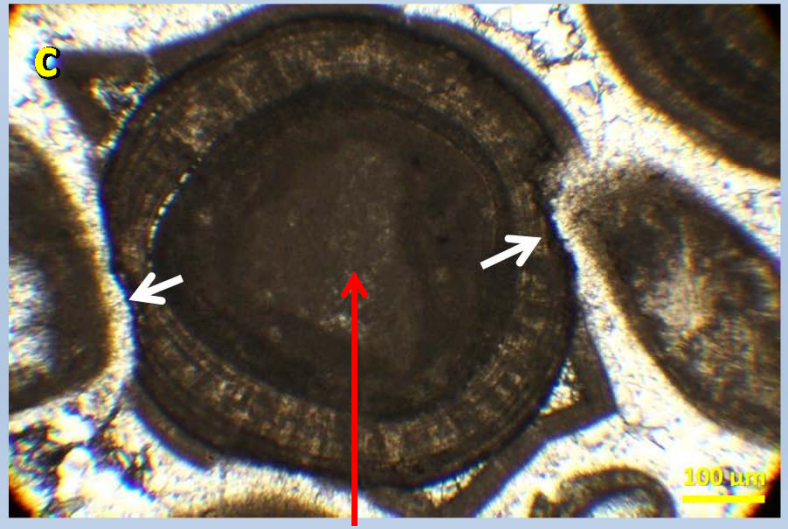
Kurdejov Fm. – Fossiliferous oolitic limestone *Nem-1, 2280 m*

***rF** – recrystallized **fossils** with micrite envelope of **isopachous cement** rest of space is filled with **blocky calcite cement (bC)**.*

PPL



Fluo



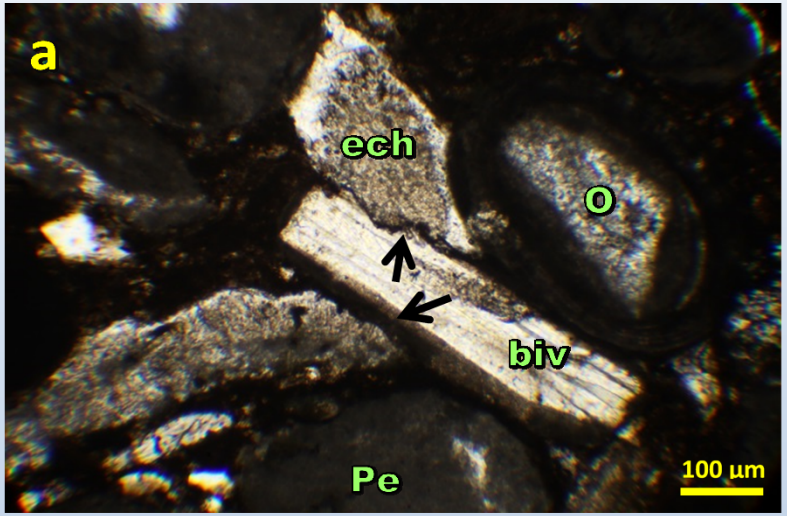
c-d): deformed ooid** – the cracked micritic coating, **pressure dissolution

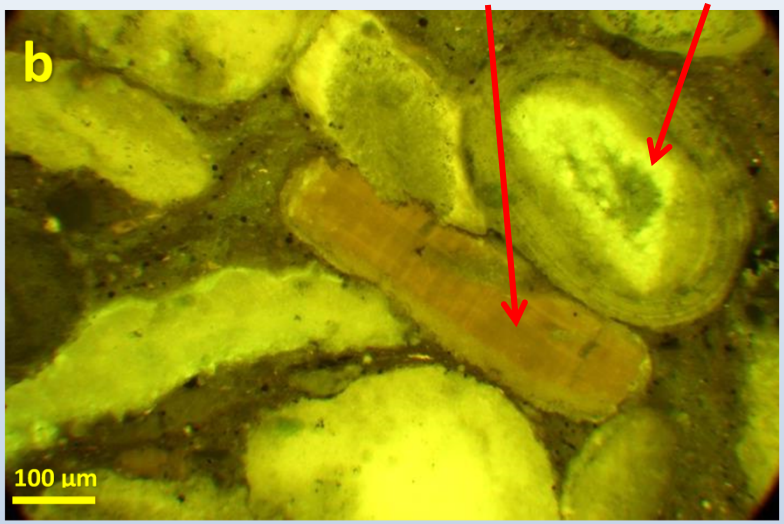
Kurdejov Fm. – Biodetritic oolitic limestone

Nem-1, 2591 m

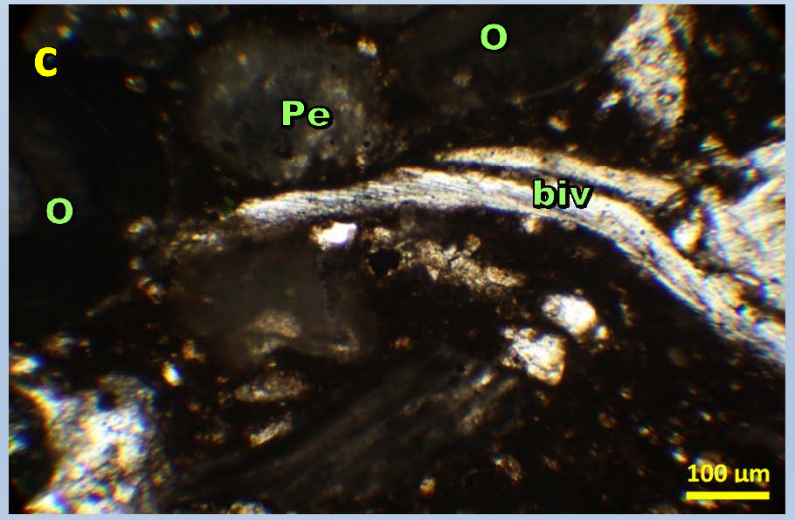
Pressure dissolution *at the contact of grains:* ***echinoderm*** *(ech),* ***bivalve*** *(biv),* ***grain***

