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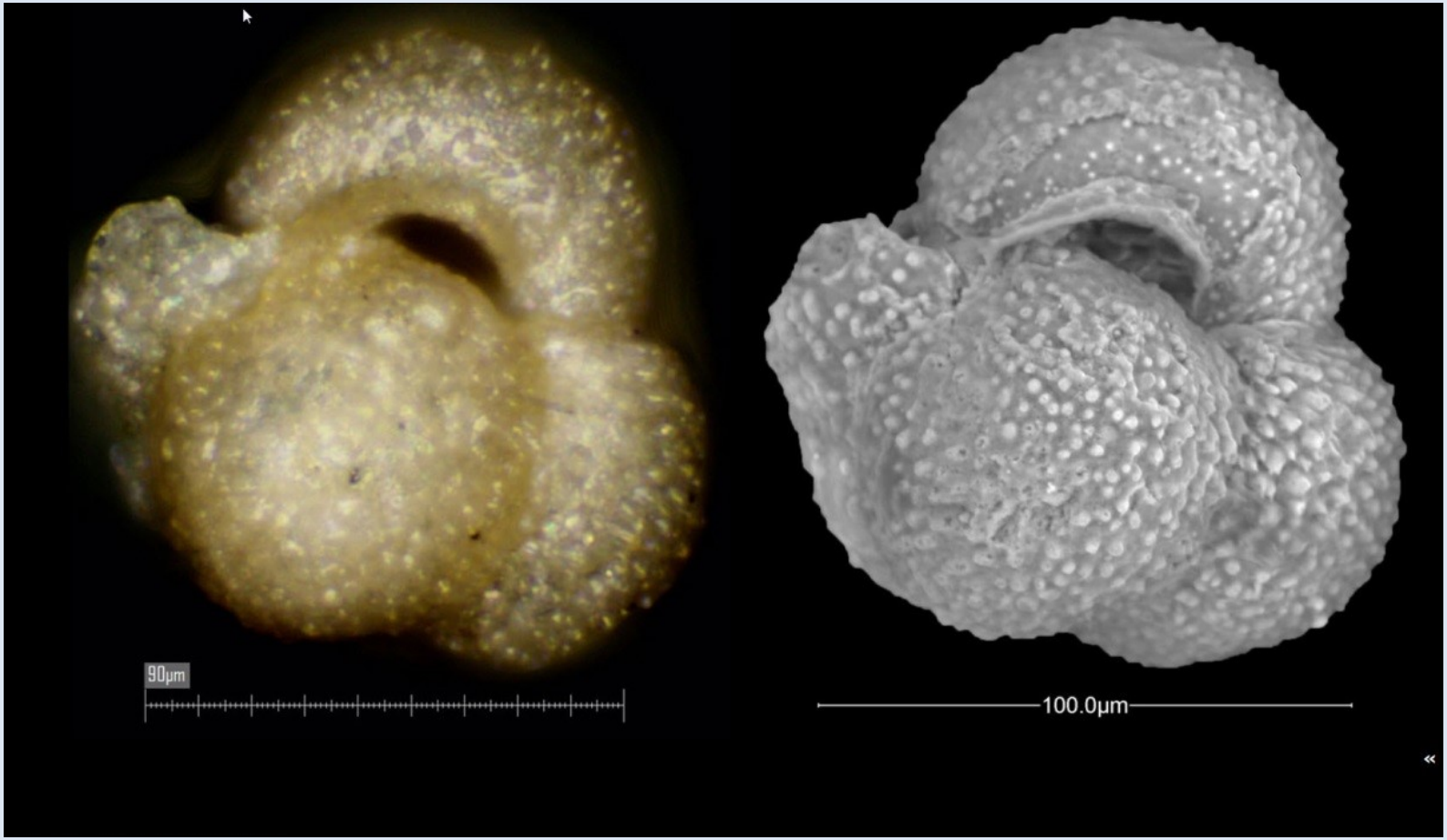
