Rochas carbonáticas: micrita, dolomitização e porosidade

GSA0252-Sedimentologia

Folk, R.L. (1965). Some aspects of recrystallization in ancient limestones Dolomitization and Limestone Diagenesis, a Symposium, vol. 13, Society of Economic Paleontologists and Mineralogists (SEPM) Special Publication, pp. 14-48

Minimicrita (< 1 µm)

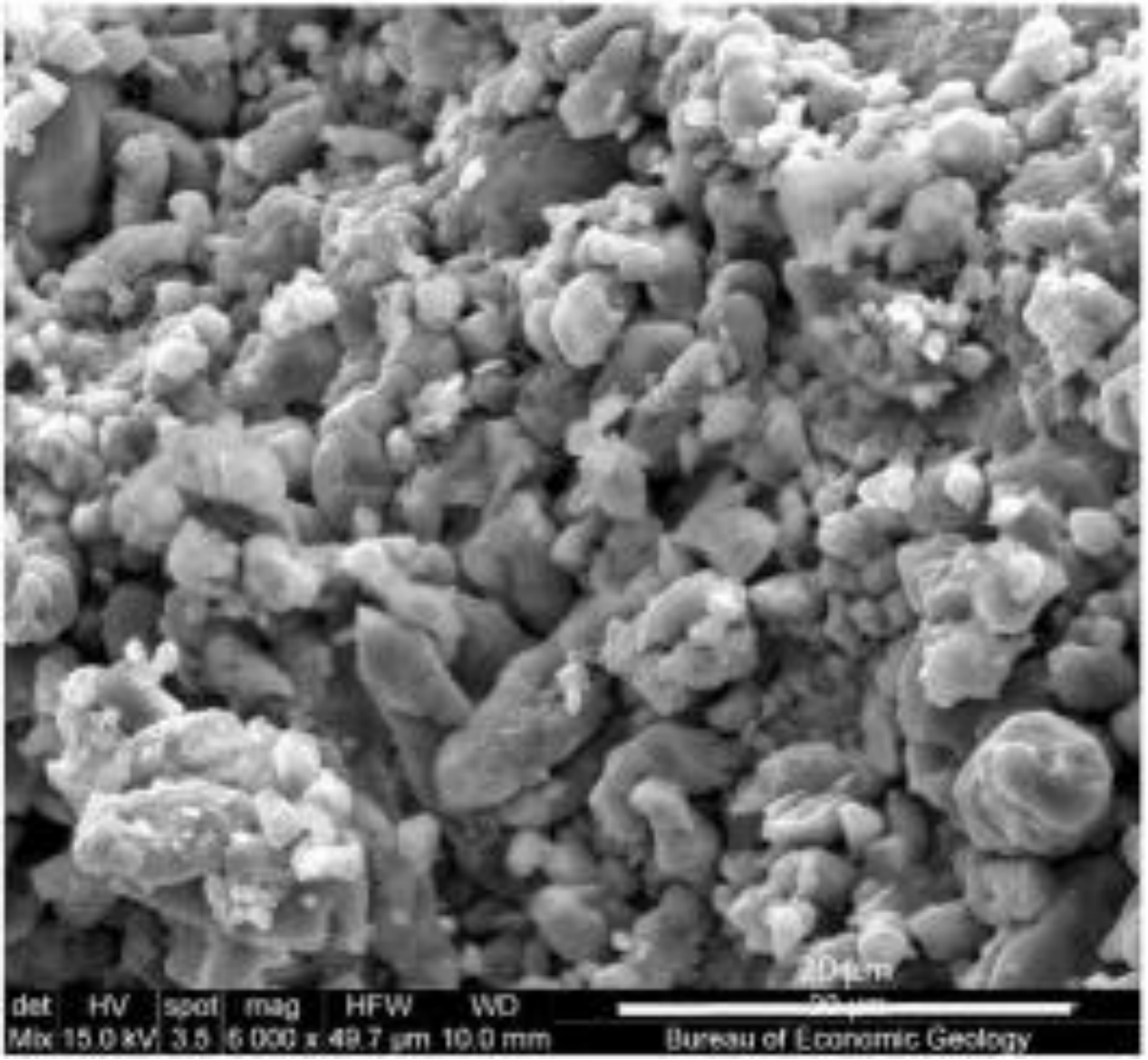
Micrita (1-4 µm)

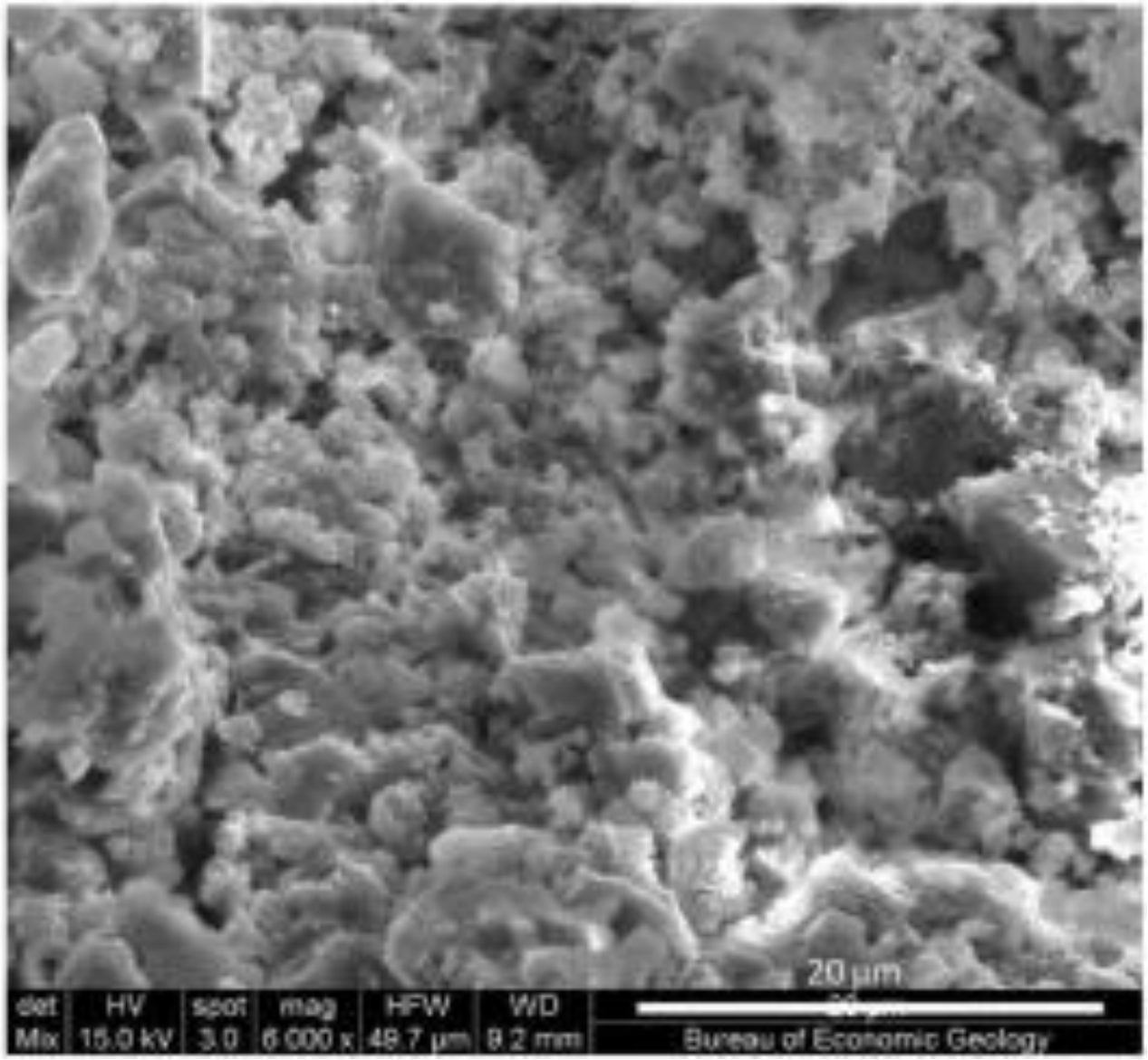
Microespato (< 4-30 µm)

Espato (> 30 µm)

Micrita: **Micr**ocrystaline calc**ite** (Folk, 1959)

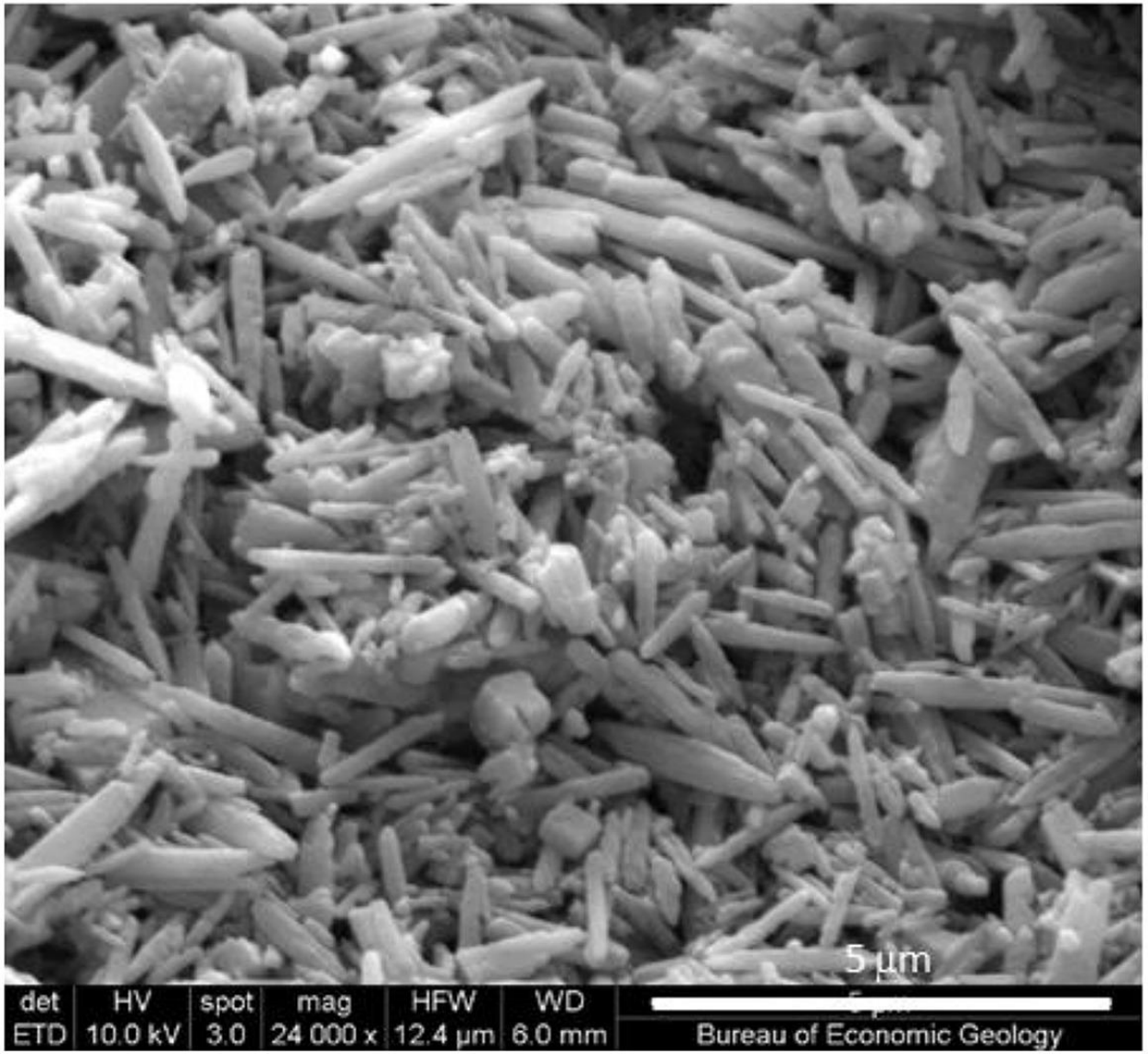
Micrita (Lucia, 2017)



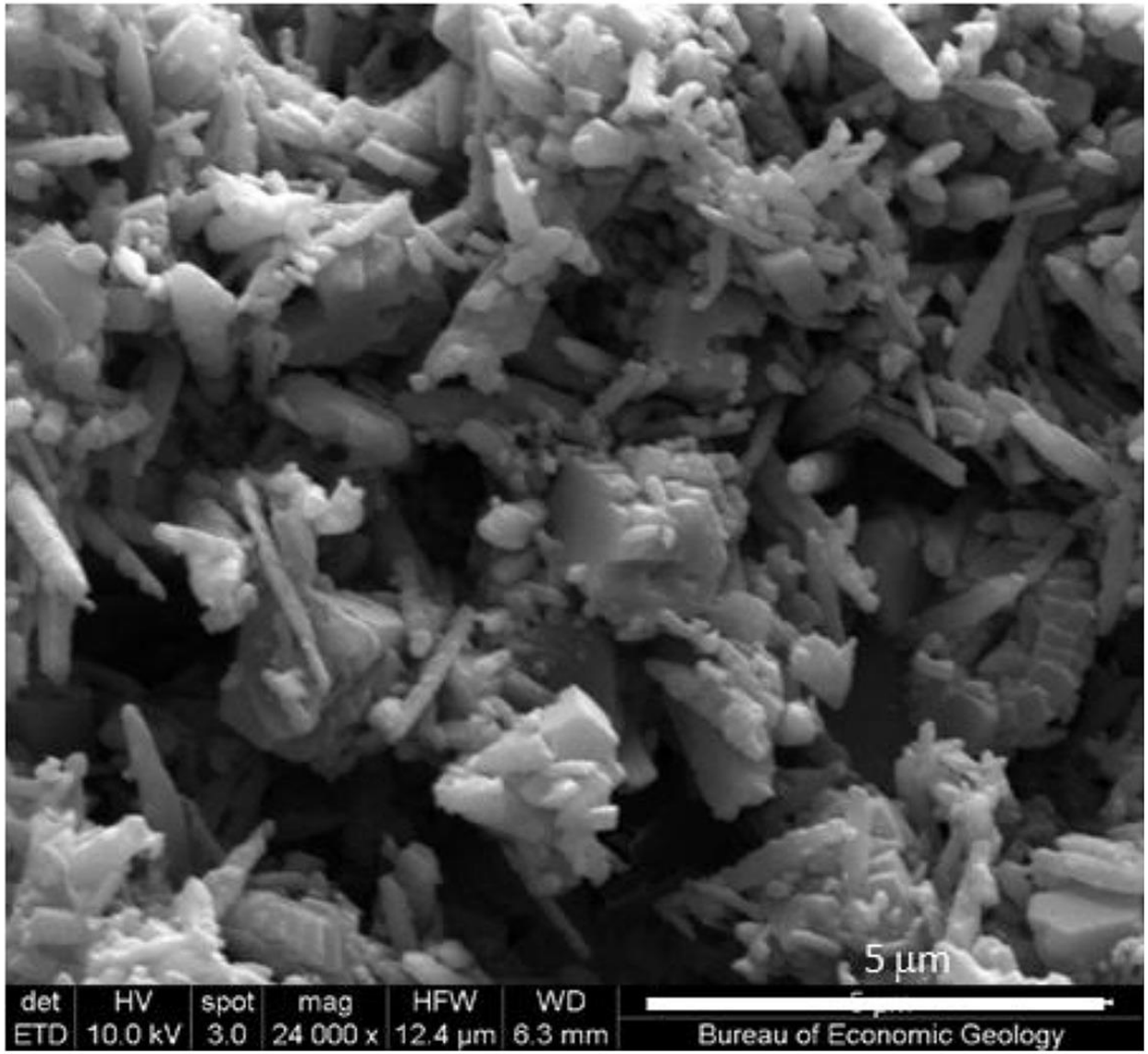


Micrita e minimicrita (Lucia, 2017)

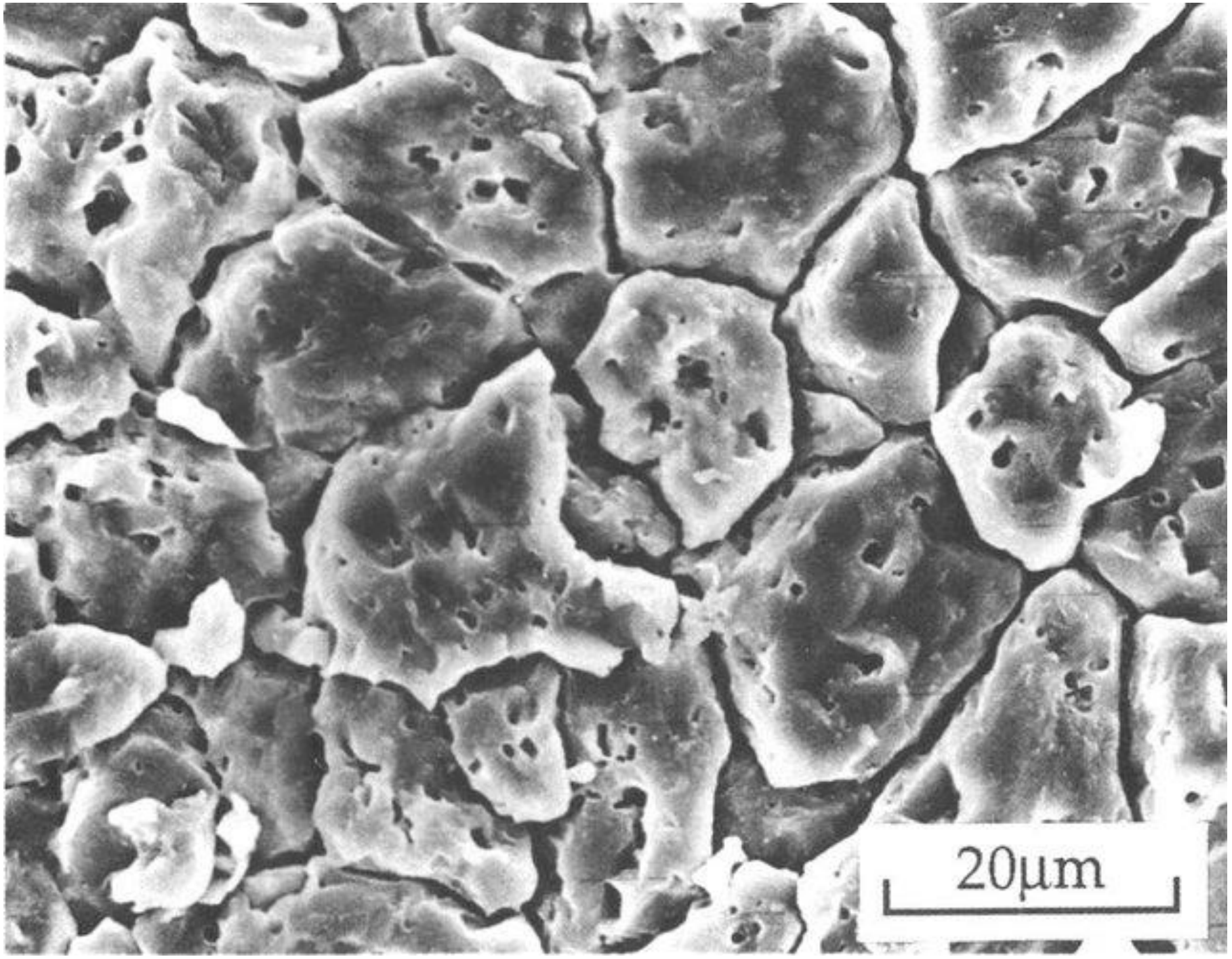
(a)