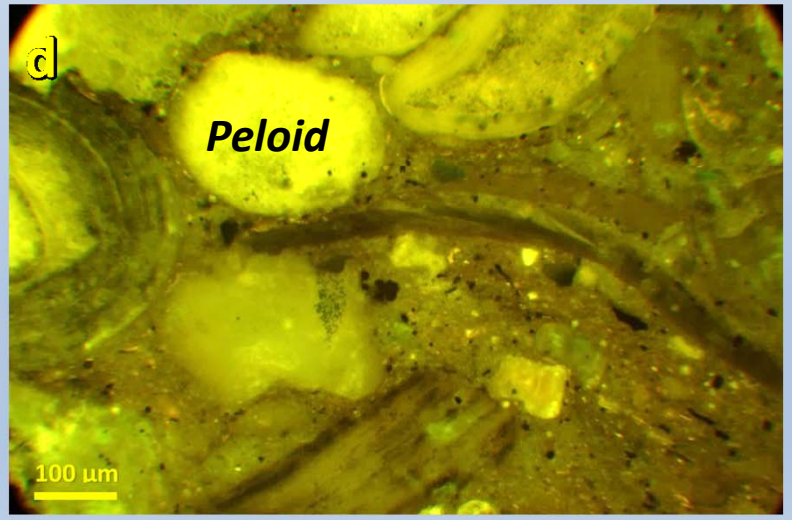
PPL





Fluo





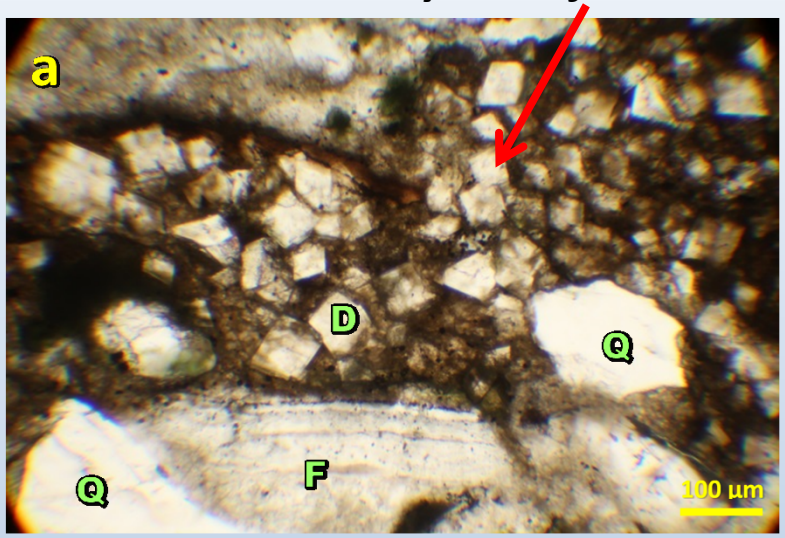
Fragment of bivalve (biv), peloid (Pe), ooid (O) and other allochems in ***micrite****.*

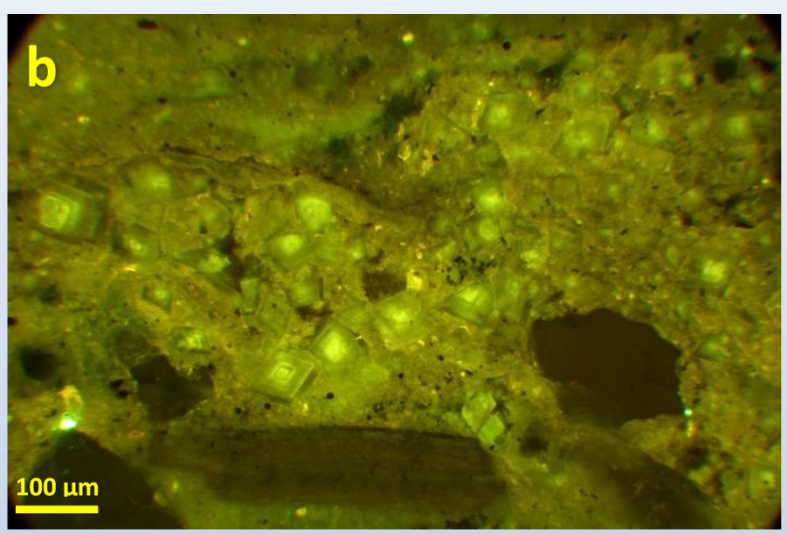
Kurdejov Fm. – Biodetritic oolitic dolomitic limestone

NP-2, 1254 m

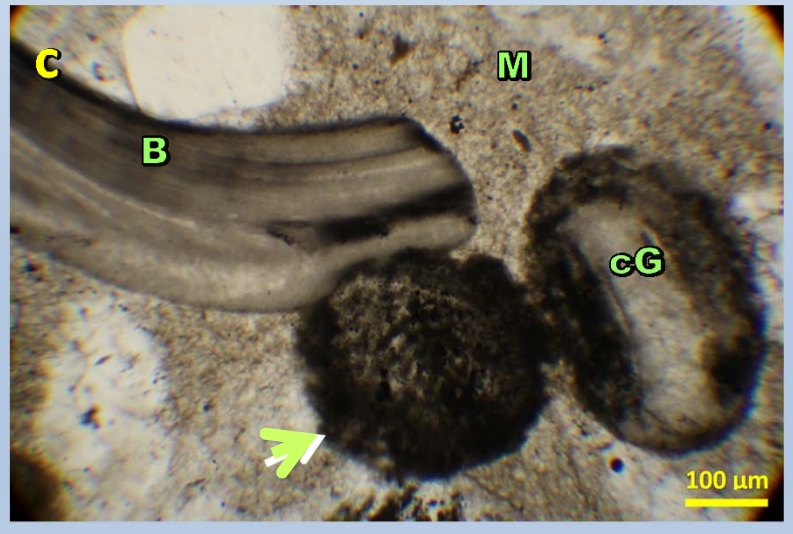
D - euhedral ***crystals of dolomite growing from micrite***