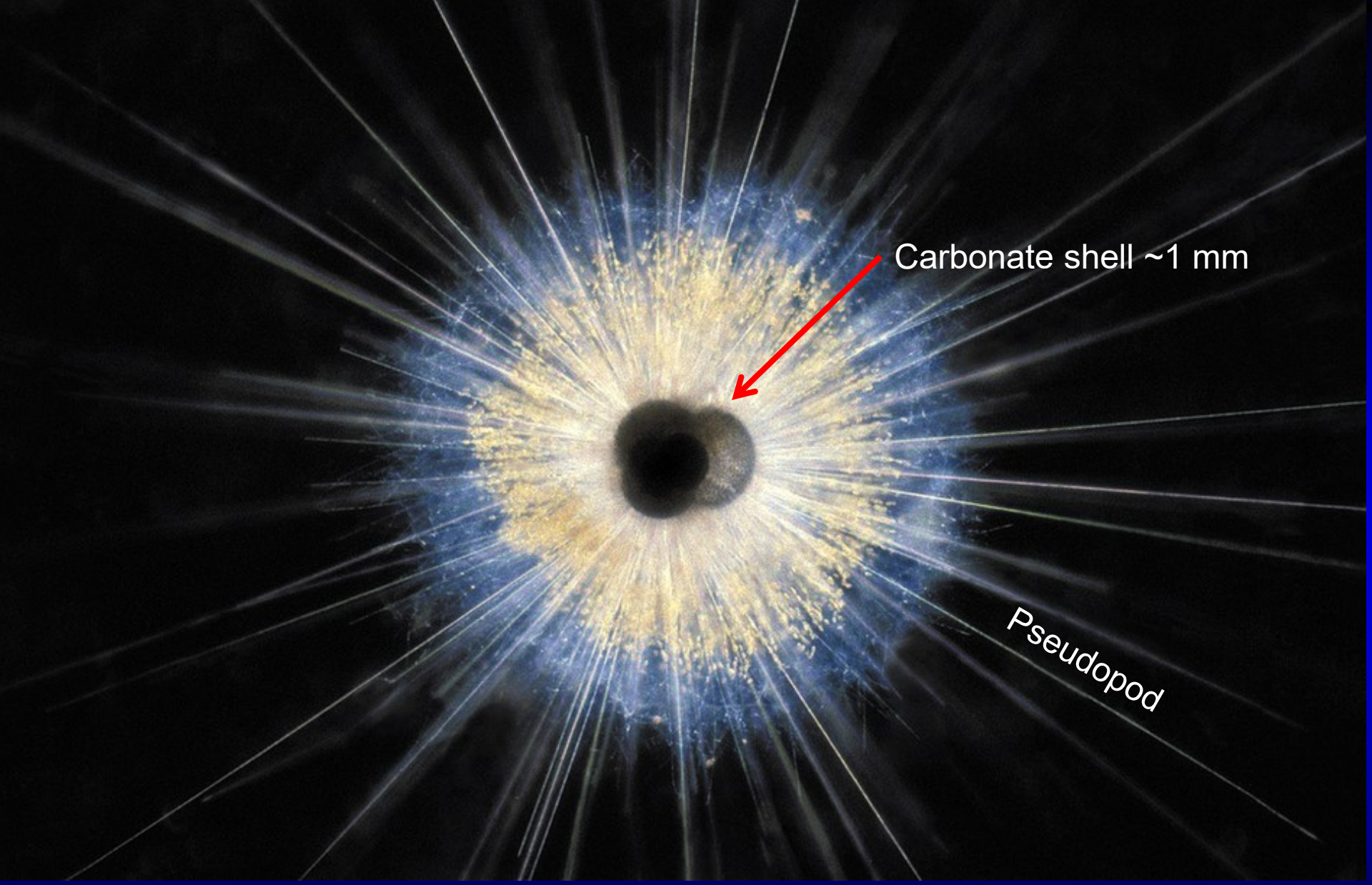
The First 40 Million Years of Planktonic Foraminifera