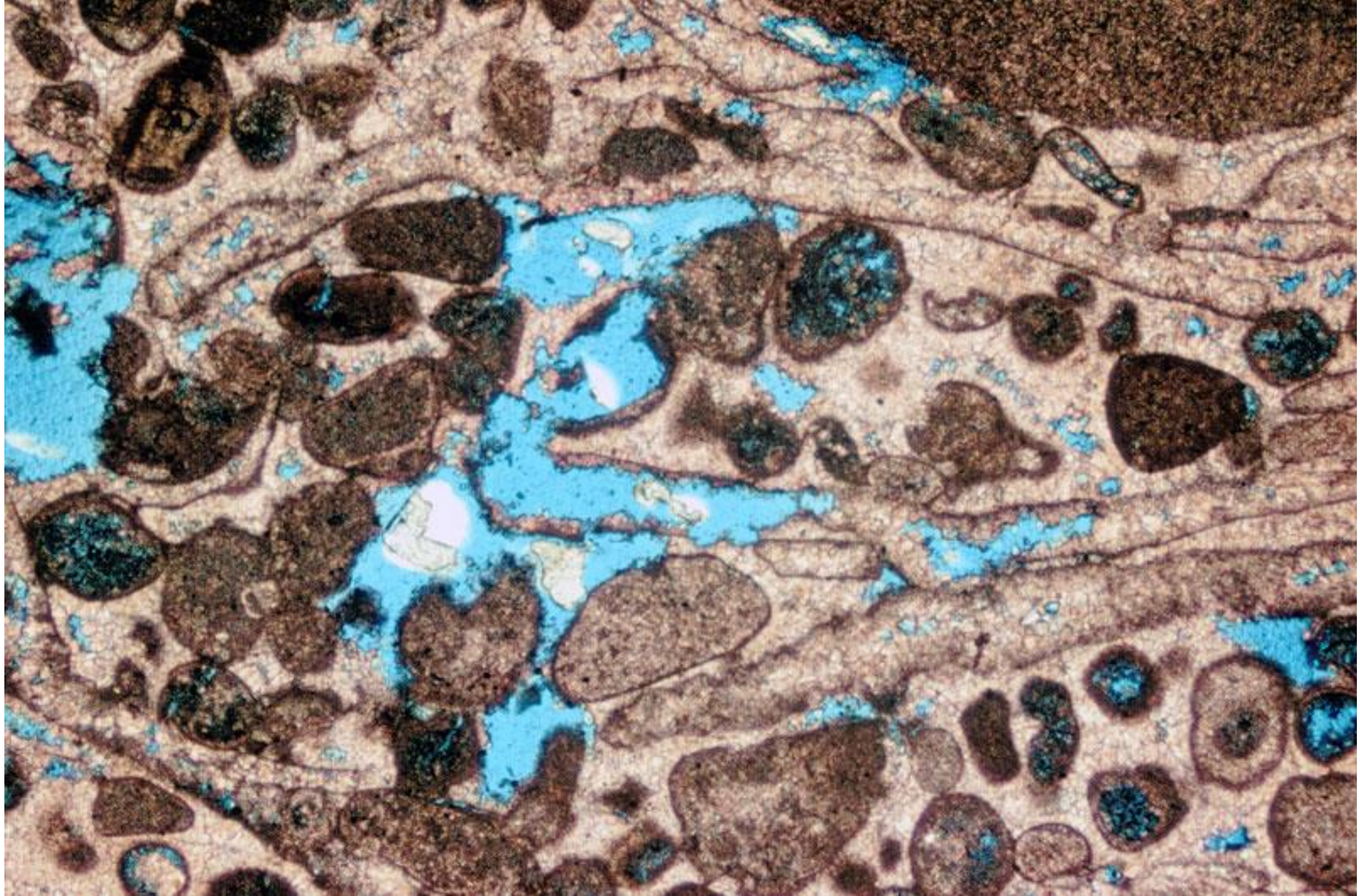
(b)



Microespato

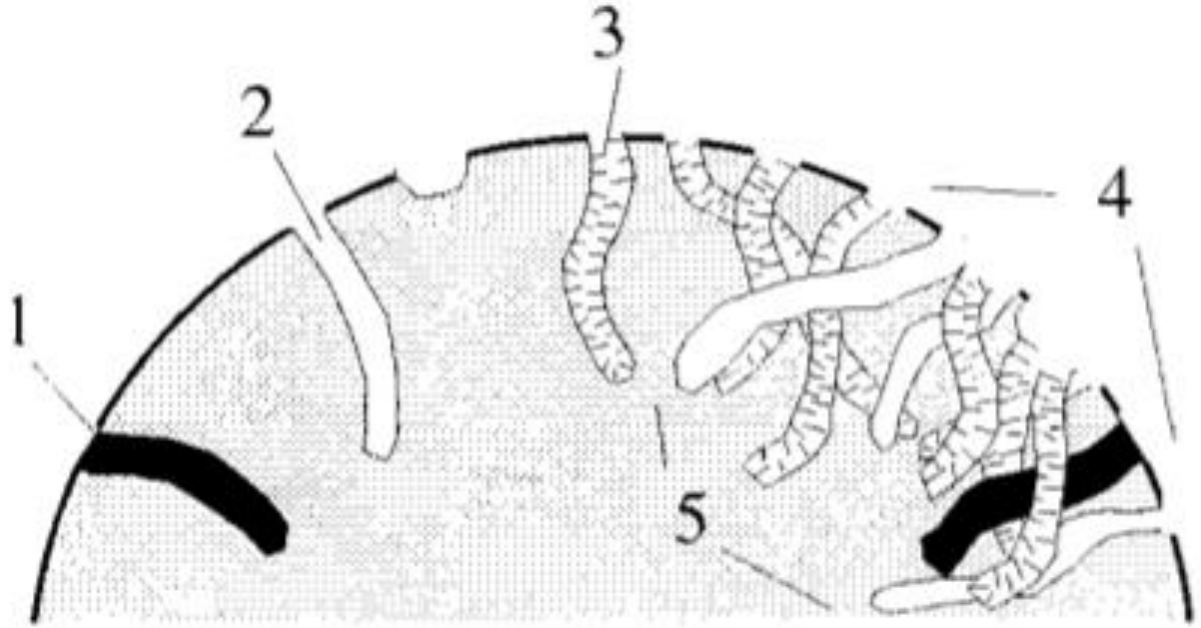


Lee (1993)



Origens da micrita

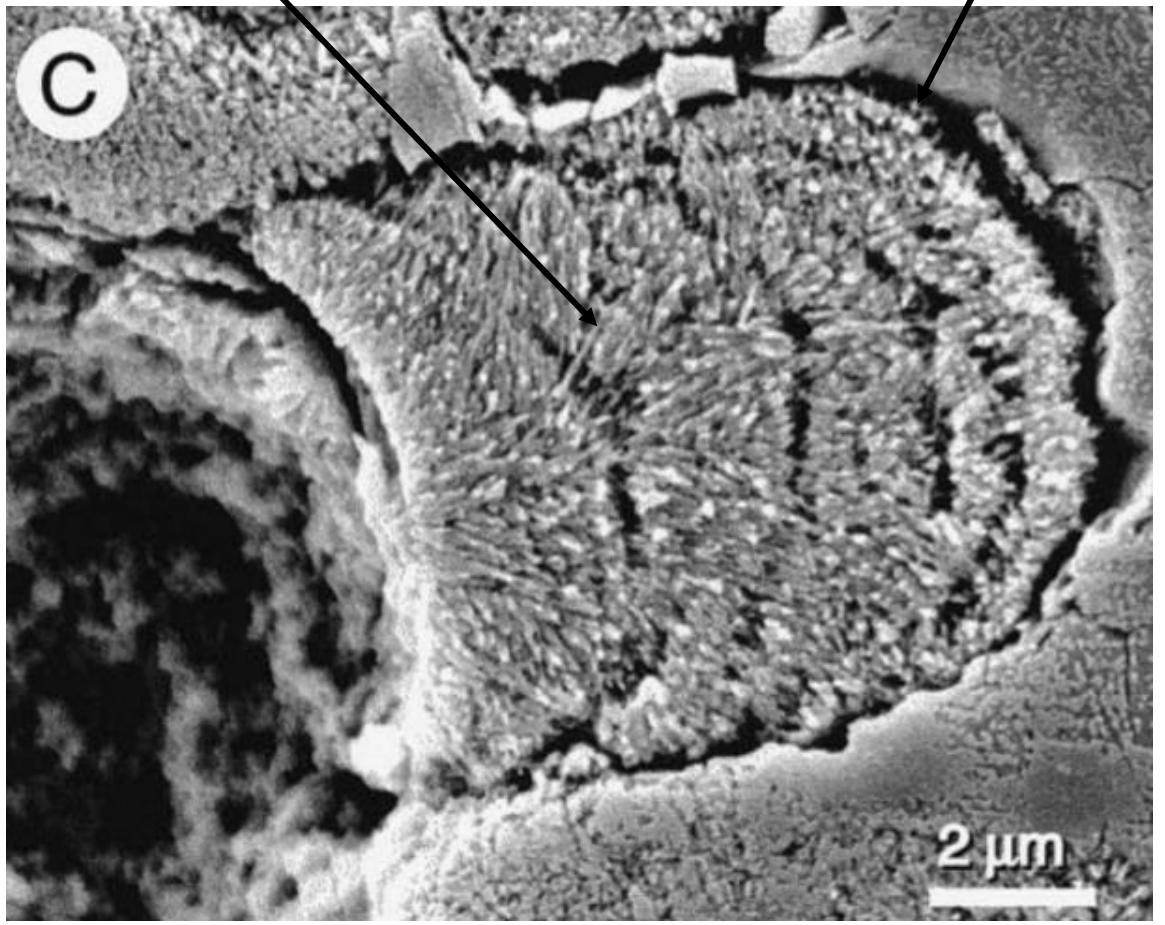
- Cristalização (primária)
- Recristalização
- Micritização microbiana (micróbios endolíticos)



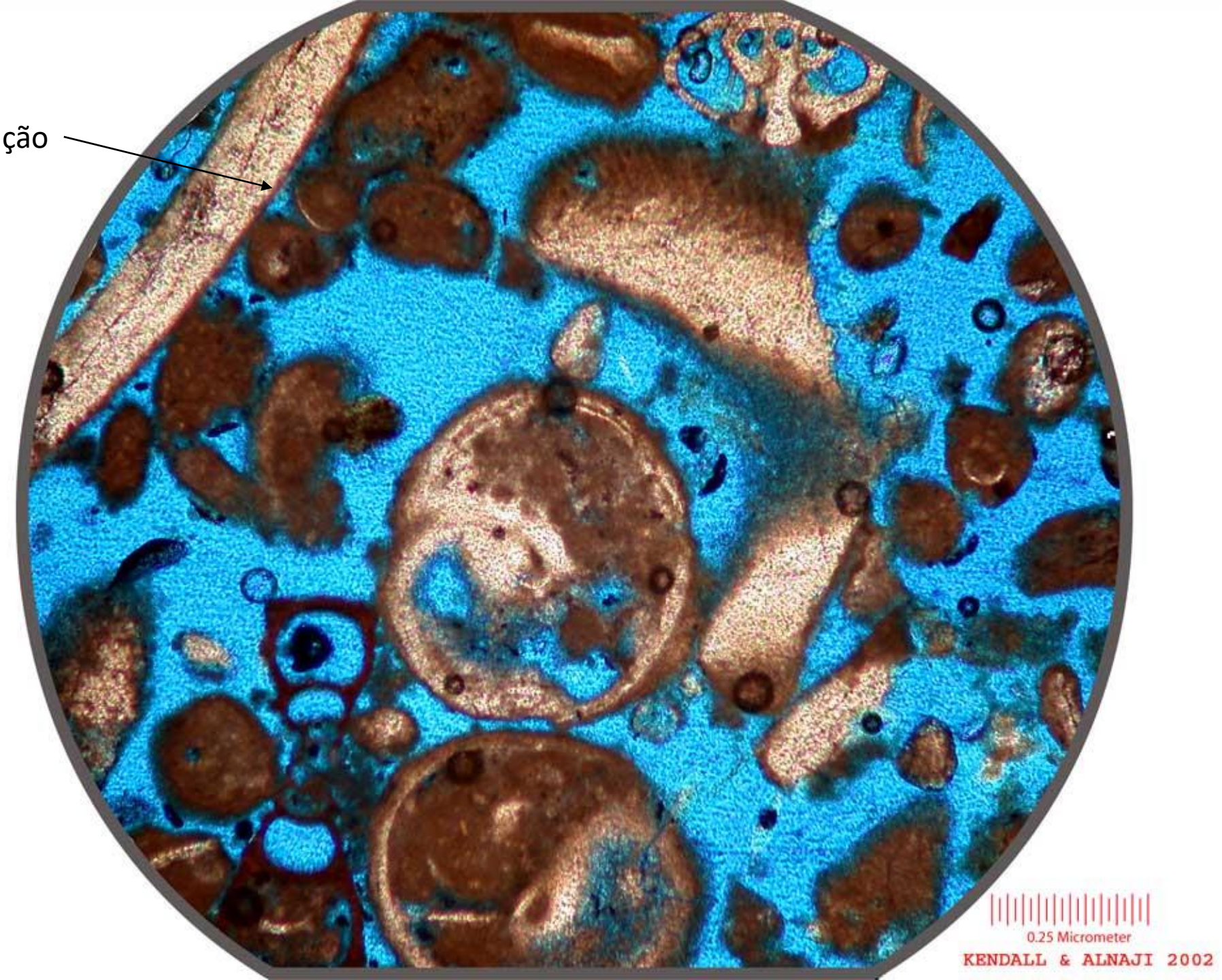
1. live endolith
2. empty bore holes (common)
3. fringe cement
4. incomplete grain margins
5. irregular edge of micritic rim

Preenchimento por microcristais de aragonita

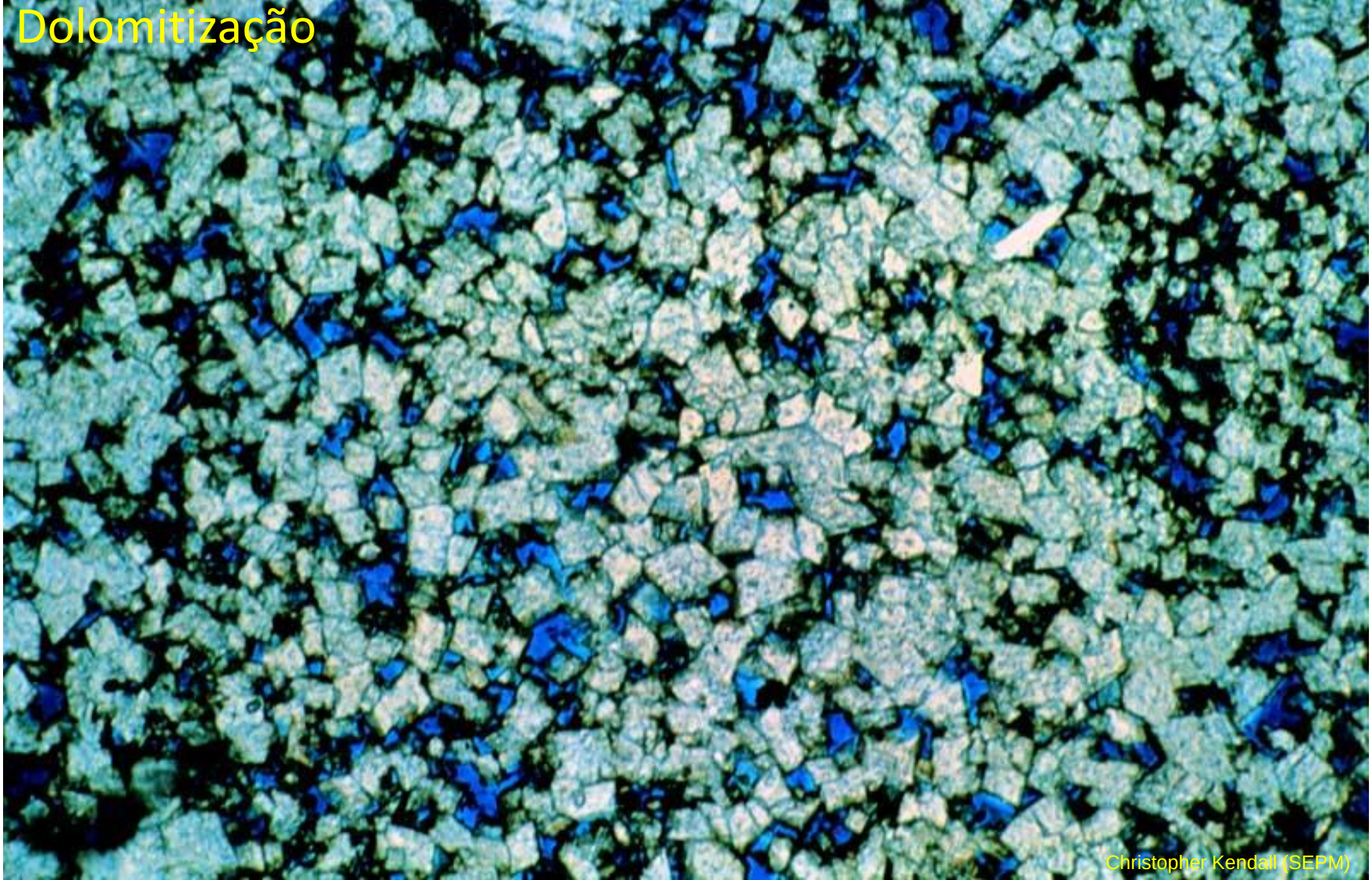
Cavidade



Reid & Macintyre (2000)


Micritização
0.25 Micrometer
KENDALL & ALNAJI 2002

Dolomitização



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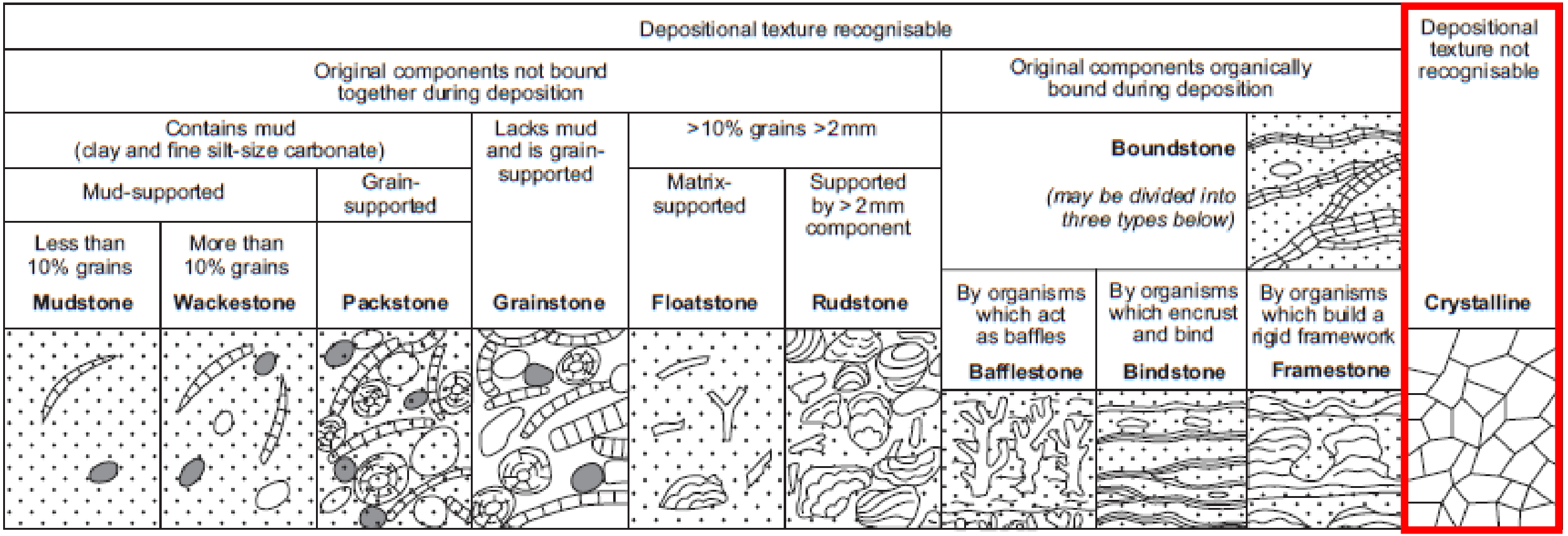
Dunham (1962) modificado por Embry & Klovan (1971)



Nichols (2009)

Déodat Dolomieu (1791)

"dolomie"

LETTRE (*)

DU COMMANDEUR DÉODAT DE DOLOMIEU,

A M. PICOT DE LA PEYROUSE,

Membre de plusieurs Académies & Président du District de Toulouse :

Sur un genre de Pierres calcaires très-peu effervescentes avec les Acides, & phosphorescentes par la collision.