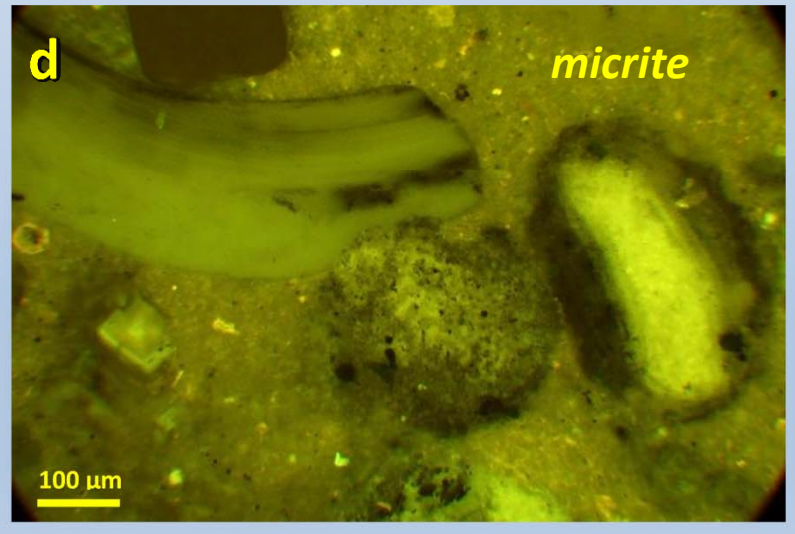
PPL





Fluo





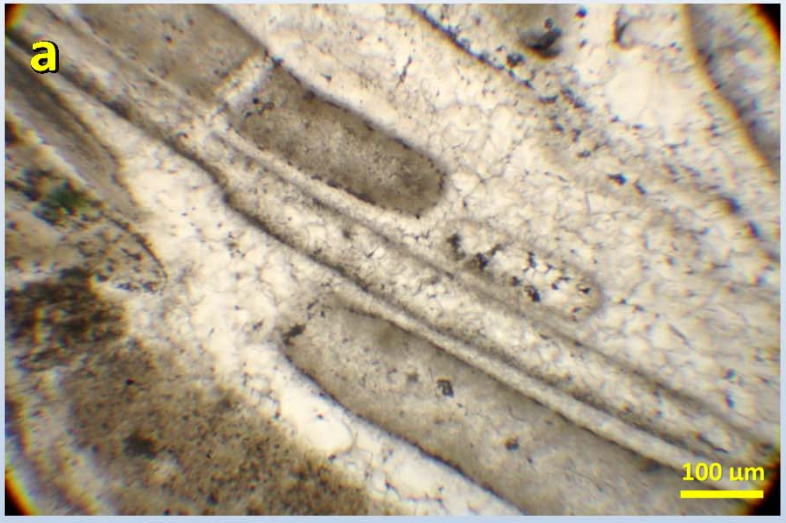
rounded fragment of bivalve (B), coated grain (cG), Q – quartz, F – fossils.

Kurdejov Fm. – Biodetritic oolitic limestone

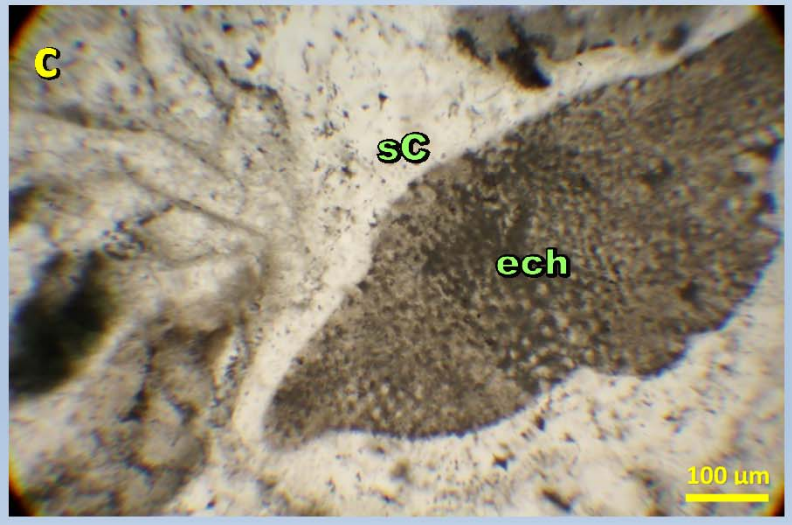
Mus-2, 1096 m

*fossils recrystalized and **replaced by micrite calcite***

PPL



Fluo



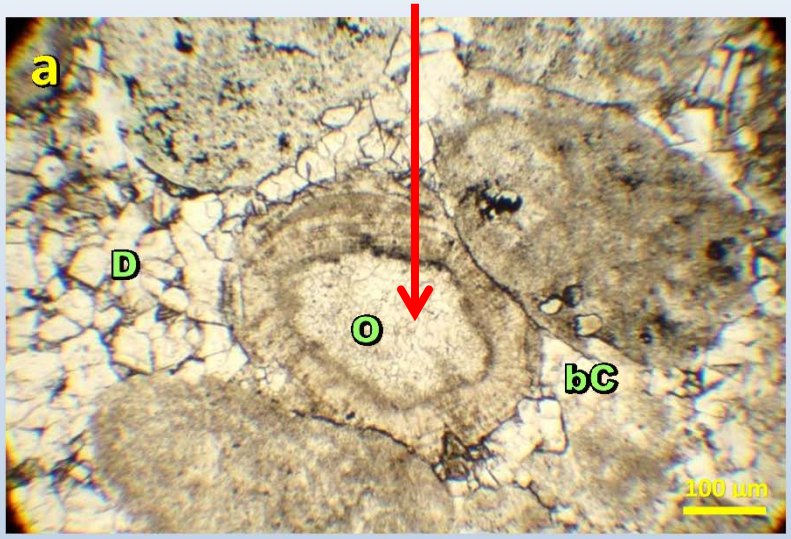
*fragment of **Echinoderm** (ech) and syntaxial calcite cement (sC) growth*

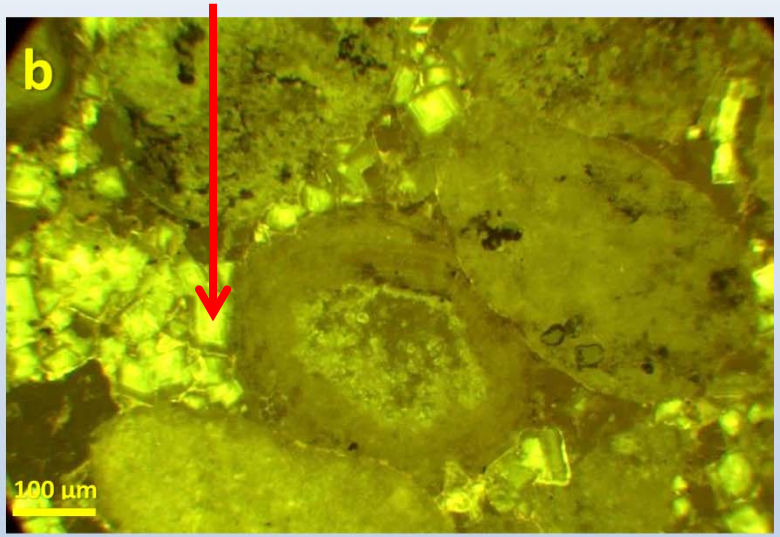
Kurdejov Fm. – Biodetritic oolitic limestone