Felix Gradstein (Oslo), Anna Waskowska (Kraków), Larisa Klinskikh (Novosibirsk)



Globuligerina waskowska, *Morrisi* Zone, Bathonian, Poland

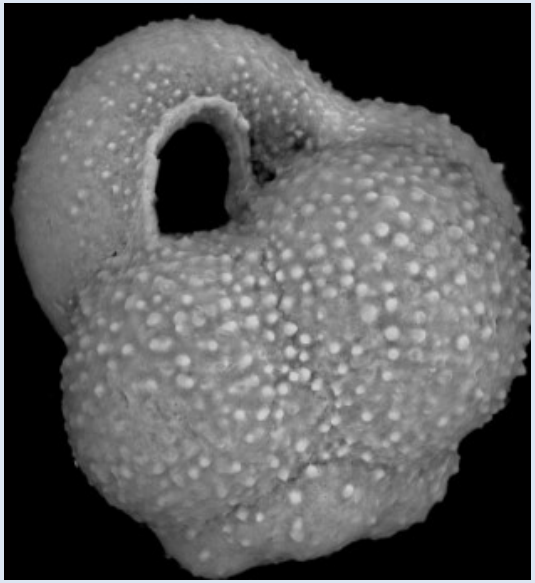


Zooplankton: a planktonic foraminifer – Globigerinoides ruber
A single celled amoeboid ‘rhizopod’

Jurassic planktonic foraminifera are neglected in micropaleontology currently with 11 species in 3 genera (~100µ tests)

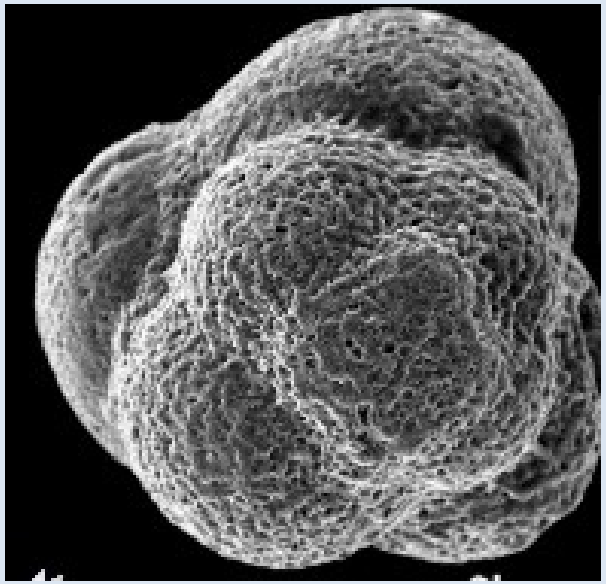
Taxonomy uses wall texture (microperforate, reticulation) and test coiling (low to high spired)
see *www.mikrotax.org*