Malte, le 30 Janvier 1791.

DEPUIS long-tems, mon excellent ami, j'avois reconnu que l'effervescence avec les acides n'étoit pas toujours un caractère essentiel des pierres calcaires, quoique cette propriété soit indiquée par tous les naturalistes comme le signe le plus certain auquel on peut reconnoître ce genre de pierres. J'avois observé que plusieurs pierres de cette nature se laissoient attaquer par les acides, sans produire ce grand dégagement d'air qui occasionne l'effervescence. J'avois vu leur dissolution se faire paisiblement, & s'achever complettement, quoiqu'elle ne fût accompagnée que de quelques grosses bulles d'air qui s'élevoient lentement du fond du menstrue où je les avois plongés, pour venir éclater à leur surface. Souvent il m'étoit arrivé de répandre des acides sur la surface de quelques pierres, qui me paroissoient calcaires par tous les autres caractères extérieurs, sans produire l'effervescence à laquelle je m'attendois; & plusieurs minutes se passoient avant de voir paroître le très-petit mouvement d'ébullition qui m'annonçoit l'action de l'acide : j'aurois toujours douté que la pierre fût entièrement calcaire, j'aurois cru qu'une très-petite quantité de terre de cette nature s'étoit combinée avec d'autres terres, sans perdre l'acide aérien qui lui appartient, si je n'avois pas employé d'autres épreuves pour mieux constater son genre. Il y a plus de cinq ans que j'ai placé de ces pierres calcaires peu effervescentes dans le cabinet de Florence, pour les faire connoître aux naturalistes, qui visitent cette superbe collection.

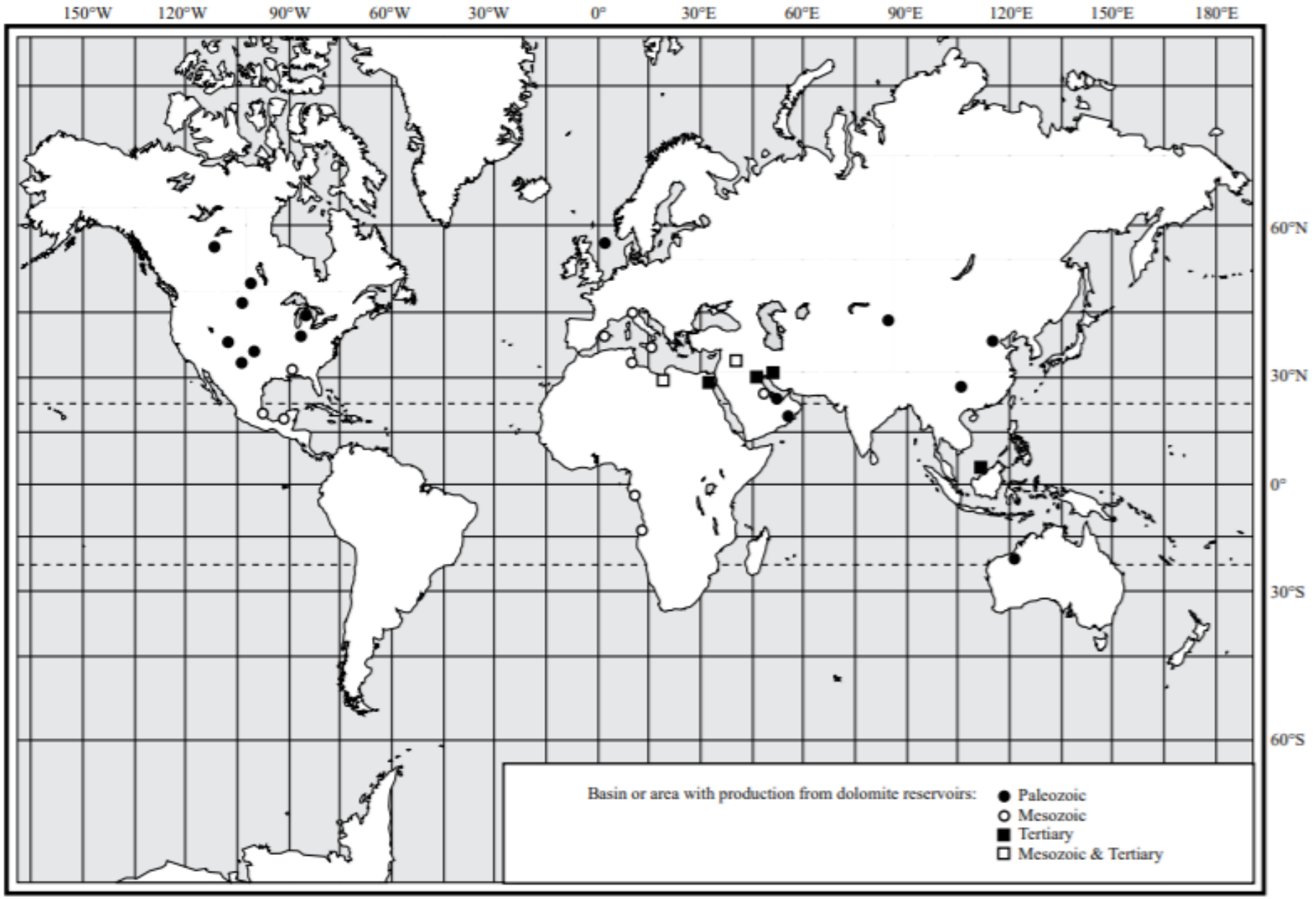
J'ai trouvé ensuite parmi les monumens de l'ancienne Rome un beau marbre blanc, d'un tissu écailleux, plus dur, plus pesant, un peu plus opaque que les autres marbres statuaires, & qui mieux qu'eux avoit

(*) Extrait du Journal de Physique du mois de Juillet 1791.

Dolomite/Dolomita (Dolomieu, 1791)

Dolostone/Dolomito (Shrock, 1948) > 75% de $CaMg(CO_2)_2$

Reservatórios de HC em dolomitos



Leduc No. 1 – Alberta (1947)

Sun (1995)

O problema da origem do dolomito:

- ✓ Dolomitos ocorrem em bacias e ambientes diagenéticos diversos
- ✓ Em muitos casos, há mais de uma explicação para a origem dos dolomitos
- ✓ Dolomitos são raros em sedimentos holocênicos e abundantes em rochas antigas
- ✓ Experimentos falharam em produzir dolomita inorgânica bem cristalizada e estequiométrica sob condições superficiais de T e P (20-30^{o}C e 1 atm)

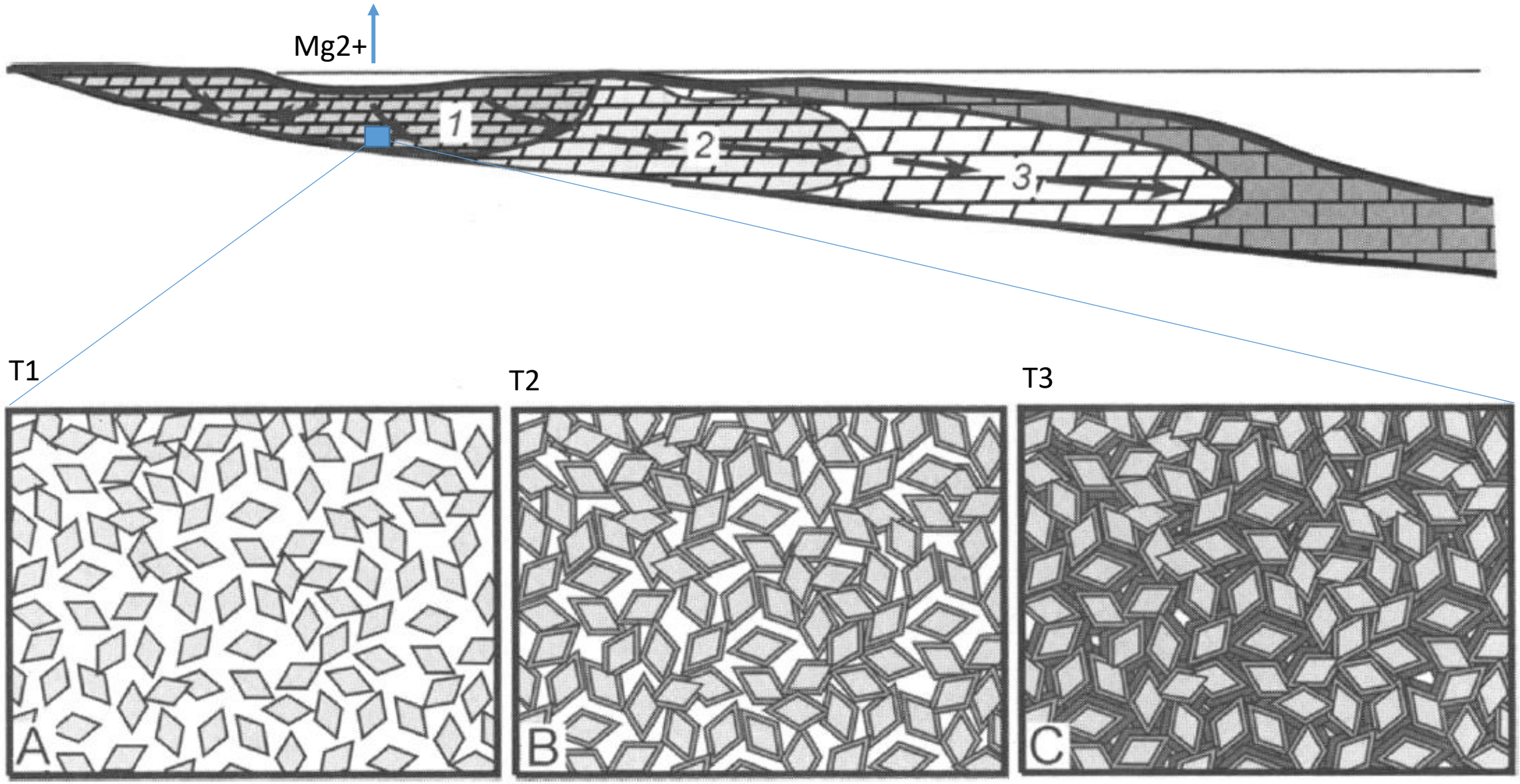
Machel (2004)

Mg

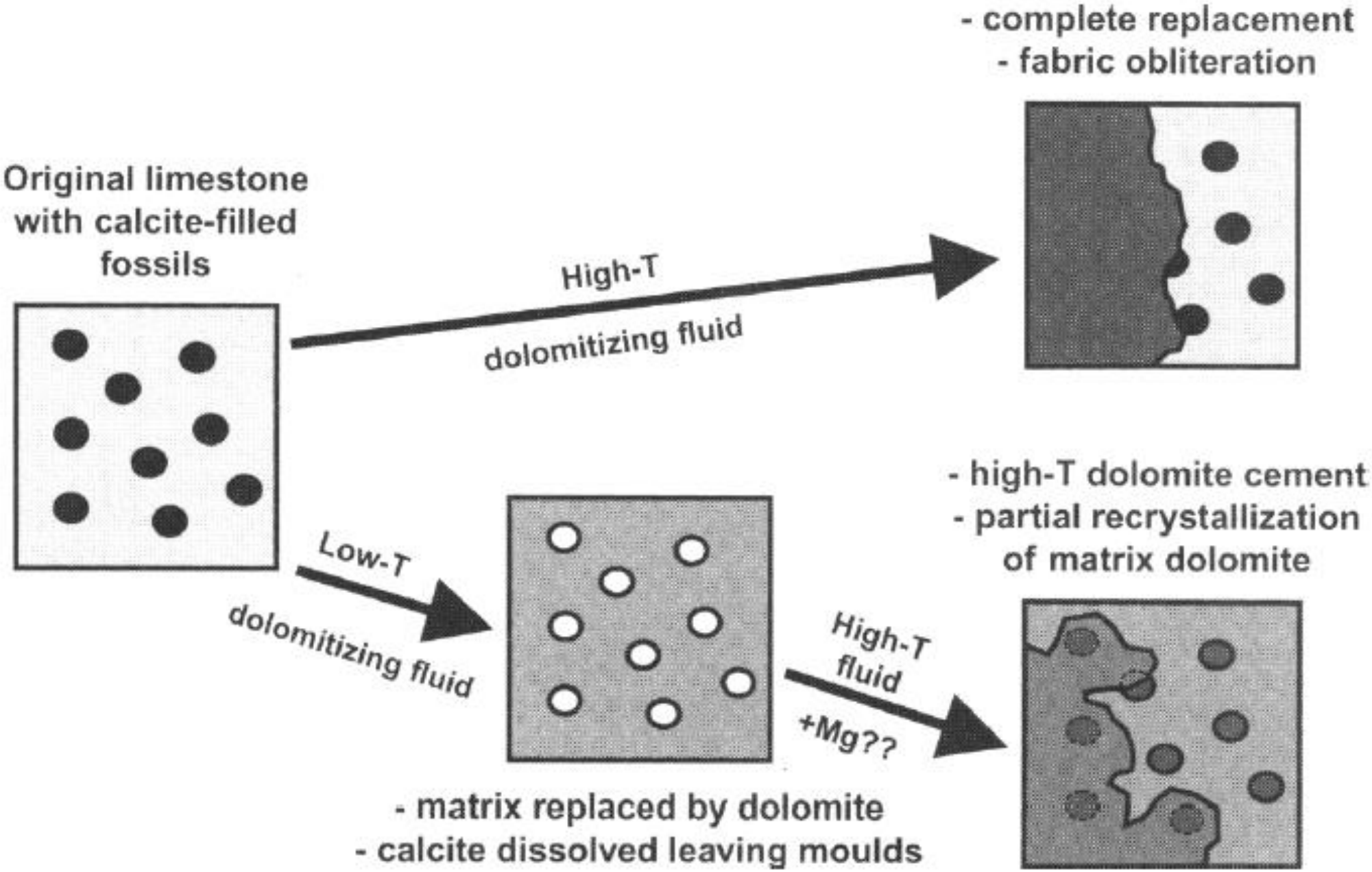
$$2CaCO_3\,(s) + Mg^{2+}(aq) \rightarrow CaMg(CO_3)_2\,(s) + Ca^{2+}(aq)$$

$$CaCO_3\,(s) + Mg^{2+}(aq) + CO_3^{2-}(aq) \rightarrow CaMg(CO_3)_2\,(s).$$

Refluxo evaporativo

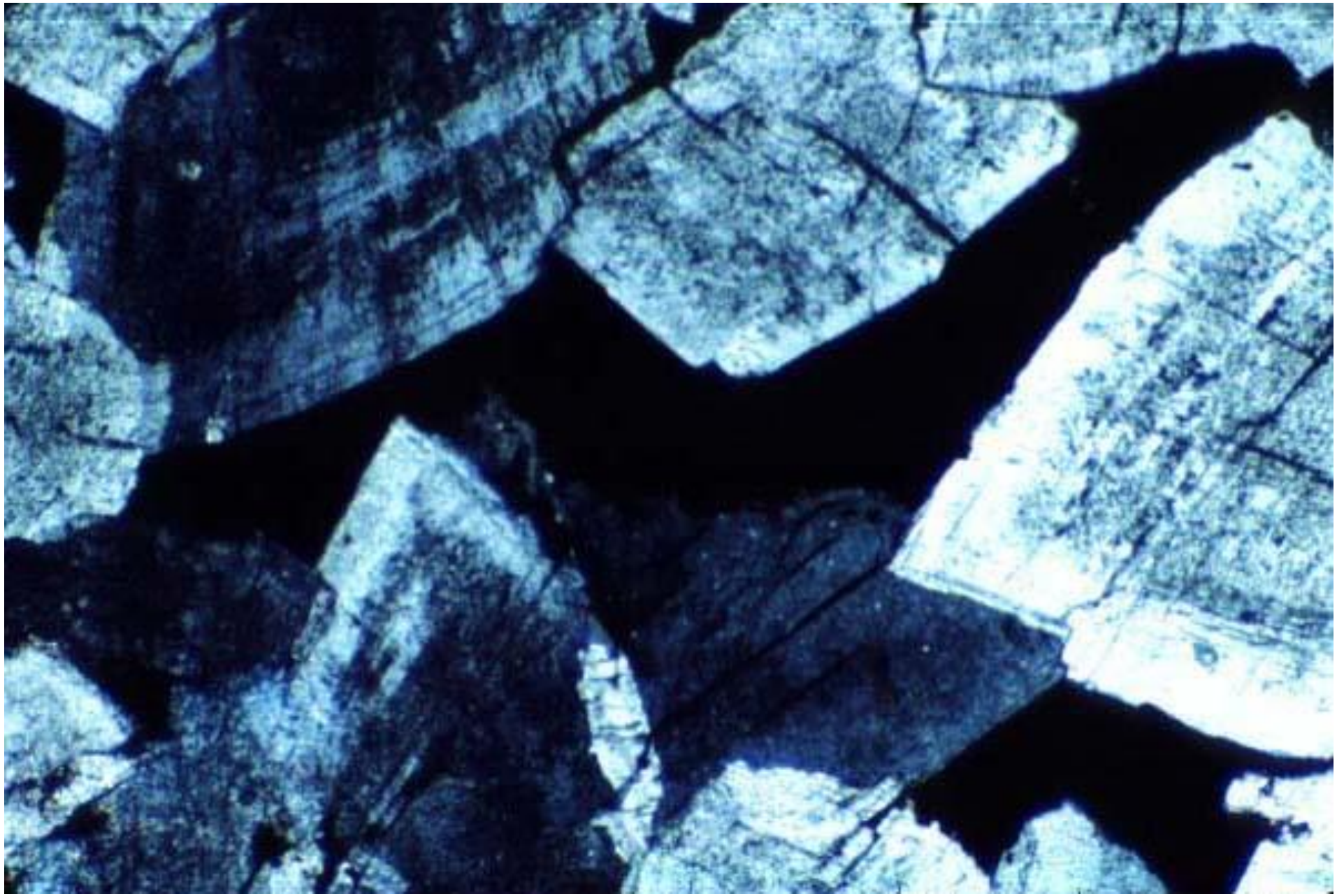


Machel (2004)