Mik-1 , 1842 m

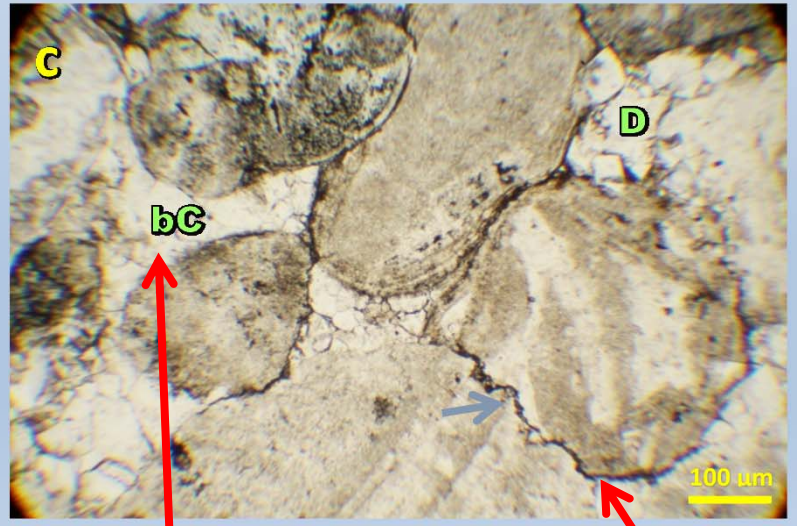
Ooid filled with **replacement calcite cement** (O) **Dolomite** crystals (D)

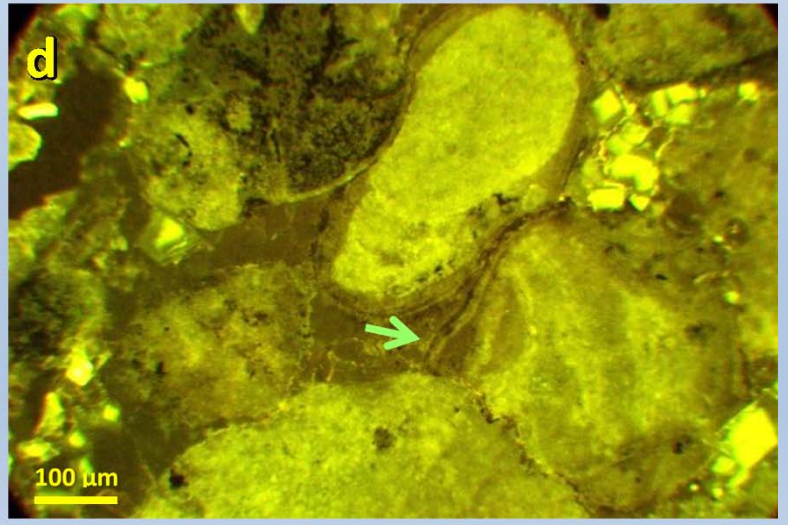
PPL





Fluo





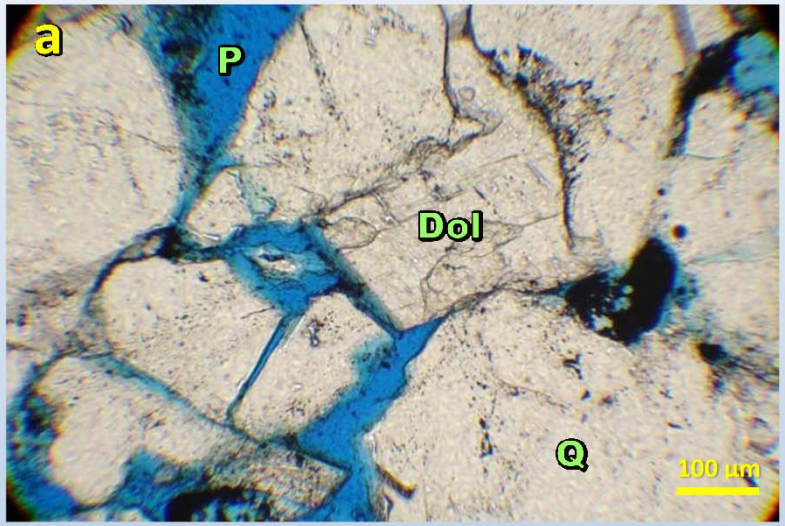
blocky calcite cement (bC), pressure seams