Low to high-spired
Globuligerina
with pustulose wall



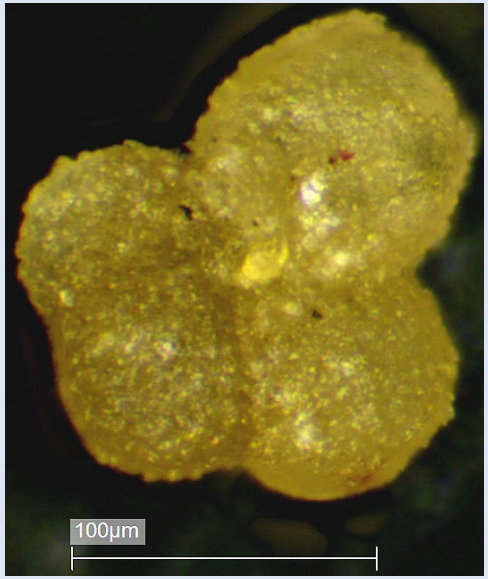
Bajocian – Tithonian

Medium high-spired
Conoglobigerina
with reticulate wall



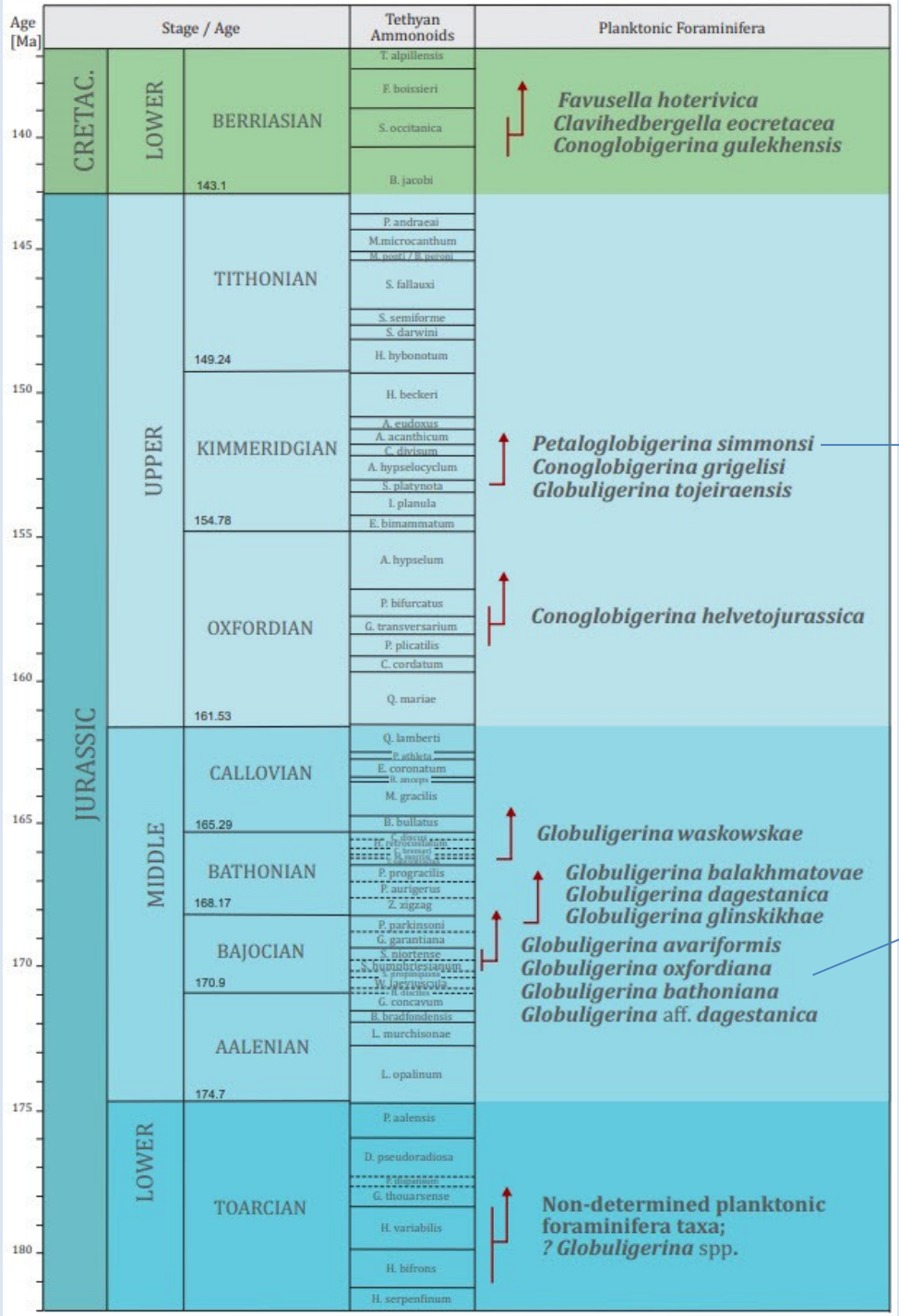
Oxfordian - Kimmeridgian

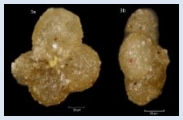
Low spired, large final whorl
Petaloglobigerina
petaloid chambers maybe twisted



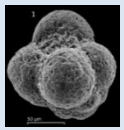
Kimmeridgian

First Appearance Datum (FAD) of species of Jurassic planktonic foraminifera.