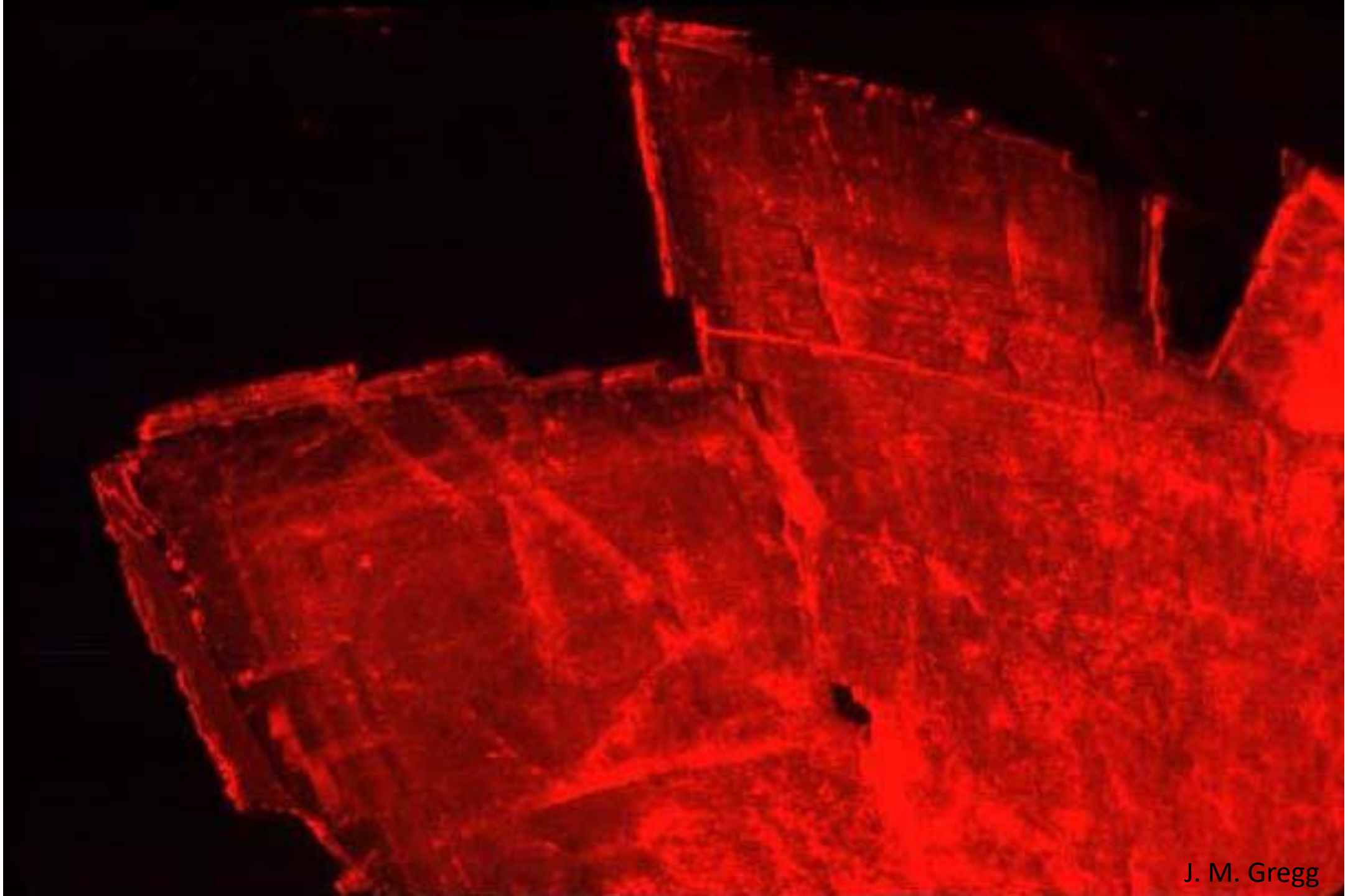

- complete replacement
- fabric obliteration
Original limestone with calcite-filled fossils
High-T
dolomitizing fluid
- high-T dolomite cement
- partial recrystallization of matrix dolomite
Low-T
dolomitizing fluid
High-T fluid
+Mg??
- matrix replaced by dolomite
- calcite dissolved leaving moulds

Machel (2004)

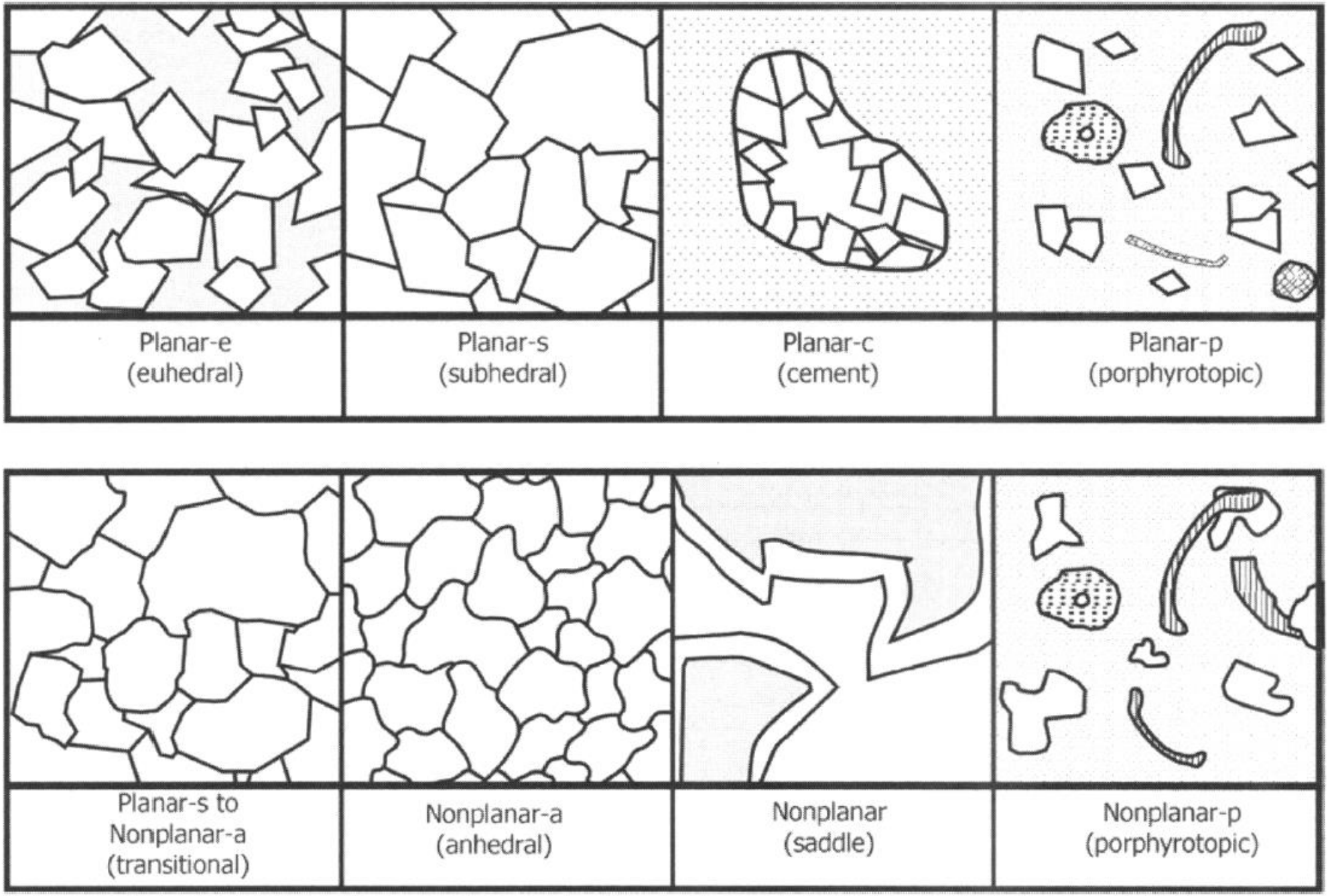
Saddle dolomite (dolomita em cela, > 60°C)



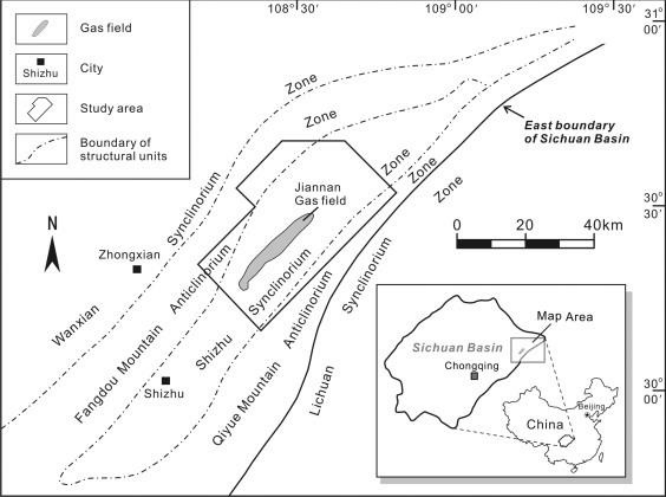
J. M. Gregg


J. M. Gregg

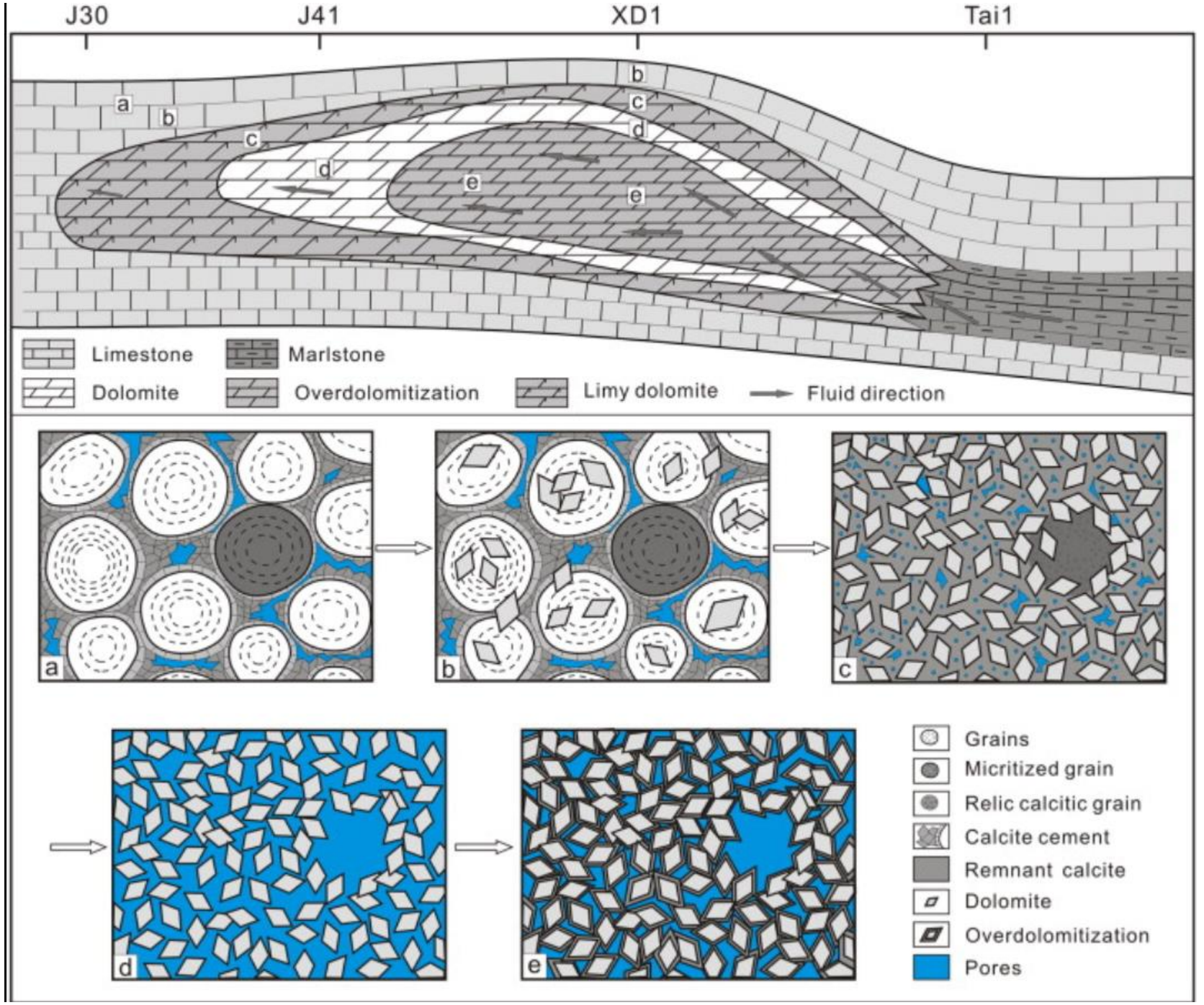
Texturas

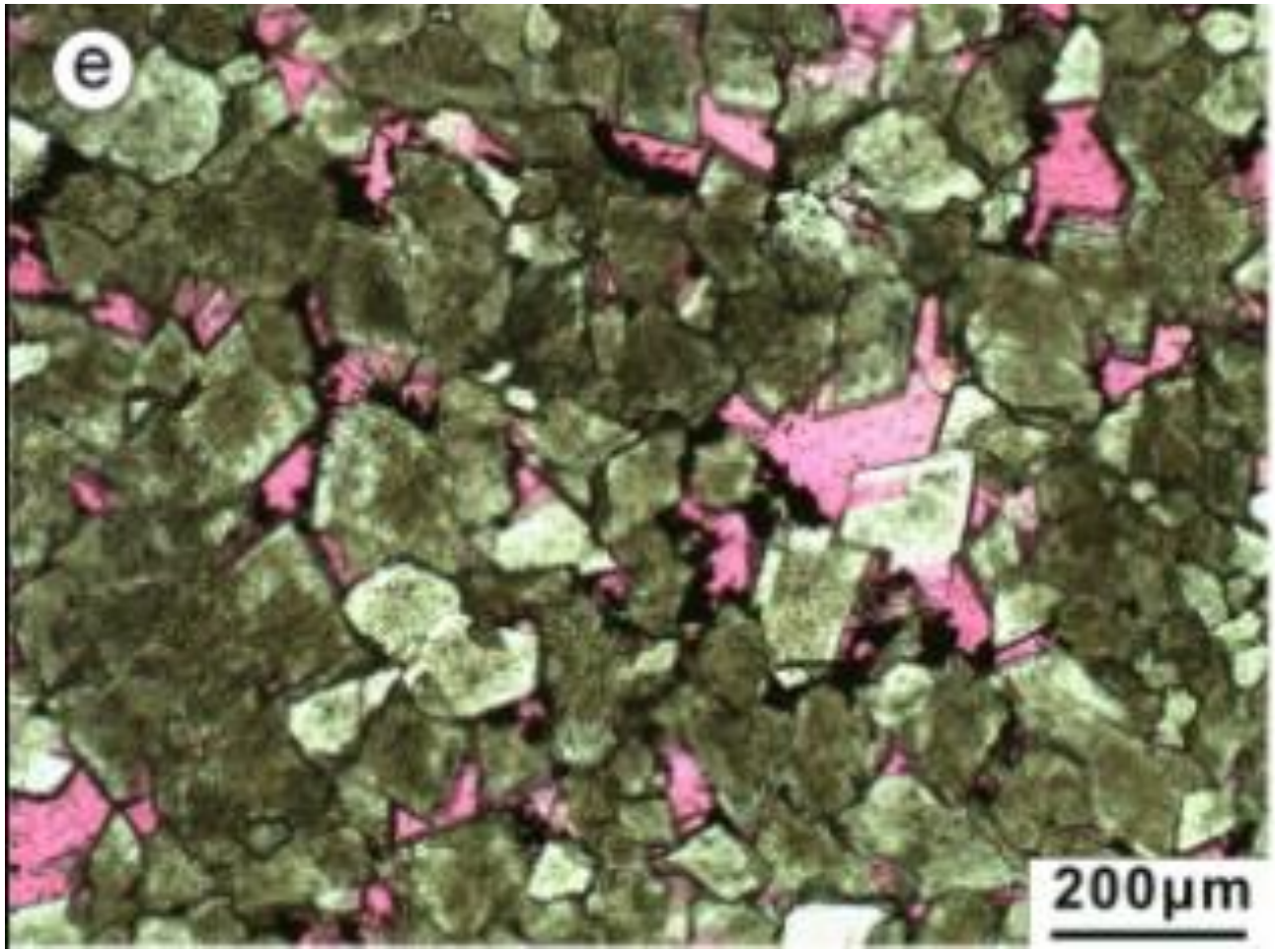


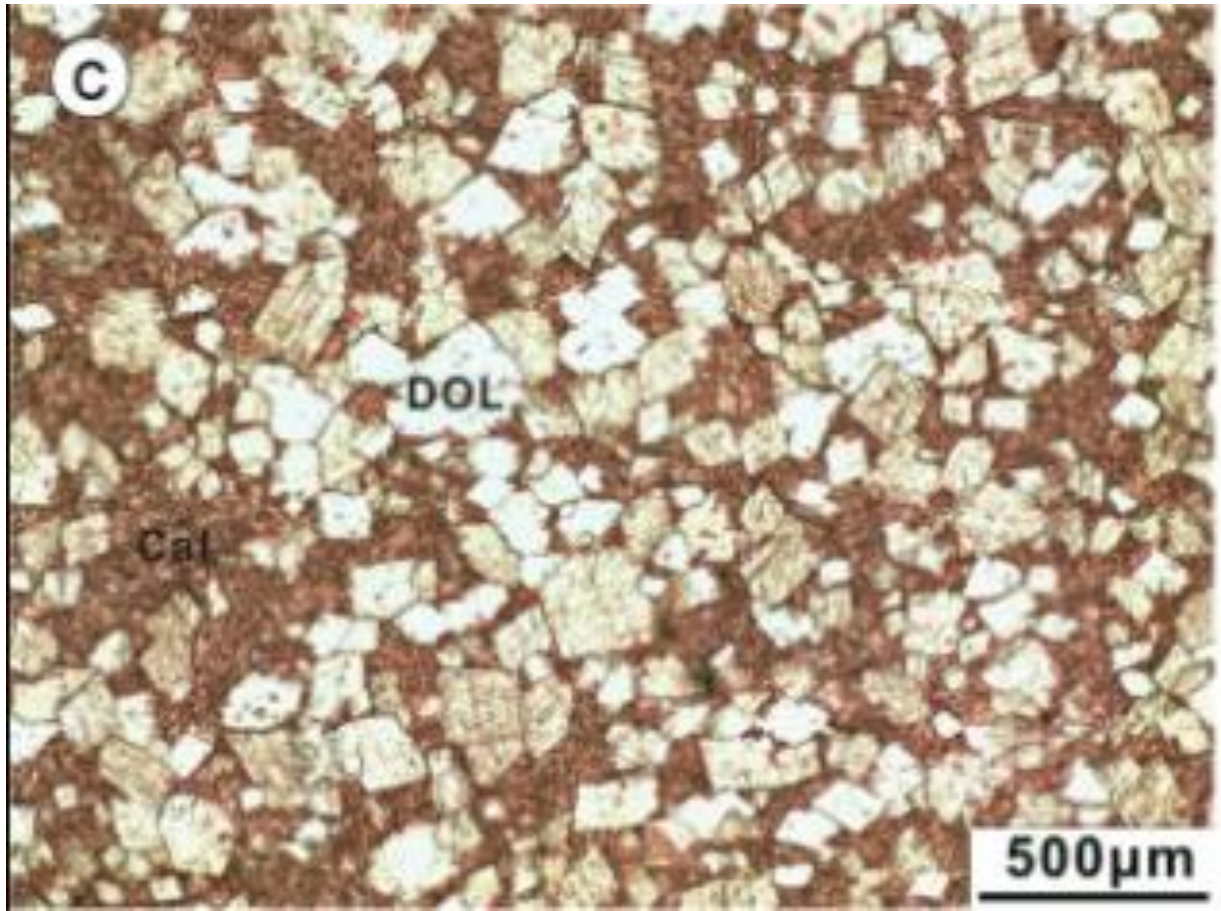
Gregg & Sibley (1984)