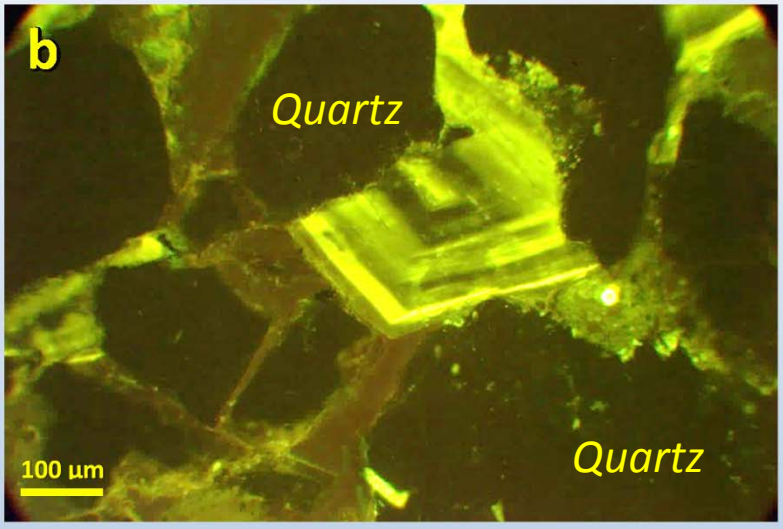
Nikolcice Fm. – Dolomitic sandstone

Nik-1A, 1911 m

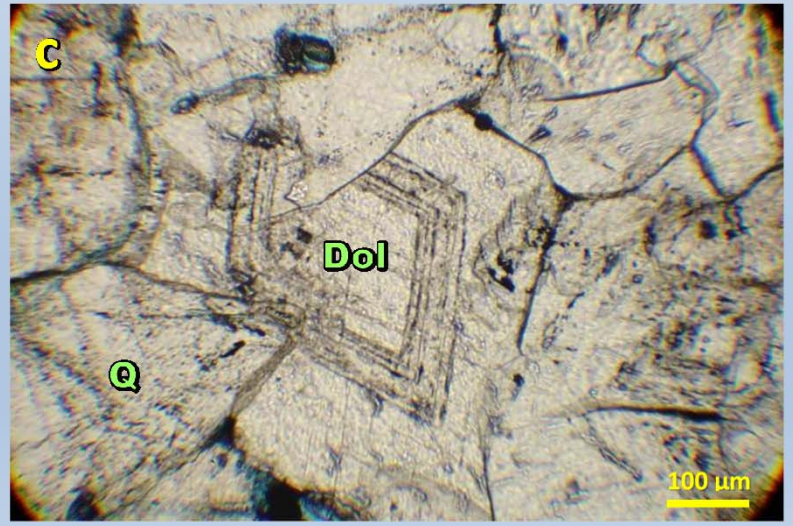
***P – free pore space** filled with blue epoxy*

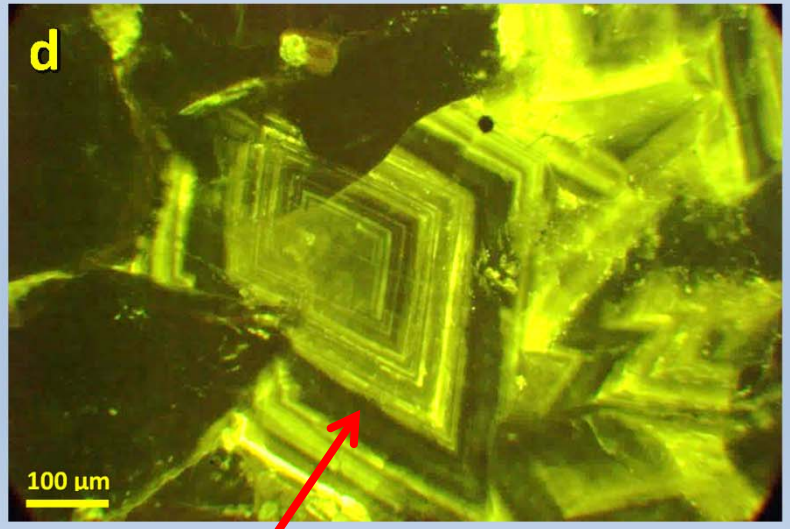
PPL





Fluo





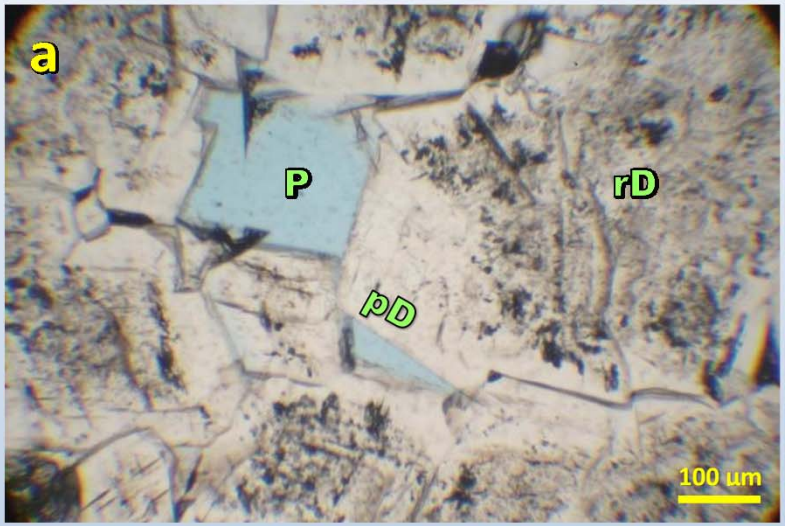
Dol – crystal of zonal cementation dolomite