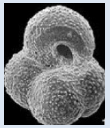


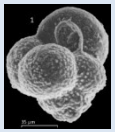


Onset of twisted chambers in test coil

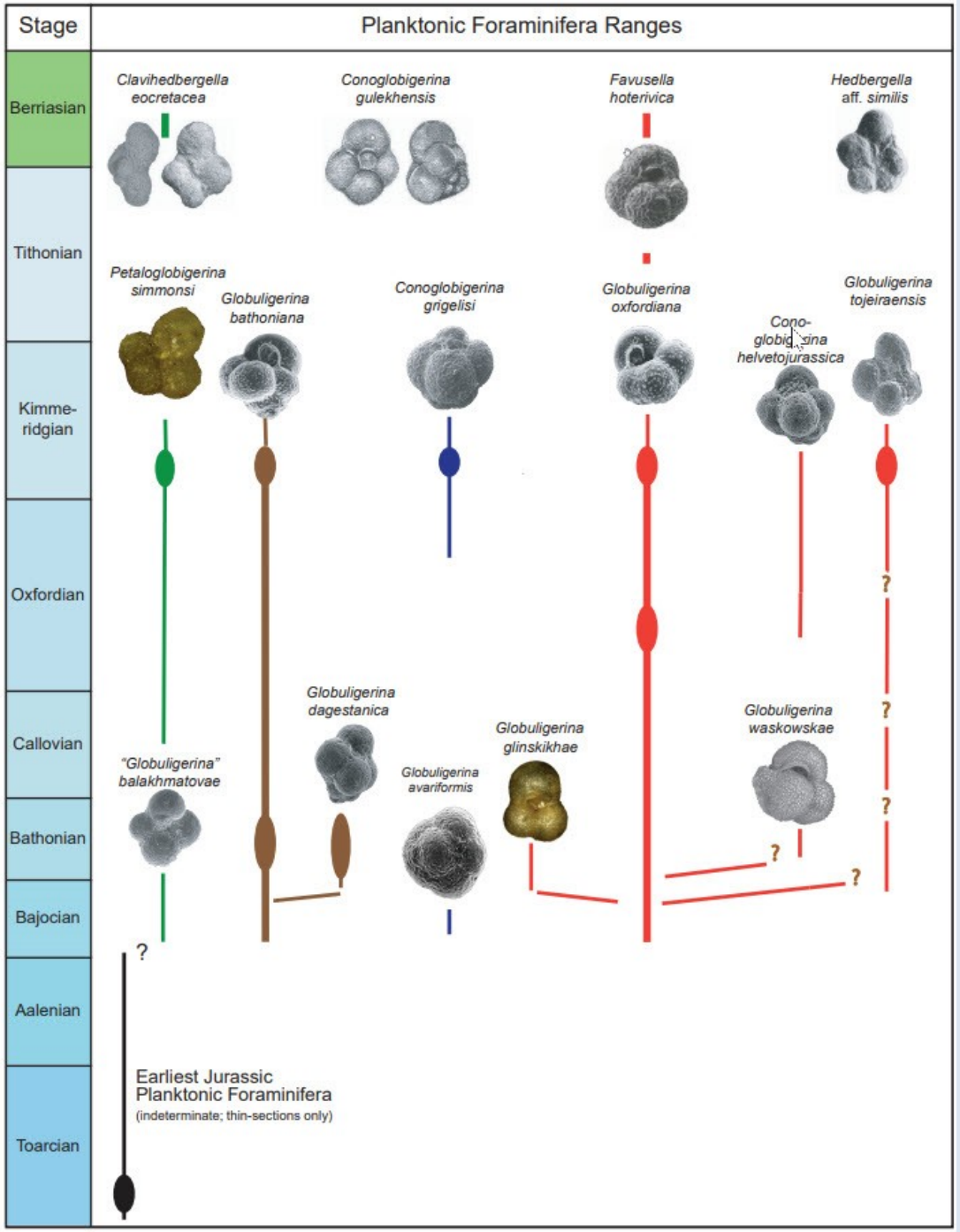


Onset of reticulate test surface





FAD of planktonic forams



Evolution and stratigraphy of Jurassic planktonic foraminifera

Genera plotted according to wall texture (microperforate, reticulation) and coiling mode.