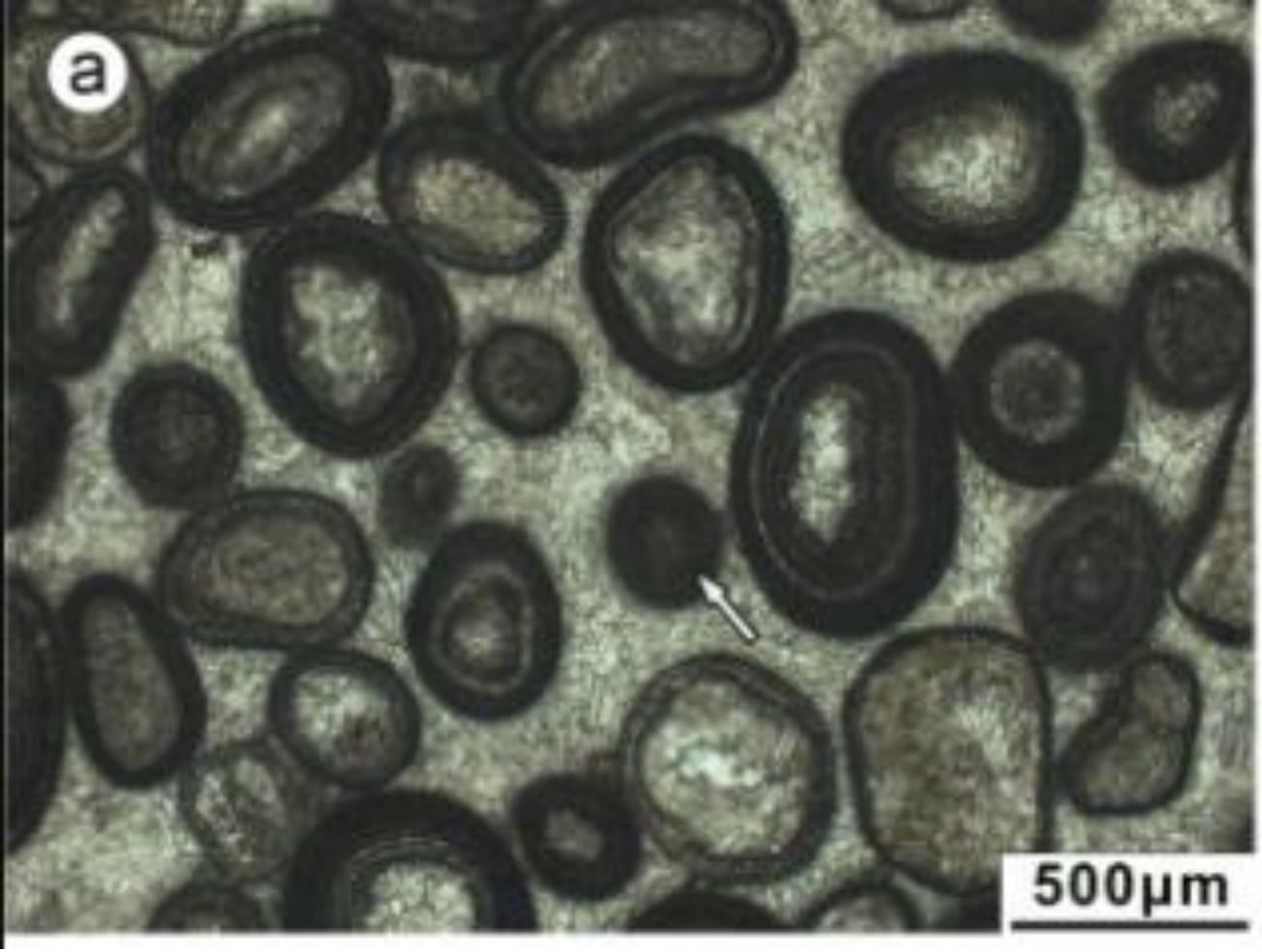
Wang et al. (2015)

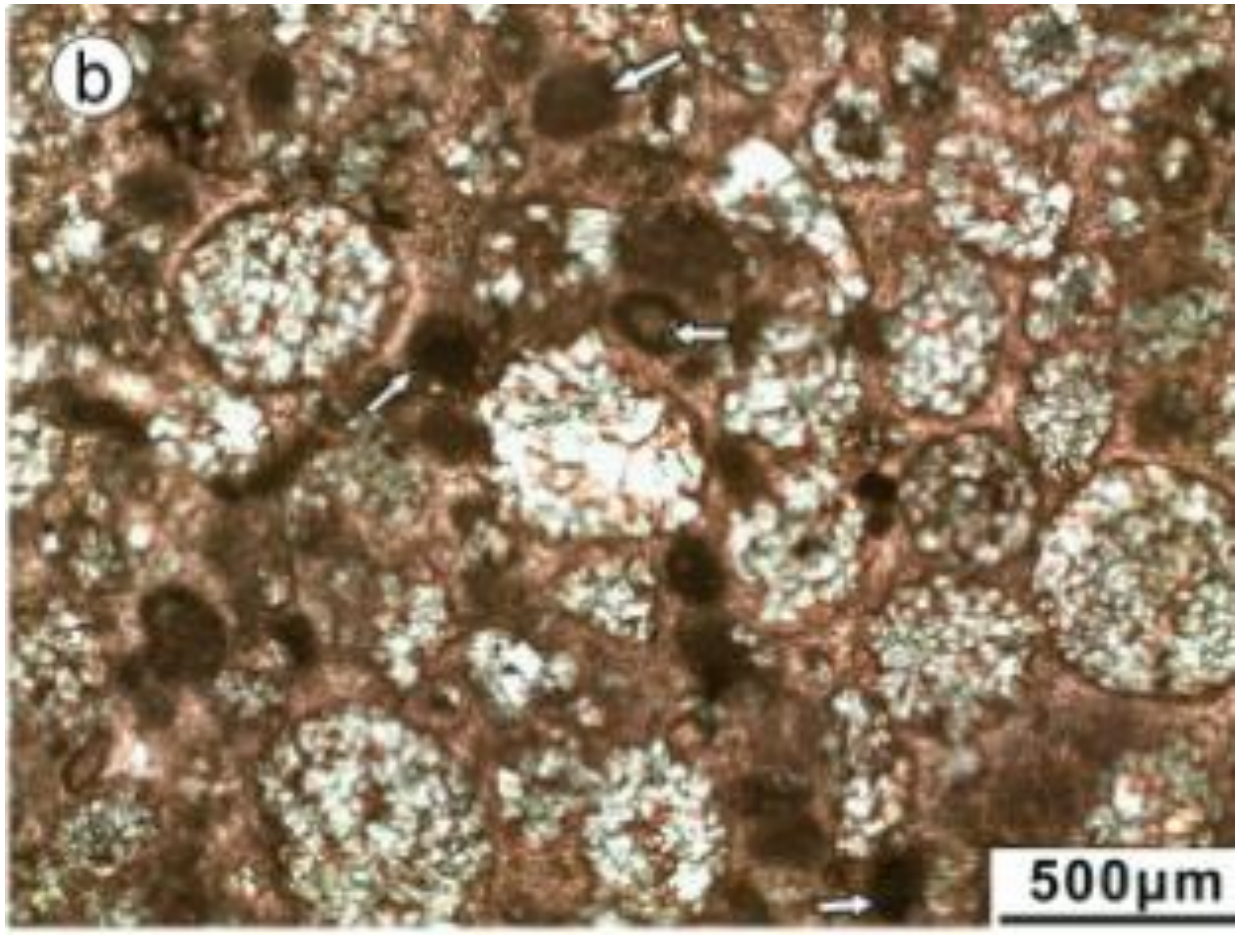






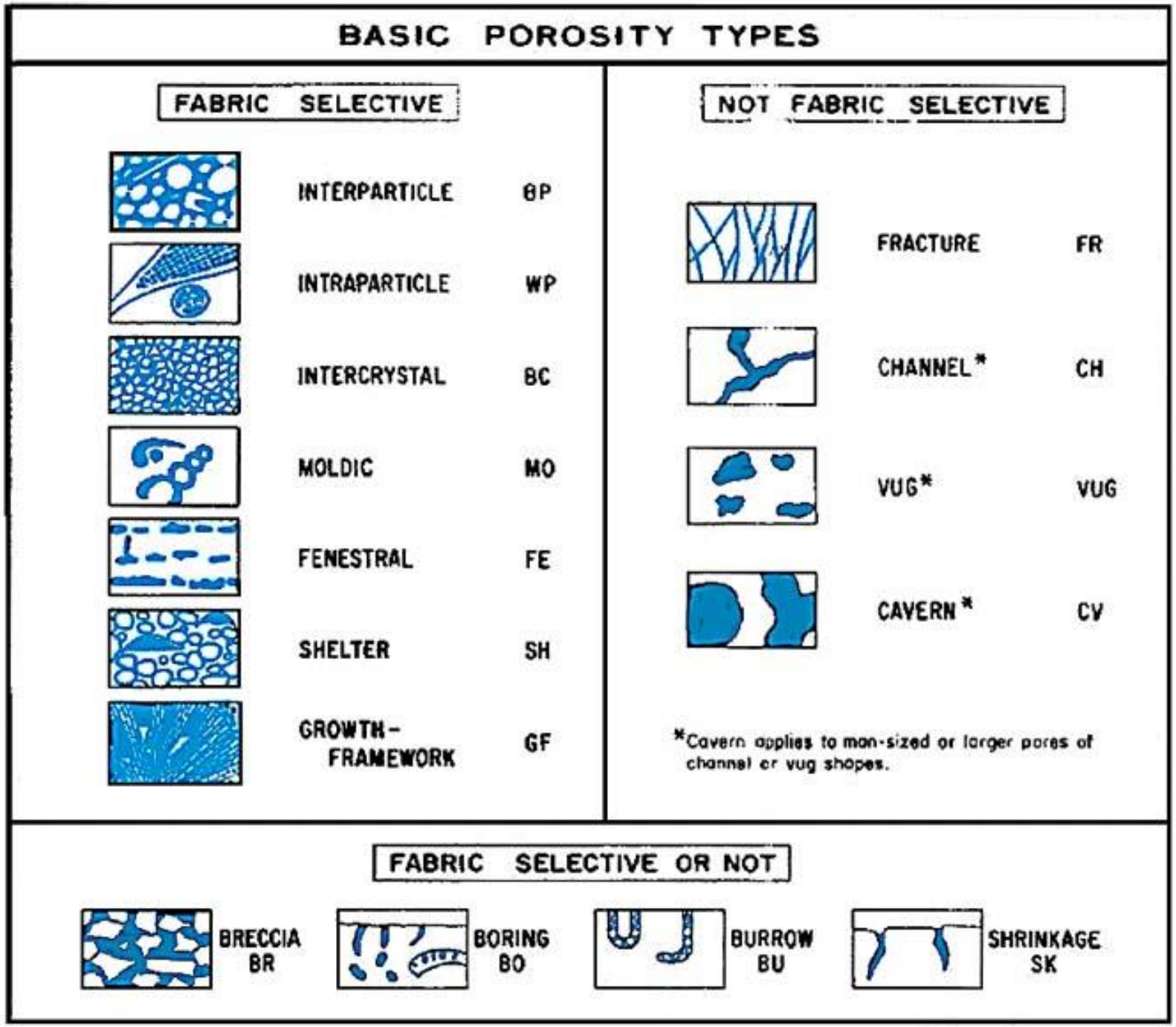
Wang et al. (2015)





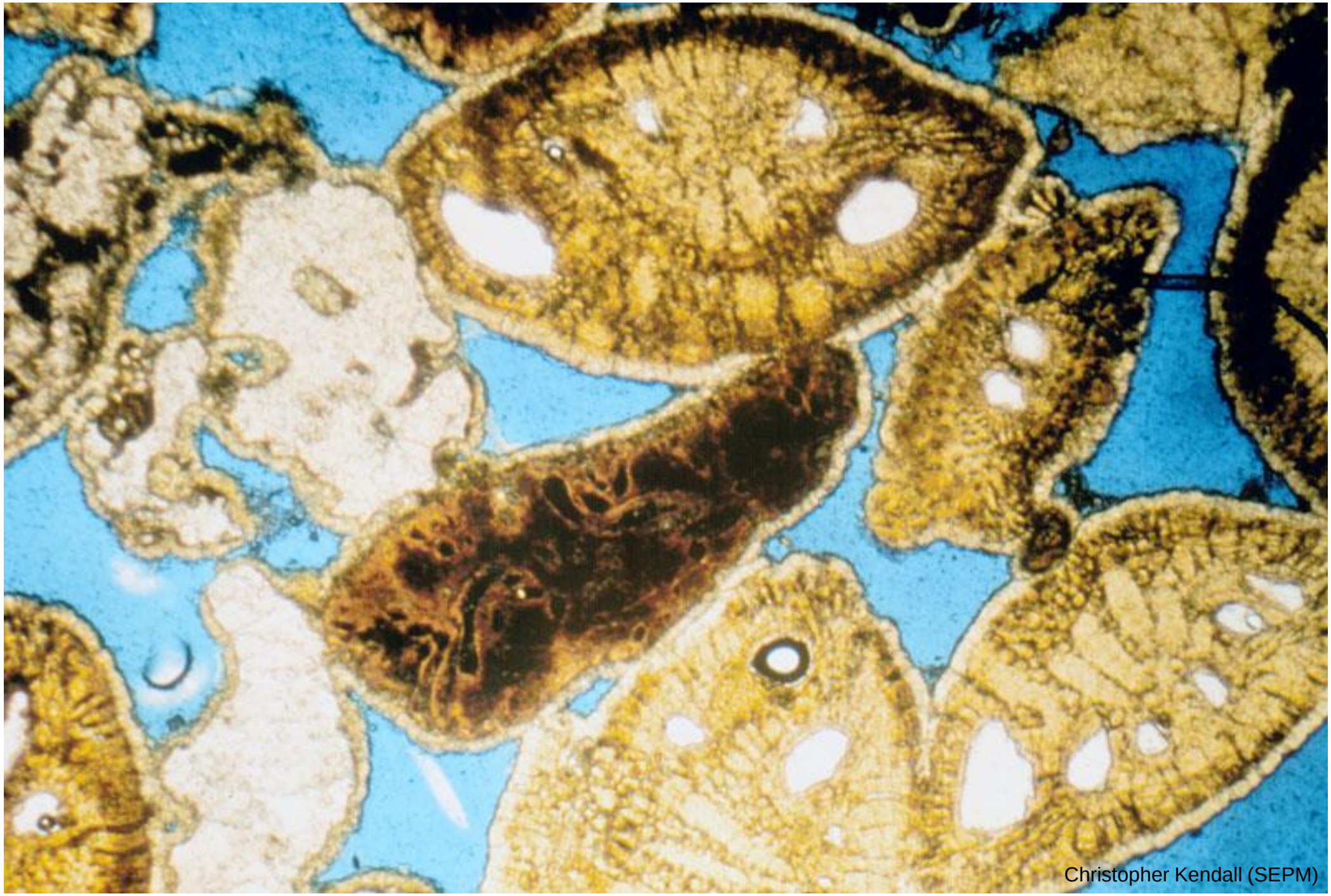
Wang et al. (2015)

Porosidade

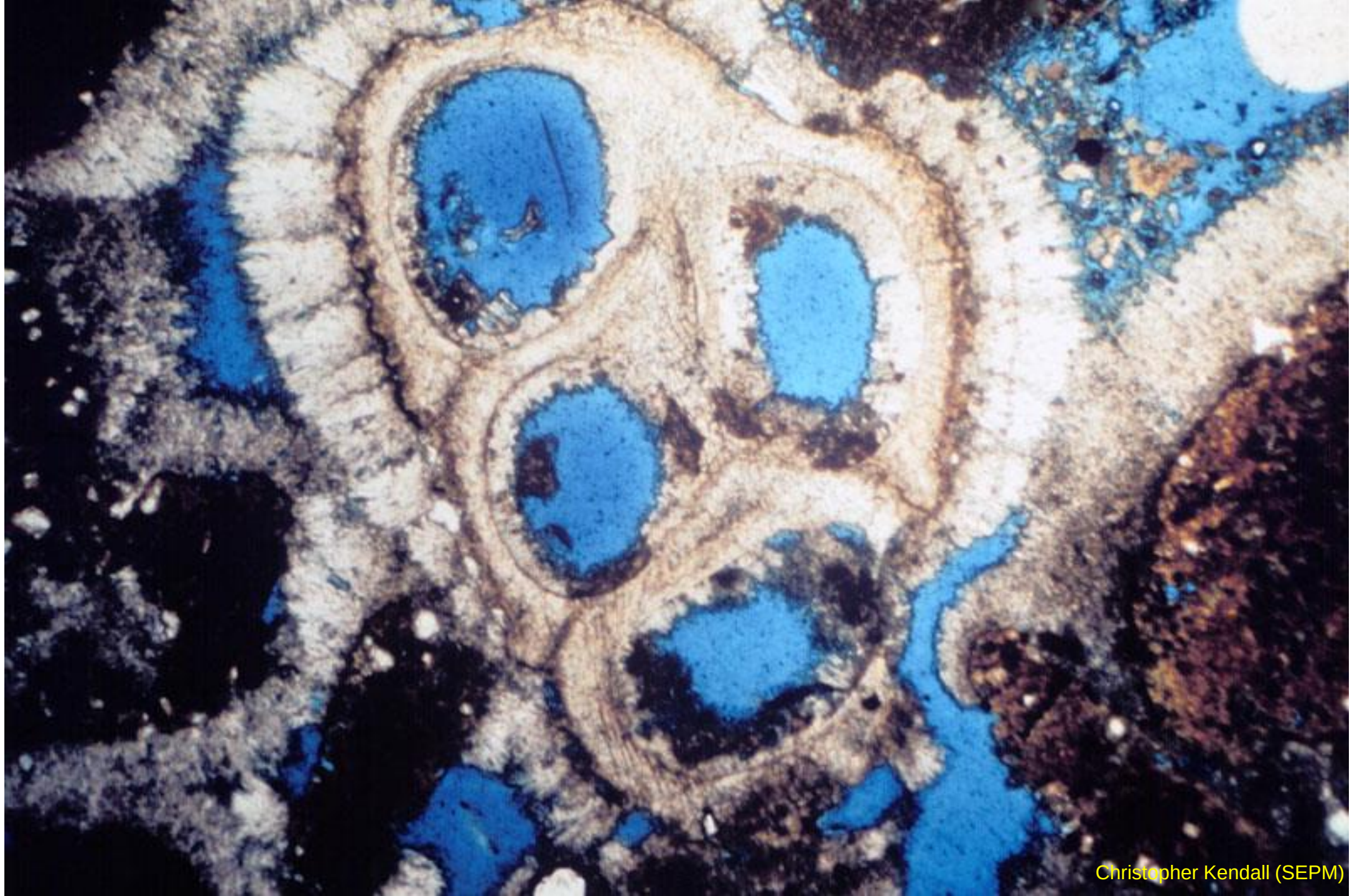


Choquette & Pray (1970)