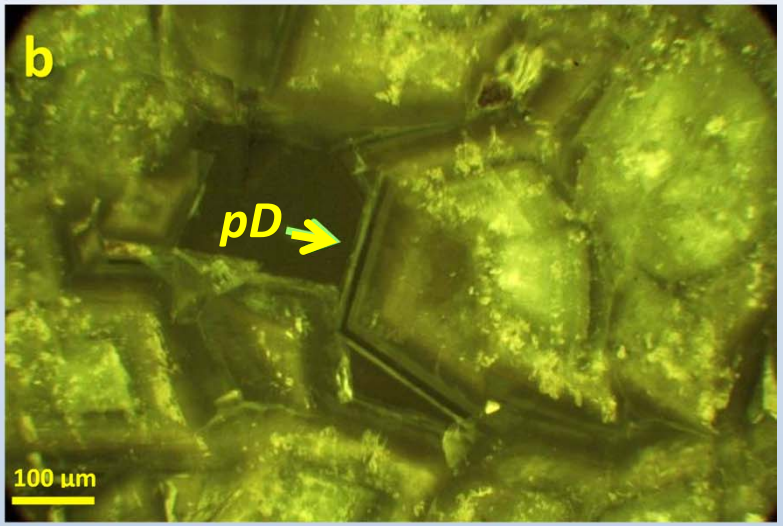
Vranovice Fm. – Dolomitic limestones

NP-1, 1075 m

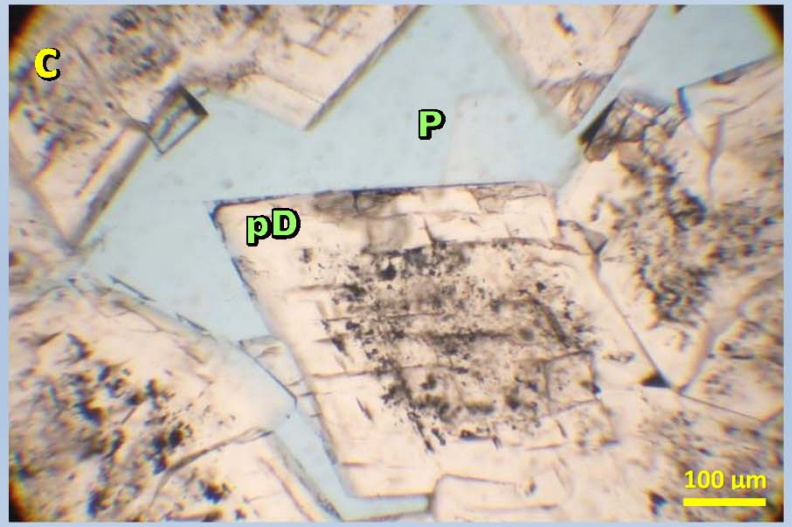
***P – free pore space** filled with blue epoxy resin , rD – replacement dolomite*

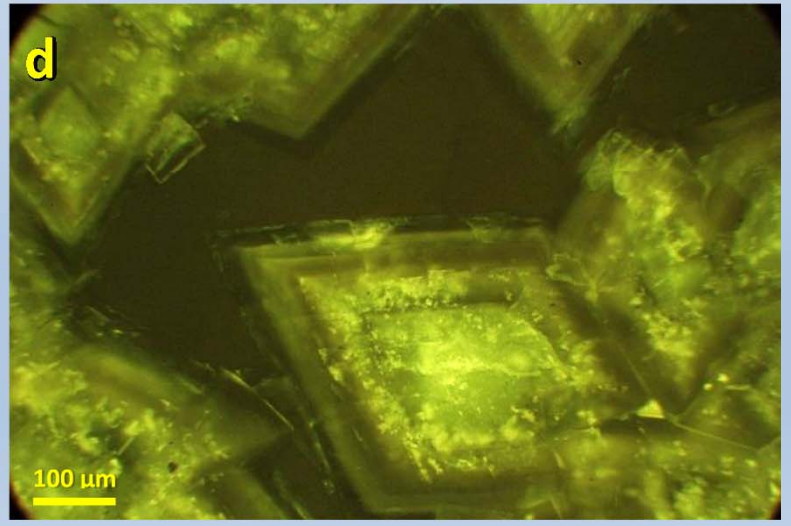
PPL





Fluo

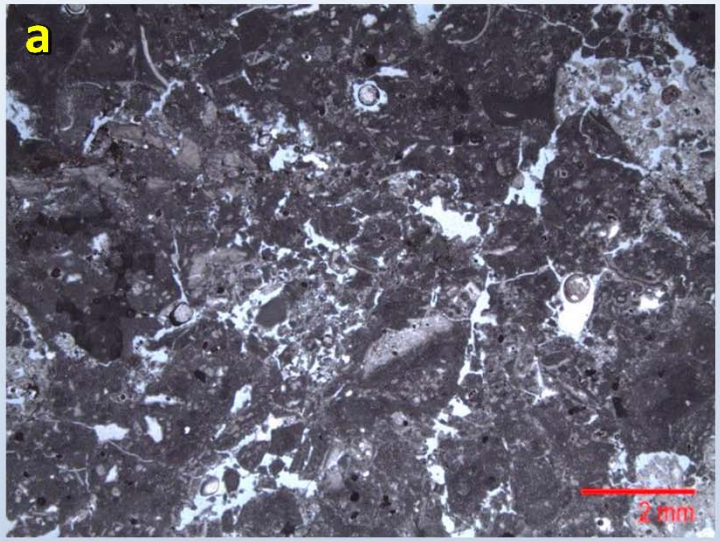


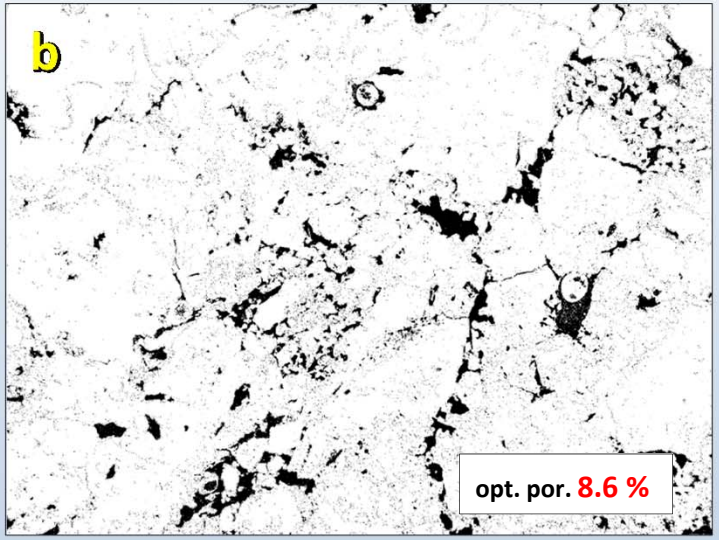


***pD – pore-lining dolomite** (arrow in fluorescence light)*

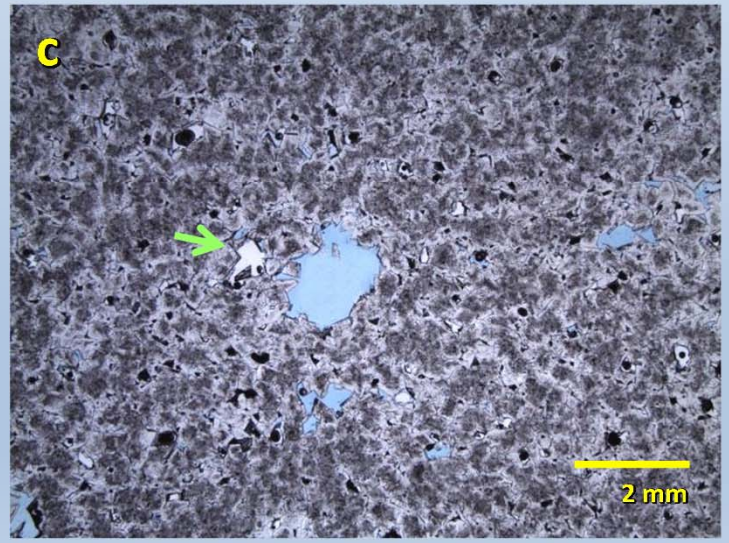
Vranovice Fm. – fracture and cavernous porosity