Morphologic convergence of Jurassic and Cenozoic planktonic foraminifera

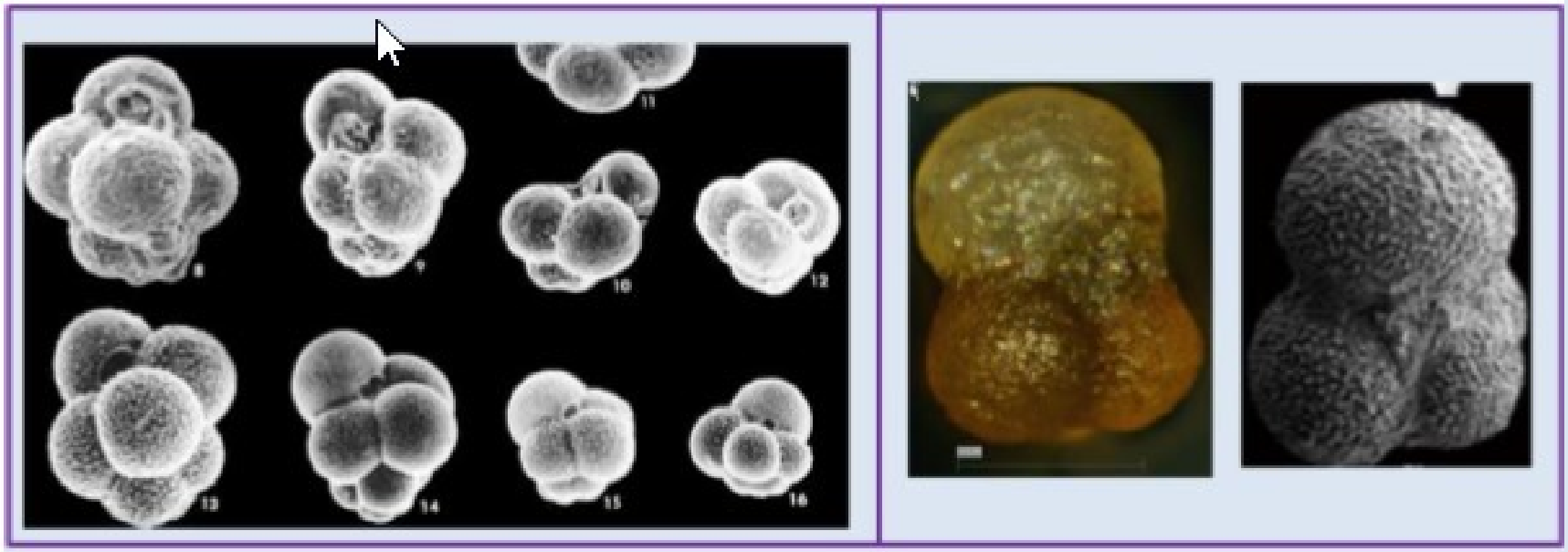


Figure 1 (left). Morphological convergence of **Jurassic** Grand Banks *Globuligerina bathoniana* (upper row) and **Recent** Scotian Shelf *Globigerinita uvula* (lower row). Reference: Dalhousie University PhD of B. Stam (1986).