Interpartícula



Intrarpartícula



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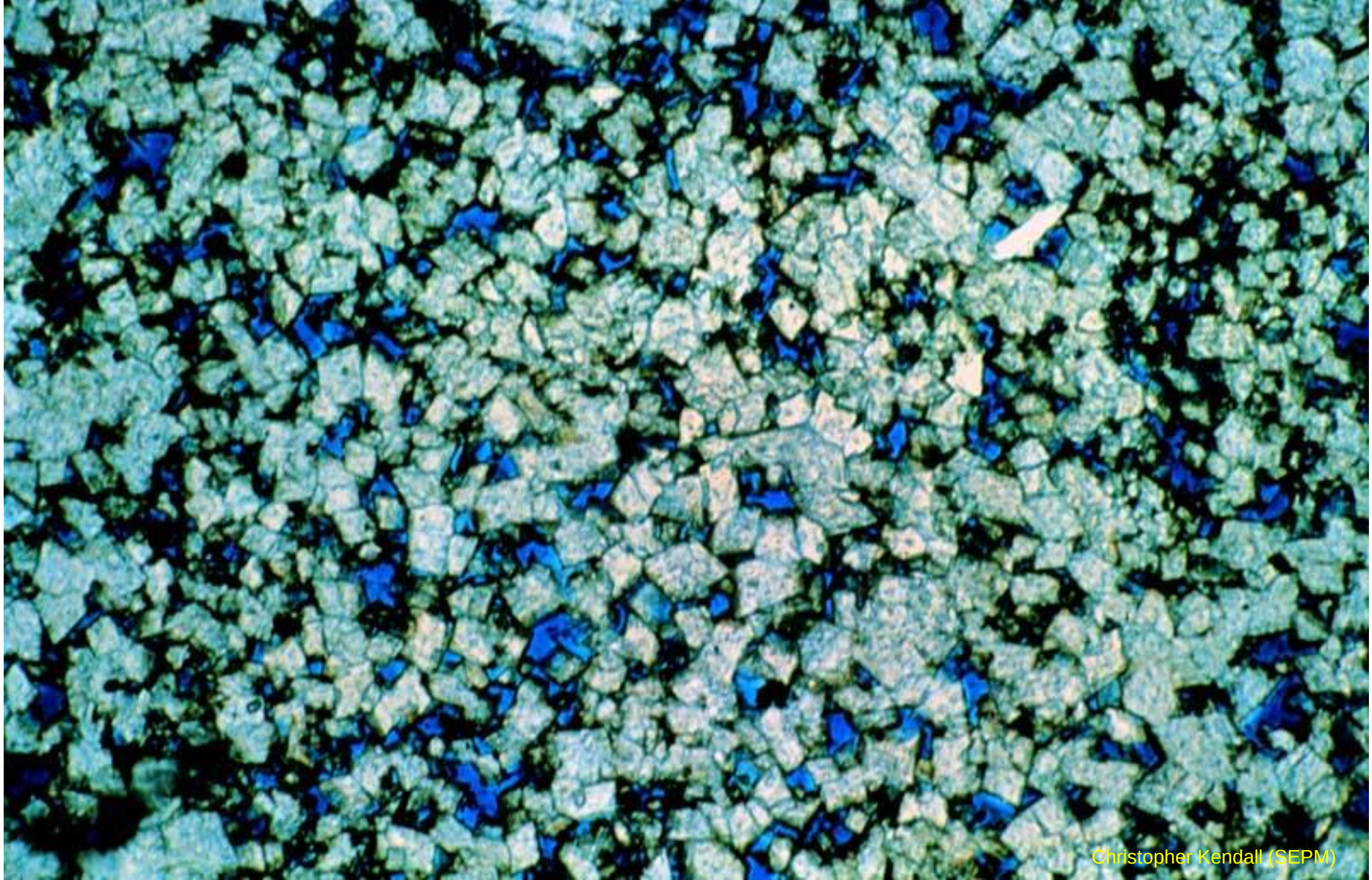
Intercristalina



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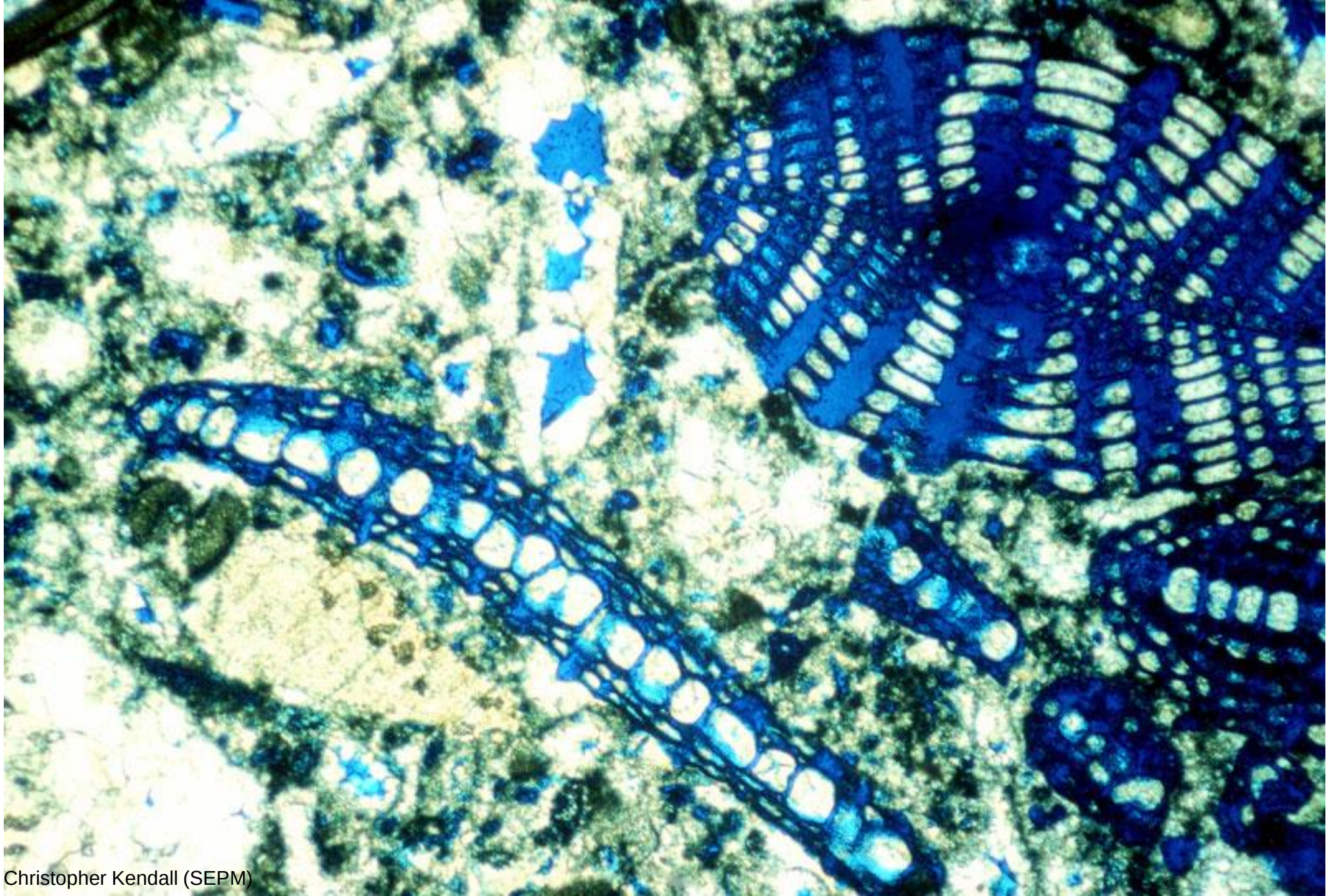
Móldica



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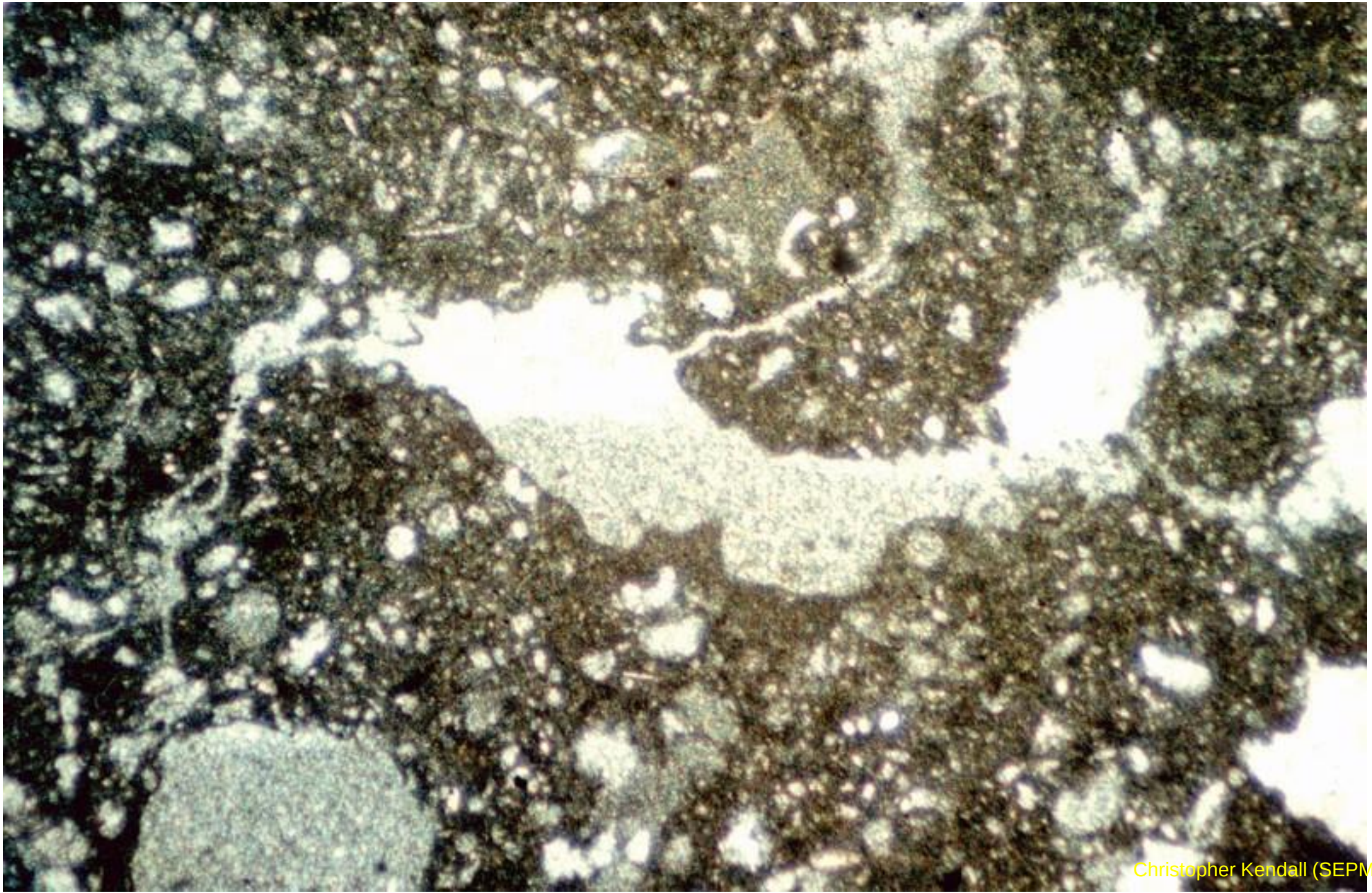
Fenestral



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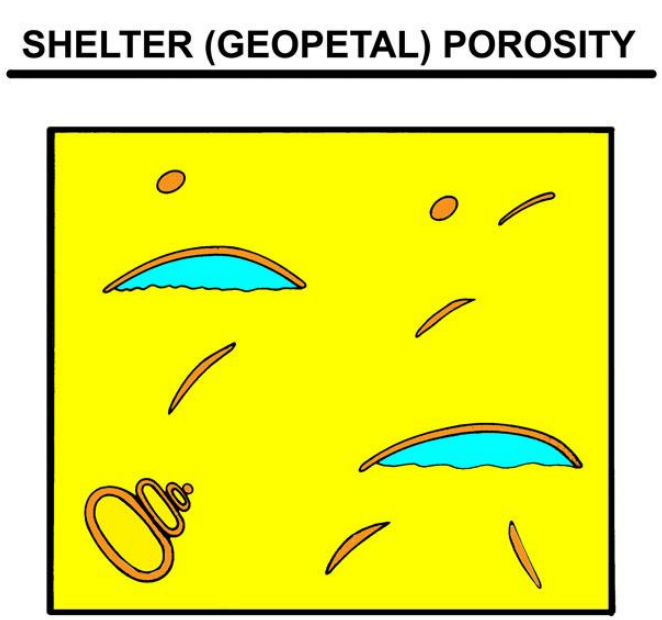
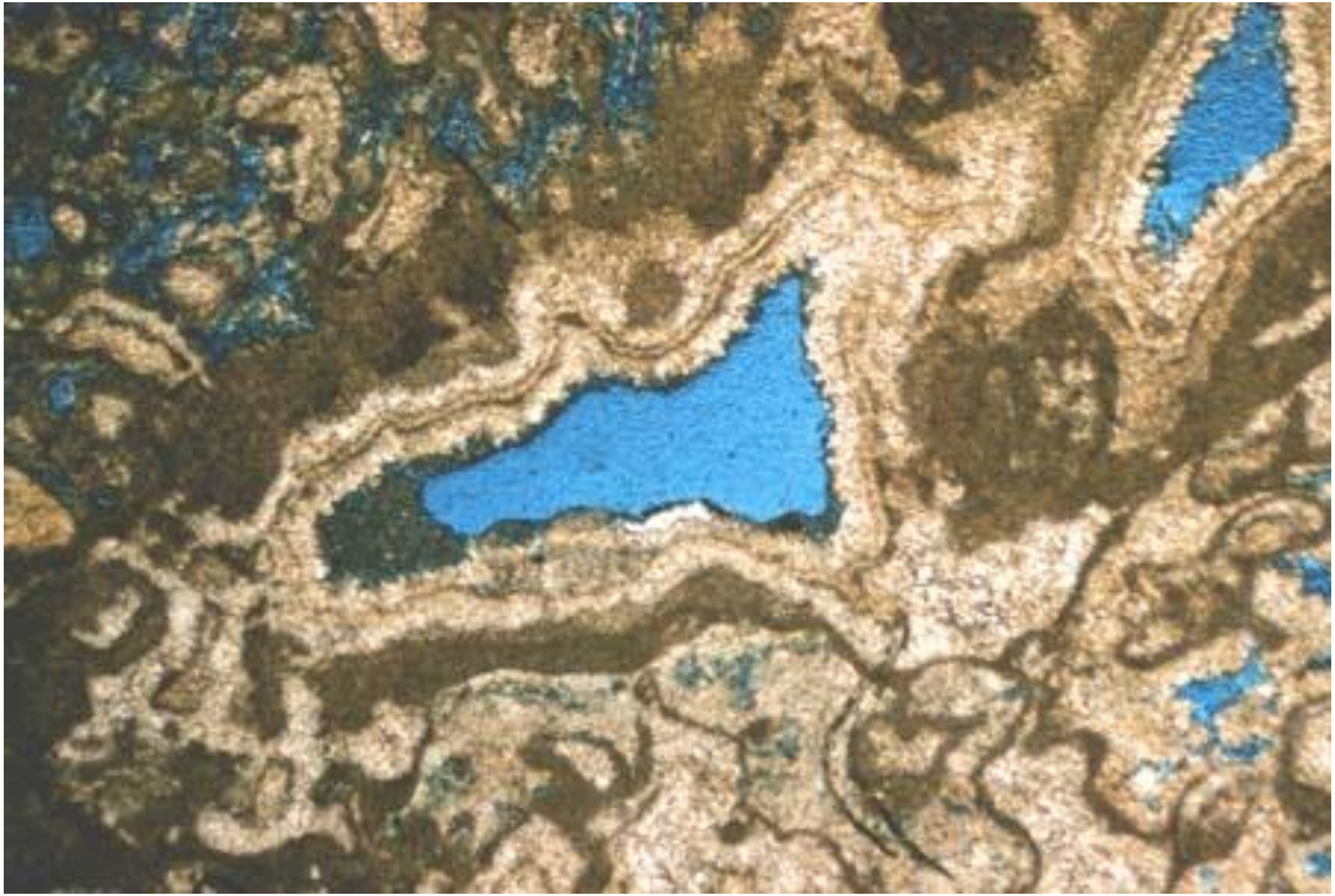
Shelter





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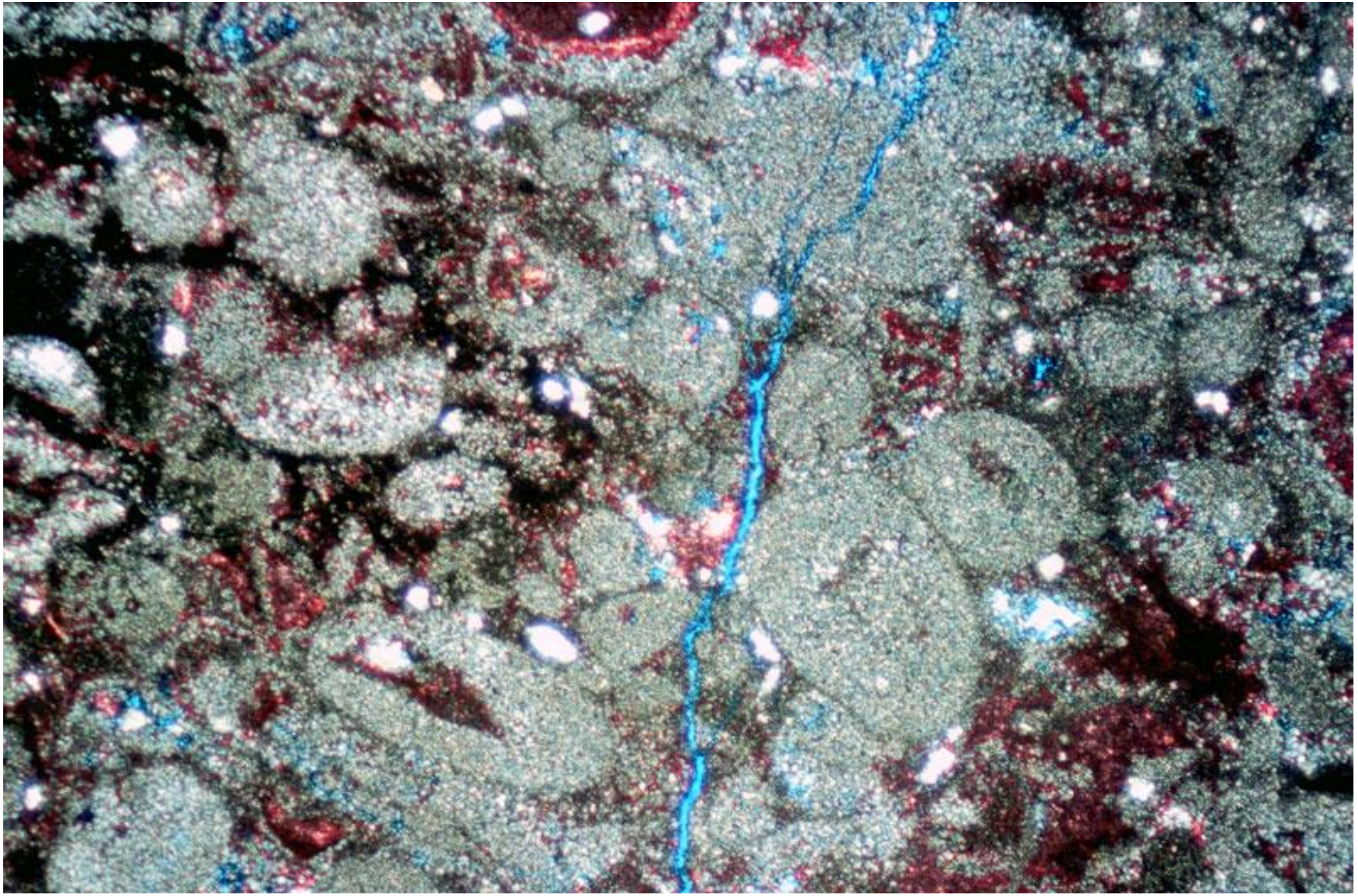
Fratura