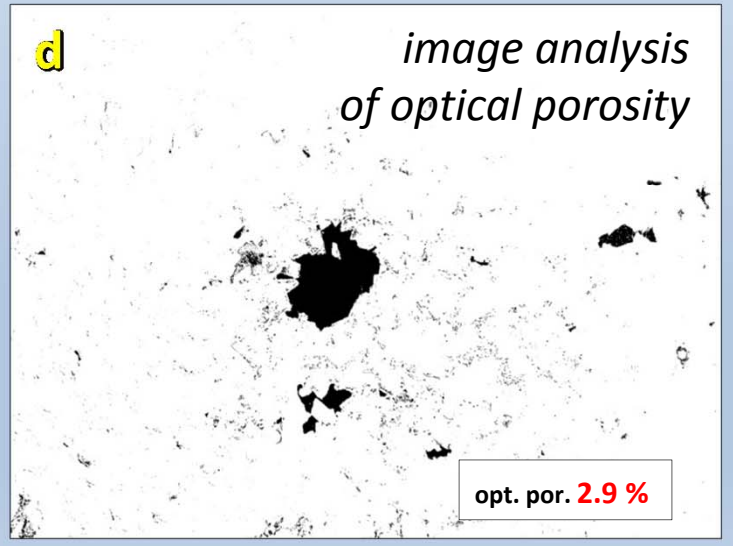
altered peloidal-bioclastic wackestone with fracture porosity