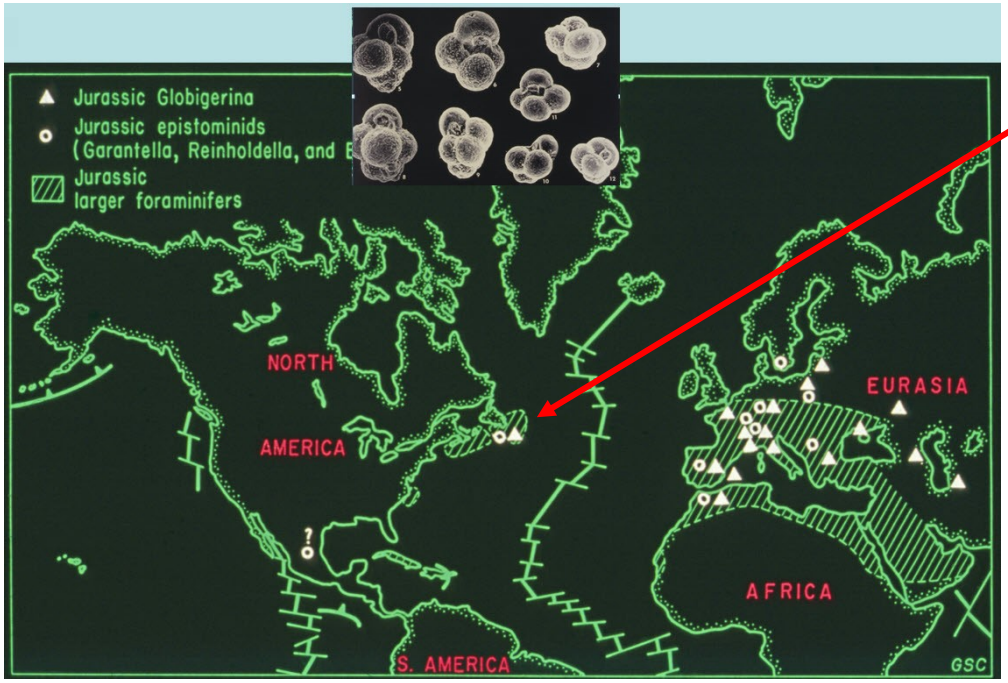
Figure 1 (right) Morphological convergence between middle **Jurassic** *Globuligerina* (left) and **Miocene** *Globigerina sp.* (right).

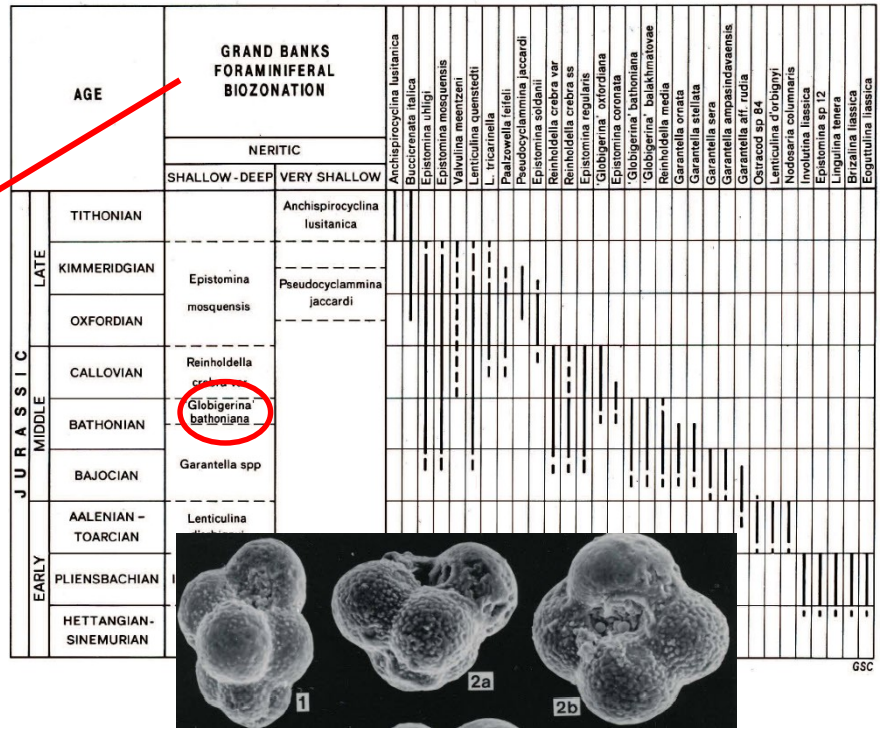
Paleobiogeography of Jurassic planktonic foraminifera