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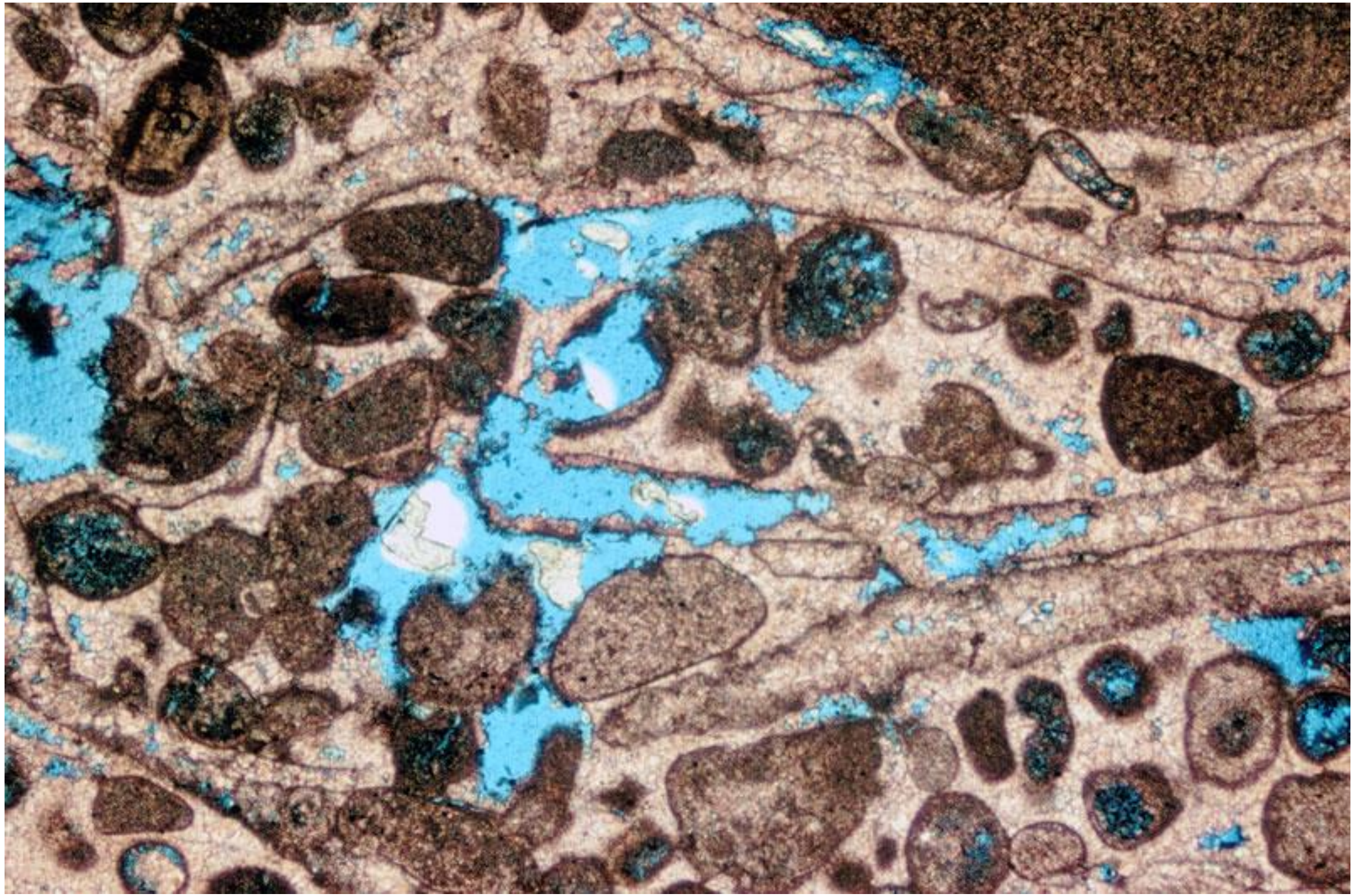
Vuggy



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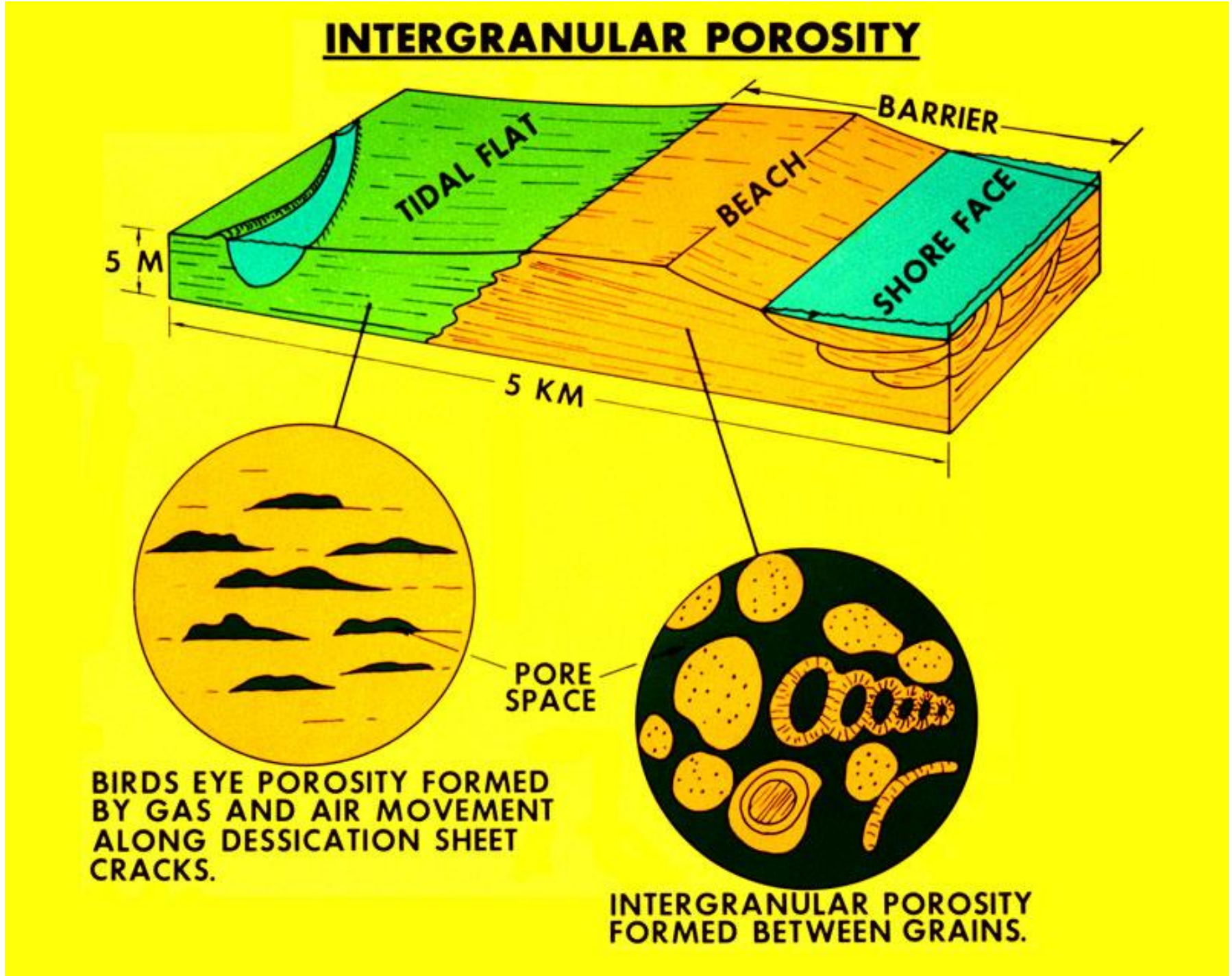
Fácies vs. tipos de poros



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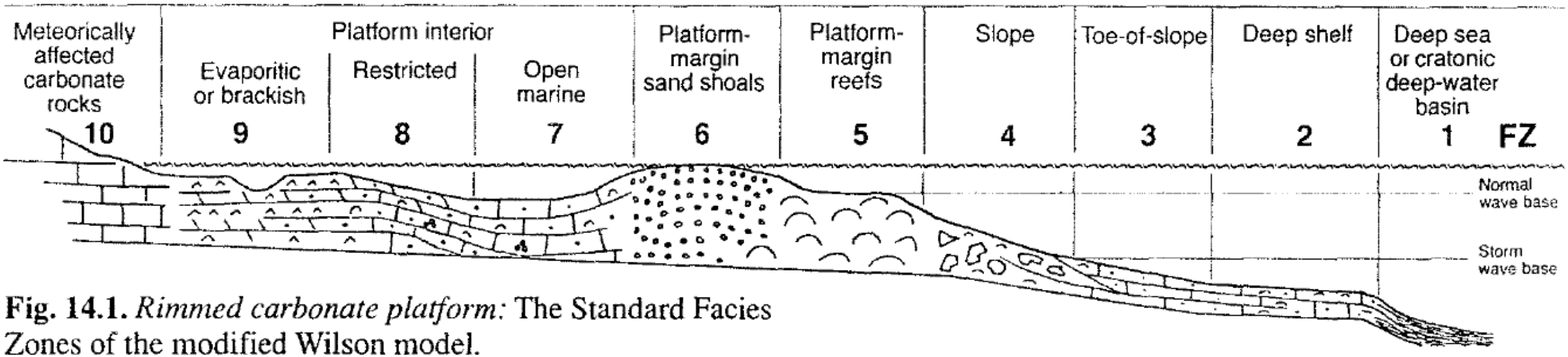
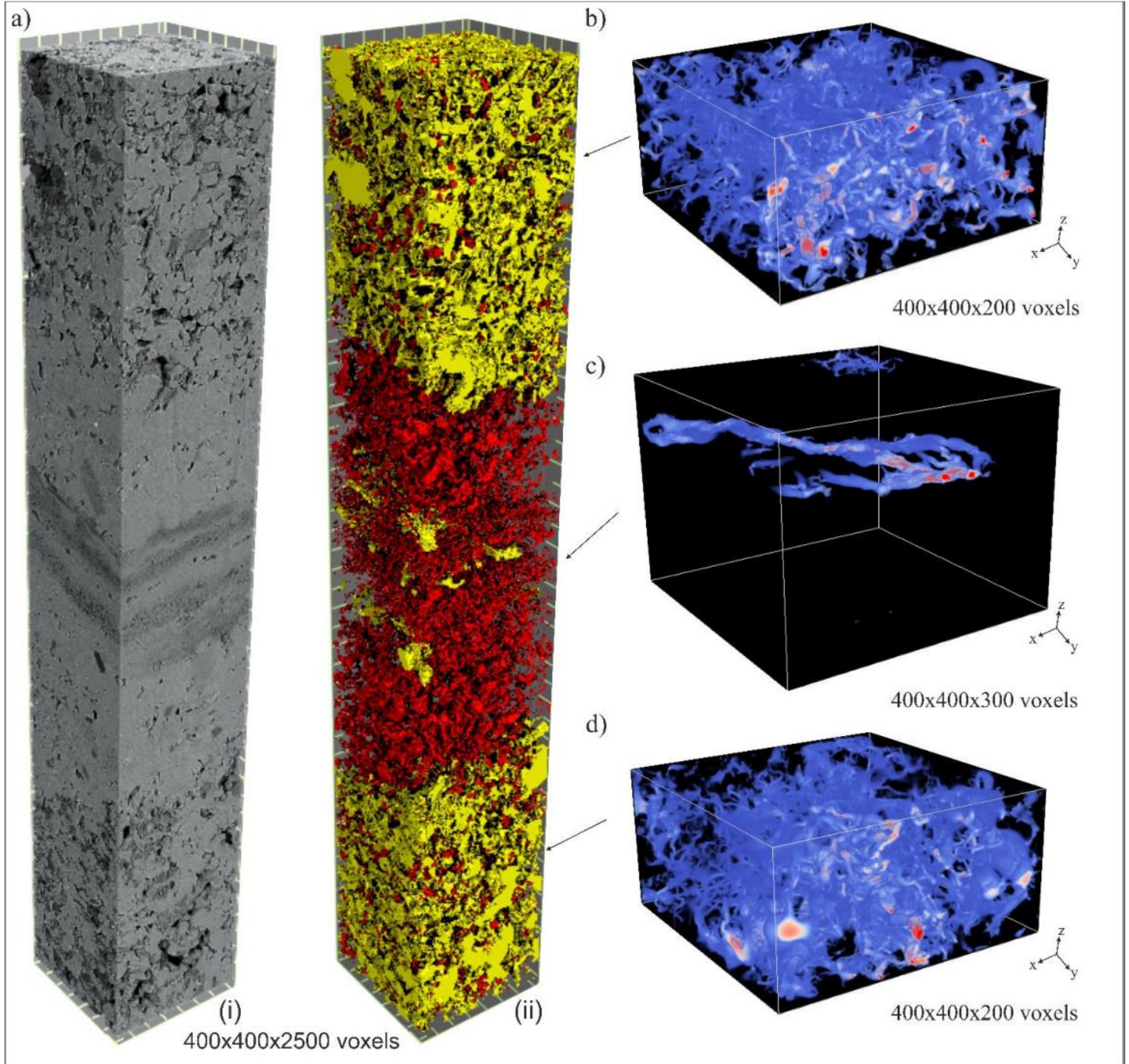


Fig. 14.1. *Rimmed carbonate platform:* The Standard Facies Zones of the modified Wilson model.

Flügel (2004)

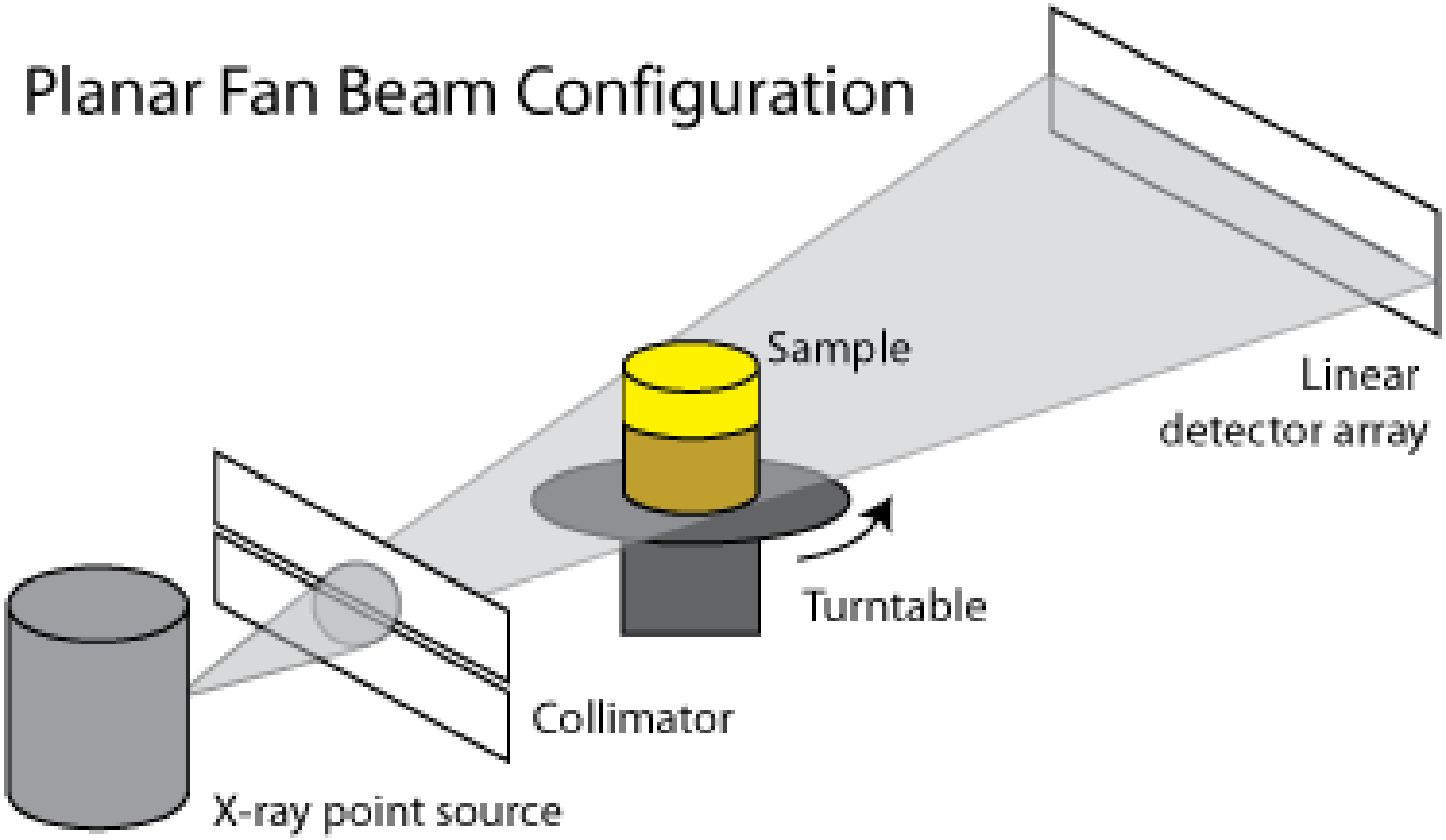


Poros conectados (amarelo) e não-conectados (vermelho)

Microtomografia de raios X

Zambrano et al. (2019)

Planar Fan Beam Configuration



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Sumário

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Research Article
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MICROBIAL BIOFACIES AND THE INFLUENCE OF METAZOANS IN HOLOCENE DEPOSITS OF THE LAGOA SALGADA, RIO DE JANEIRO STATE, BRAZIL