Ivaň-1
675 m



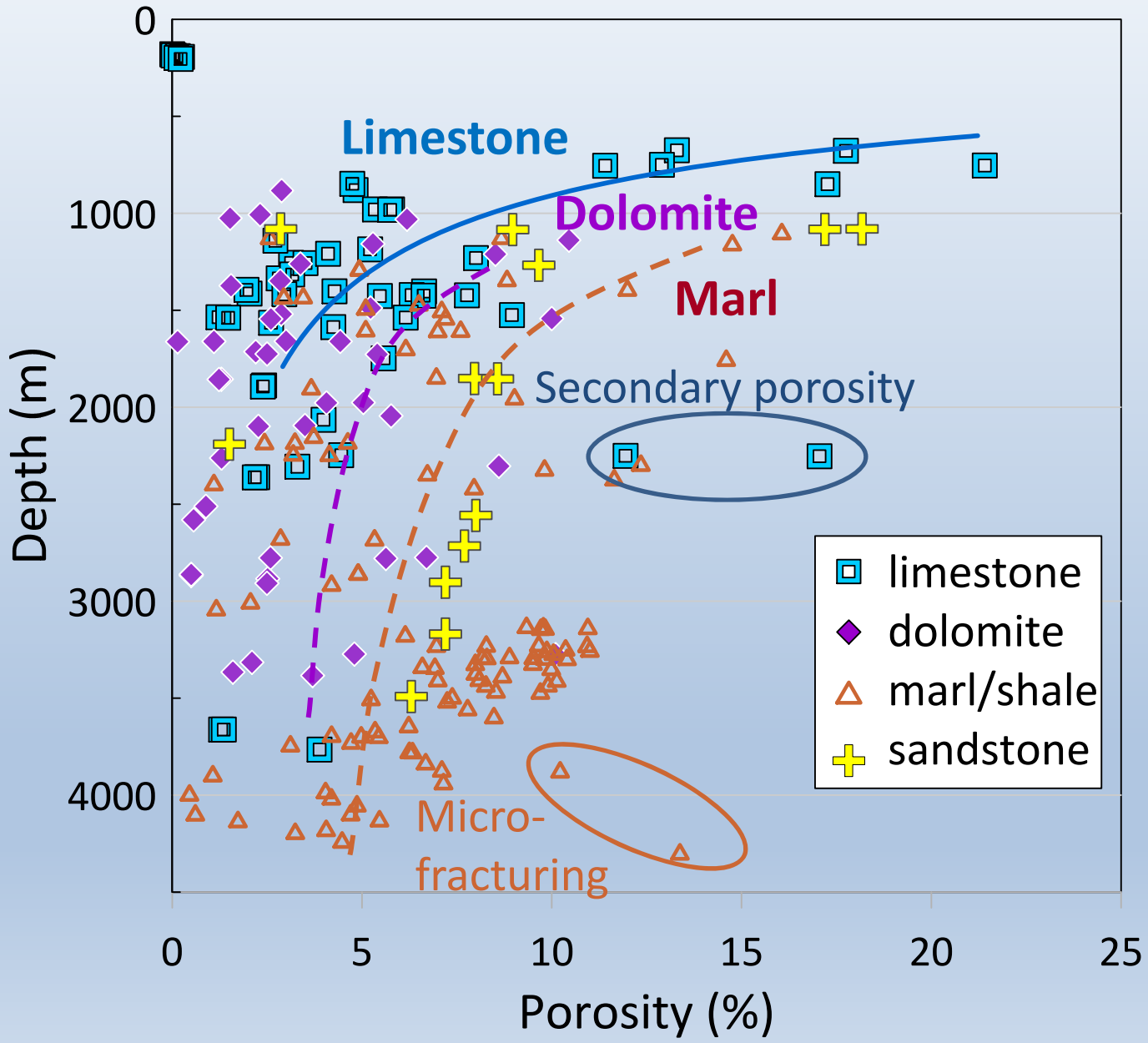


NP-1
1075 m

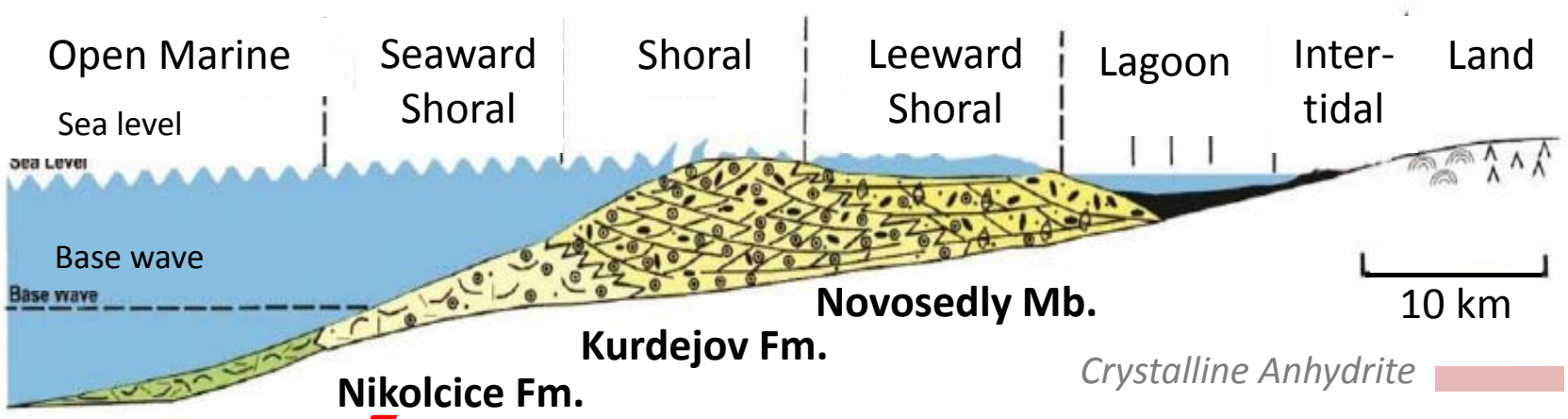
polymodal planar-s dolomite with cavernous porosity

Optical porosity estimated by image analysis of color-coded pore space

Jurassic Rocks – Porosity with Depth



Carbonate Depositional Environments & Lithofacies



Crystalline Anhydrite

Fenestral dolomudstone

Stromatolite-throbolite boundstone

Evaporite nodule bearing dolomudstone

Pelloid bioclast wackestone

Fine grained allochemical packstone/grainstone

Ooid grainstone to dolograinstone

Coarse grained allochem. packstone/grainstone

Fossiliferous wackestone/mudstone

General scheme modified from Dunham (1962), Wilson (1975) and Nosrati et al. (2019)

Conclusions

- **Fluorescence** microscopy provides **new details** in paleontology, facial types and diagenesis of carbonates.
- Two generations of dolomite were identified:
  1) **matrix dolomite** and
  2) **zonal cementation dolomite**.
- **Cement** generations follow changes in the **formation water chemical** composition during the diagenesis.
- Jurassic carbonates exhibit **cavernous and fracture porosity** controled by dolomitization and tectonic deformation.
- Major carbonate diagenesis occurs in **thermally immature** zone
- Jurassic petroleum system includes both

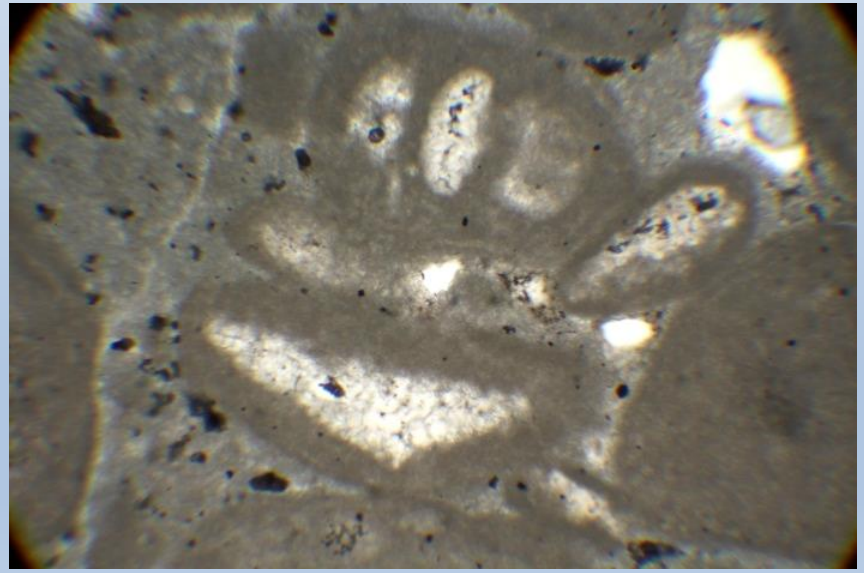
  source rocks - Mikulov Fm., kerogen type II

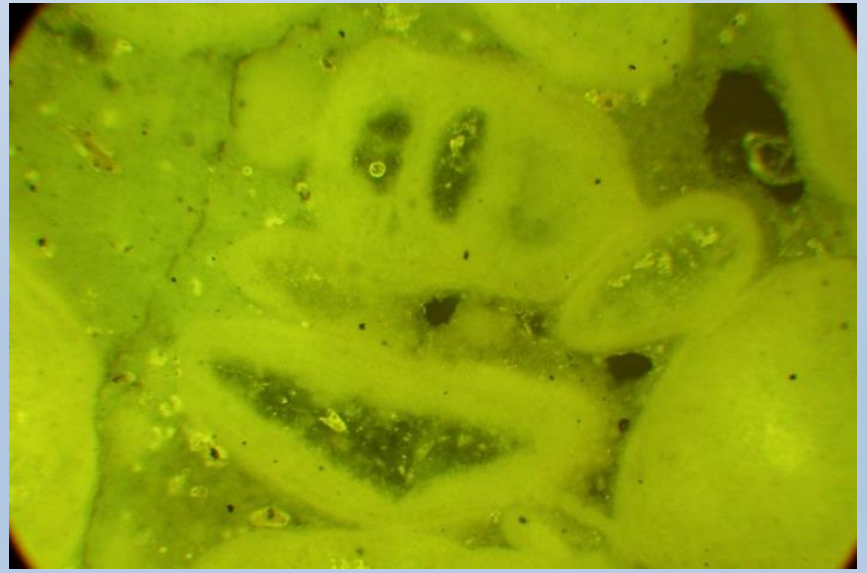
  reservoirs - Gresten, Nikolcice, Vranovice and Kurdejov fms.

Acknowledgements:

- The CO_2-SPICER project benefits from a € 2.32 mil. grant from Norway and Technology Agency of the Czech Republic;
- MND for core samples and geology

Thank you for your attention!





Tentatively proposed new Jurassic carbonate "mon" microfacies