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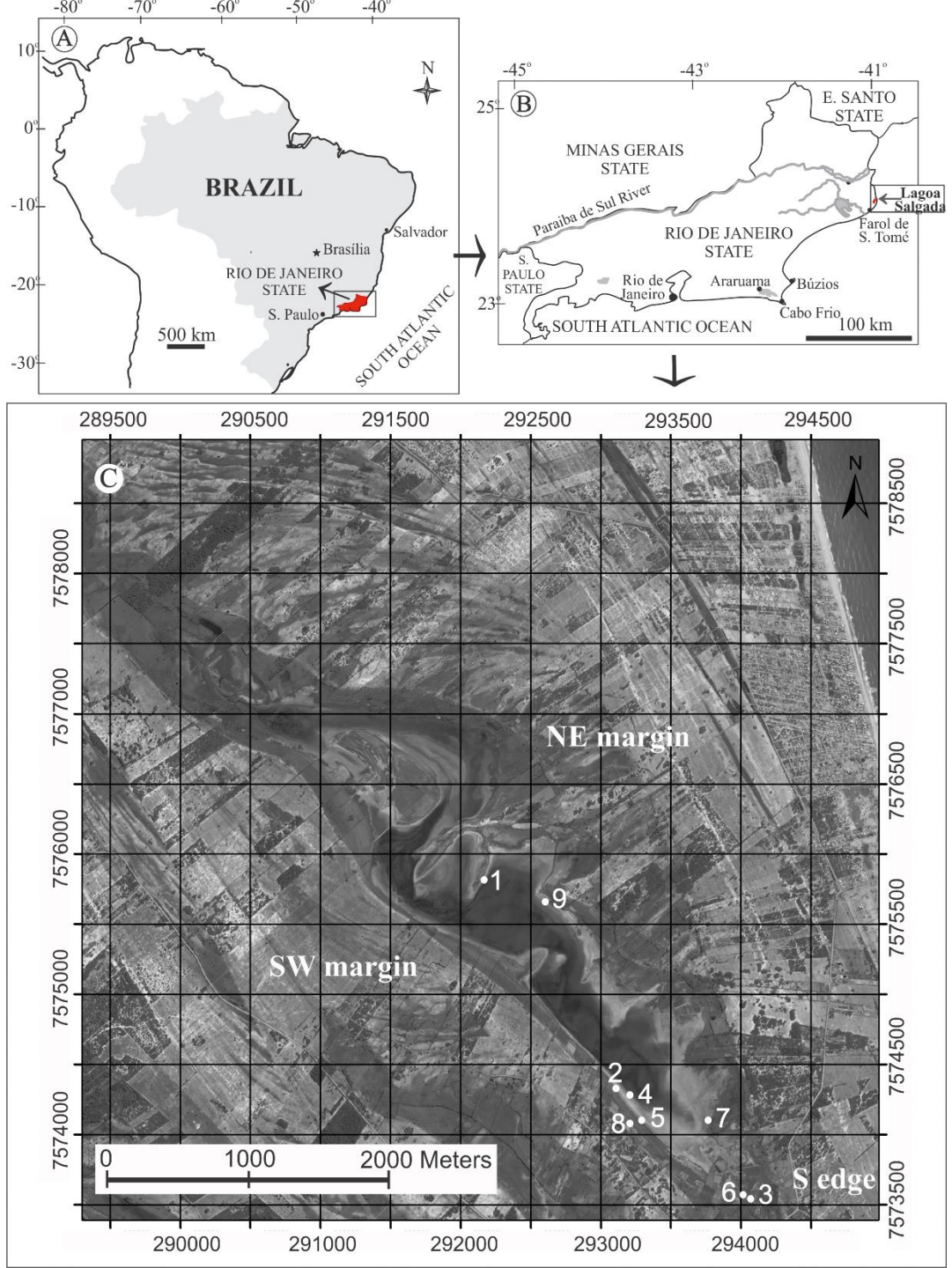
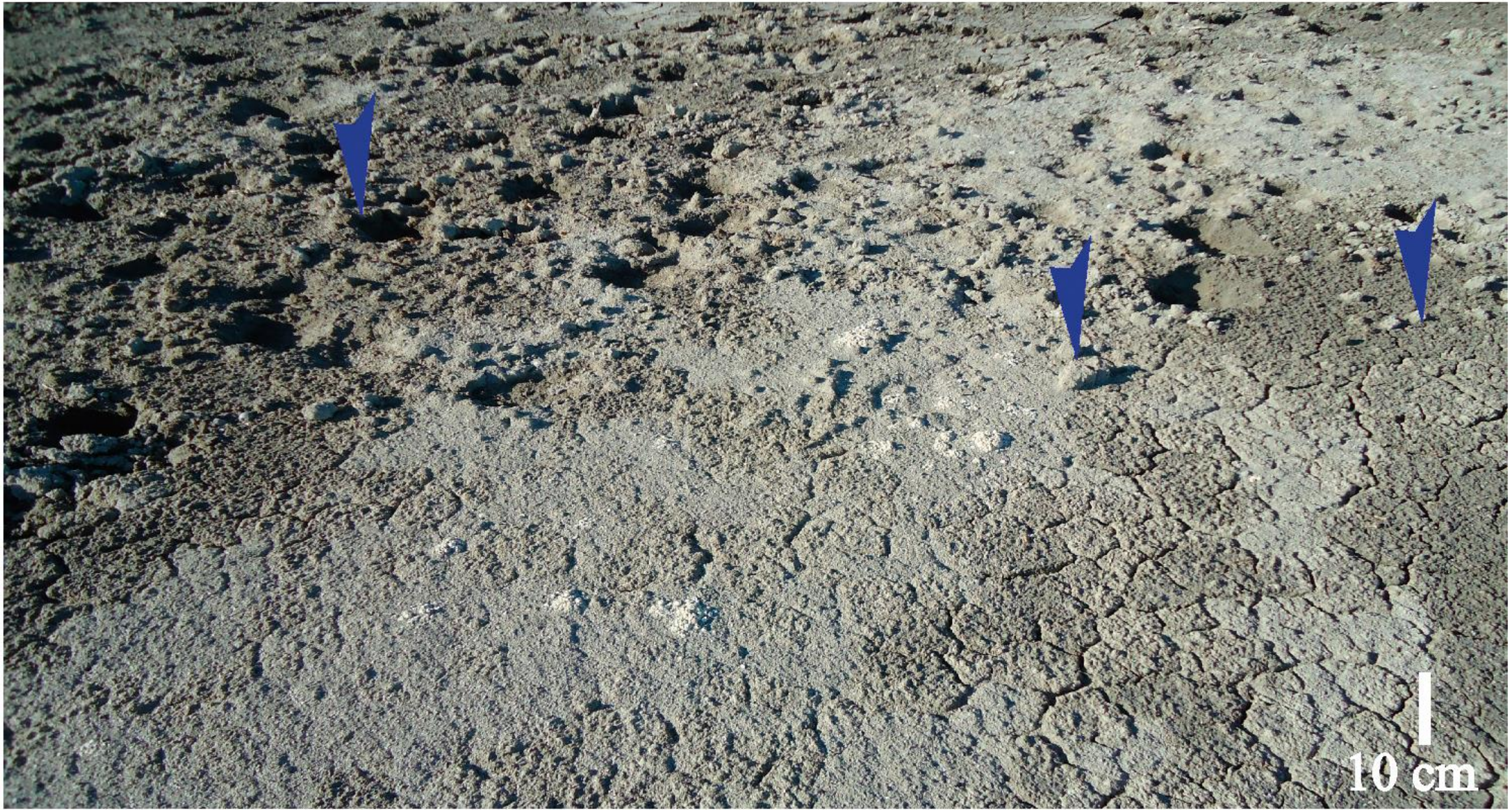
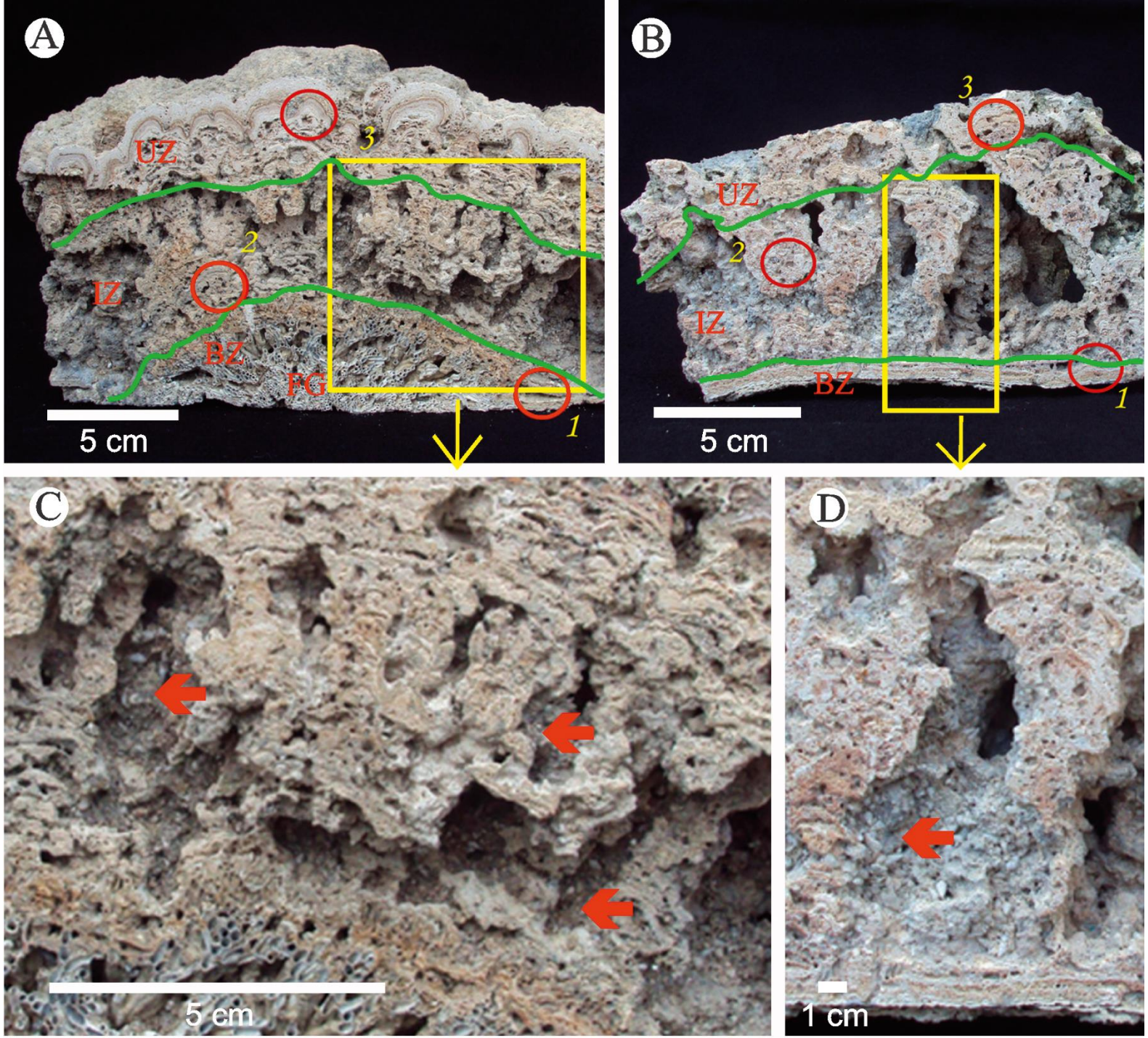
e-mail: fresia@ige.unicamp.br

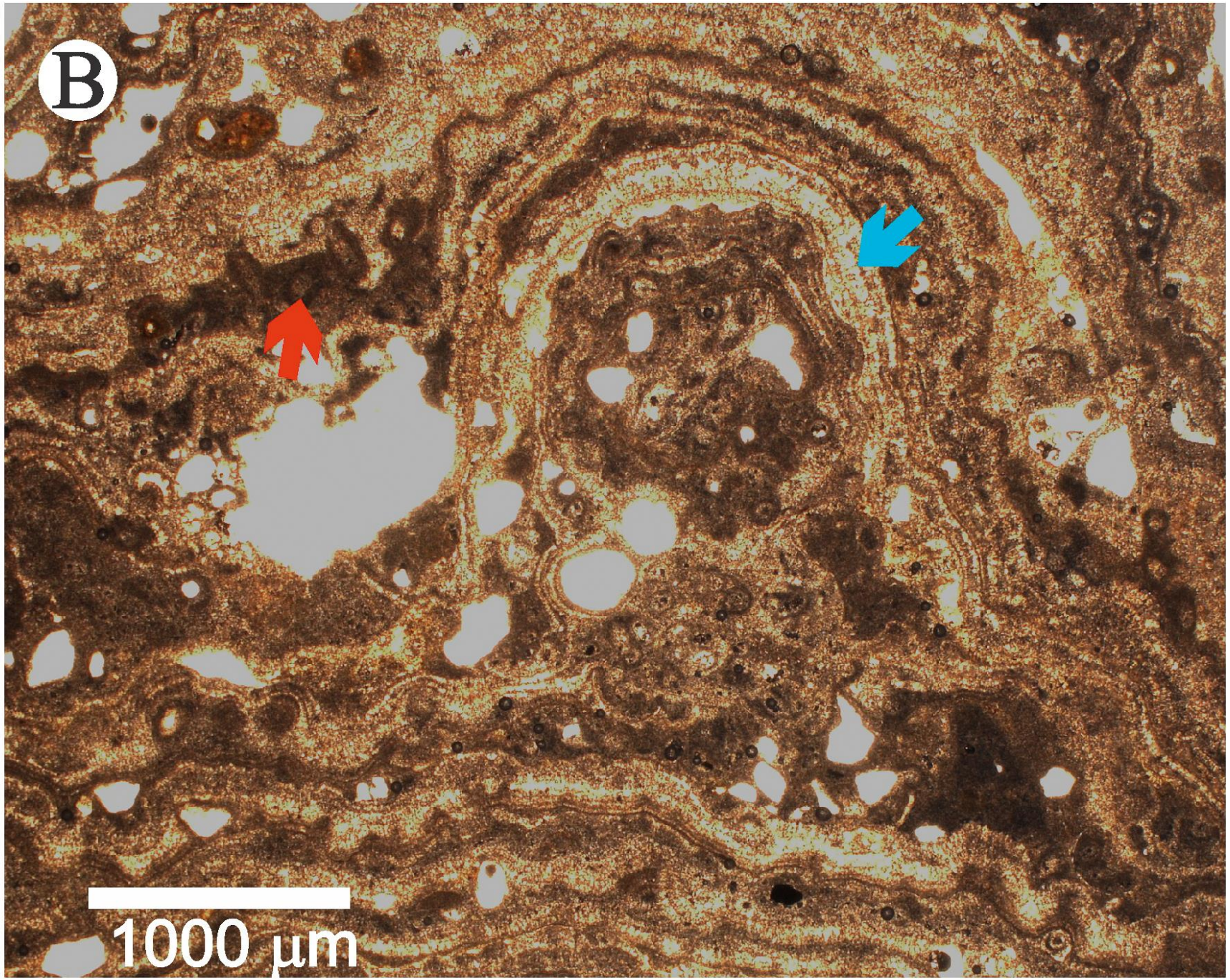

A
-80°
-70°
-60°
-50°
-40°
10°
0°
-10°
-20°
-30°
N
BRAZIL
Salvador
Brasília
RIO DE JANEIRO
STATE
S. Paulo
500 km
SOUTH ATLANTIC
OCEAN
B
-45°
-43°
-41°
25°
23°
E. SANTO
STATE
MINAS GERAIS
STATE
Paraíba de Sul River
Lagoa
Salgada
Farol de
S. Tomé
RIO DE JANEIRO
STATE
S.
PAULO
STATE
Rio de
Janeiro
Araruama
Búzios
Cabo Frio
SOUTH ATLANTIC OCEAN
100 km
C
289500
290500
291500
292500
293500
294500
7578500
7578000
7577500
7577000
7576500
7576000
7575500
7575000
7574500
7574000
7573500
N
NE margin
SW margin
S edge
1
9
2
4
8
5
7
6
3
0
1000
2000 Meters
290000
291000
292000
293000
294000



Ricardi-Branco et al. (2018)

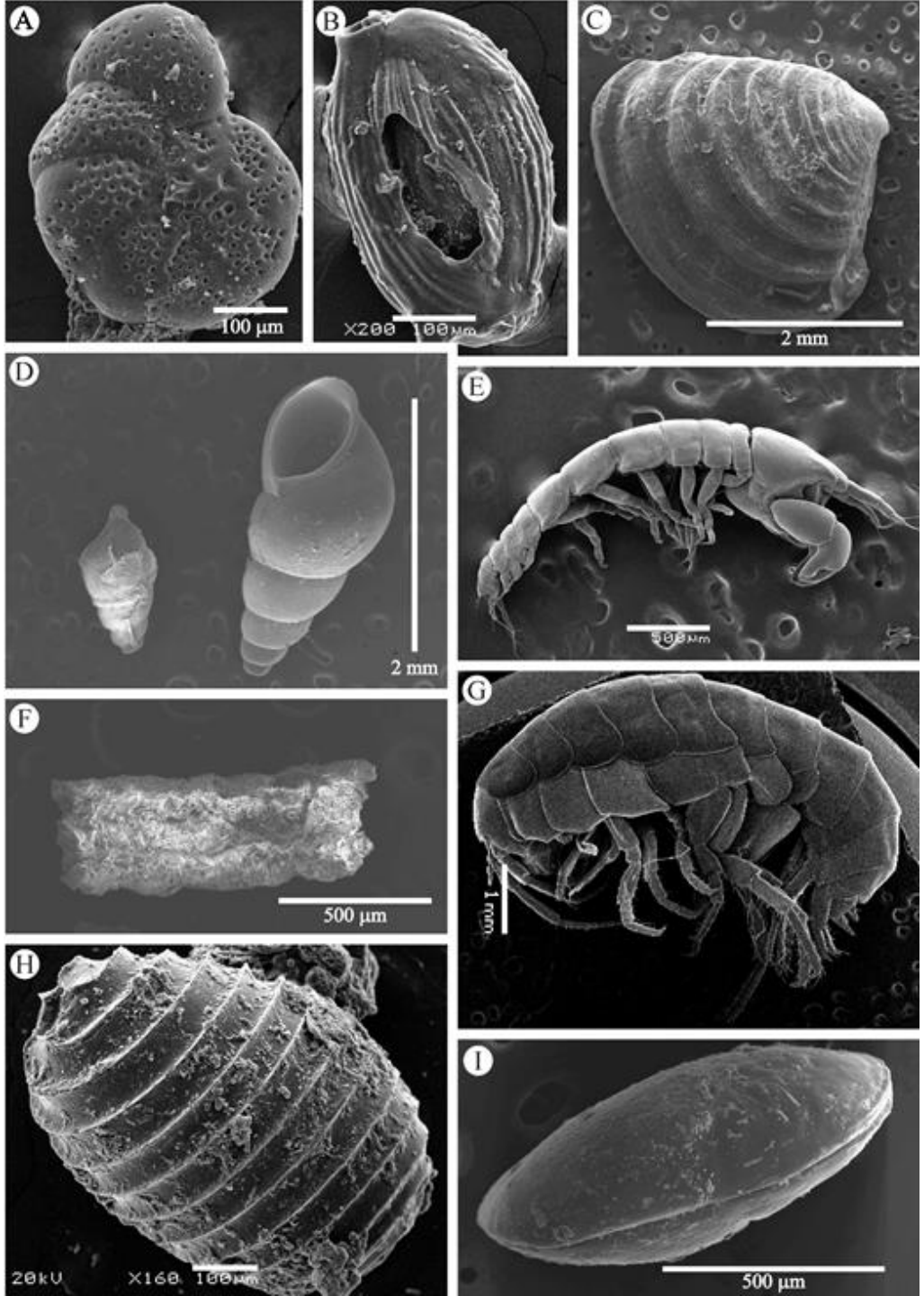


Ricardi-Branco et al. (2018)



Ricardi-Branco et al. (2018)

Background sediments (SF): biota in microbialites from the Lagoa Salgada, SEM photography. ***A)****Quinqueloculina sp.* ***B)****Elphidium sp.* ***C)*** *Shell of Verenidae.* ***D)*** *Shell of H. australis.* ***E)*** *Tanaidaceae.* ***F)*** *Tubes secreted by Tanaidaceae.* ***G)*** *Gammaridae.* ***H)*** *Charophyte gyrogonites.* ***I)*** *Ostracod carapace.*



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