Relatively ‘near-shore’ in Tethys-subTethys marine belt

BIOSTRATIGRAPHY AND BIOGEOGRAPHY OF
JURASSIC GRAND BANKS FORAMINIFERA 1976

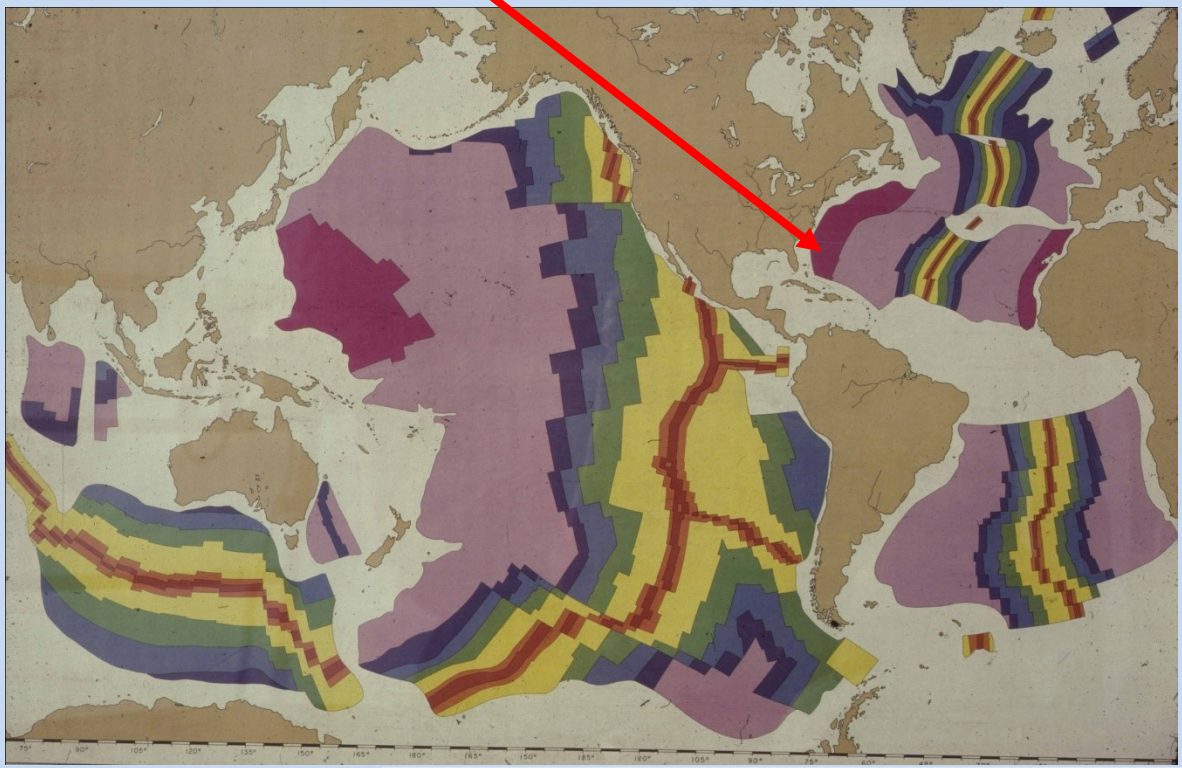
F.M. GRADSTEIN
Atlantic Geoscience Centre, Geological Survey of Canada

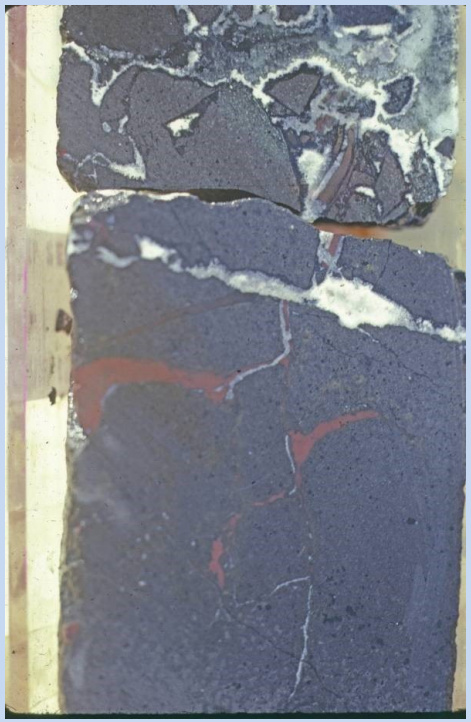




Globuligerina bathoniana (Pazdrowa)

Marine Magnetic Anomaly Map of the World Oceans with
Blake Bahama Basin sedimentary window on oldest Atlantic Ocean crust





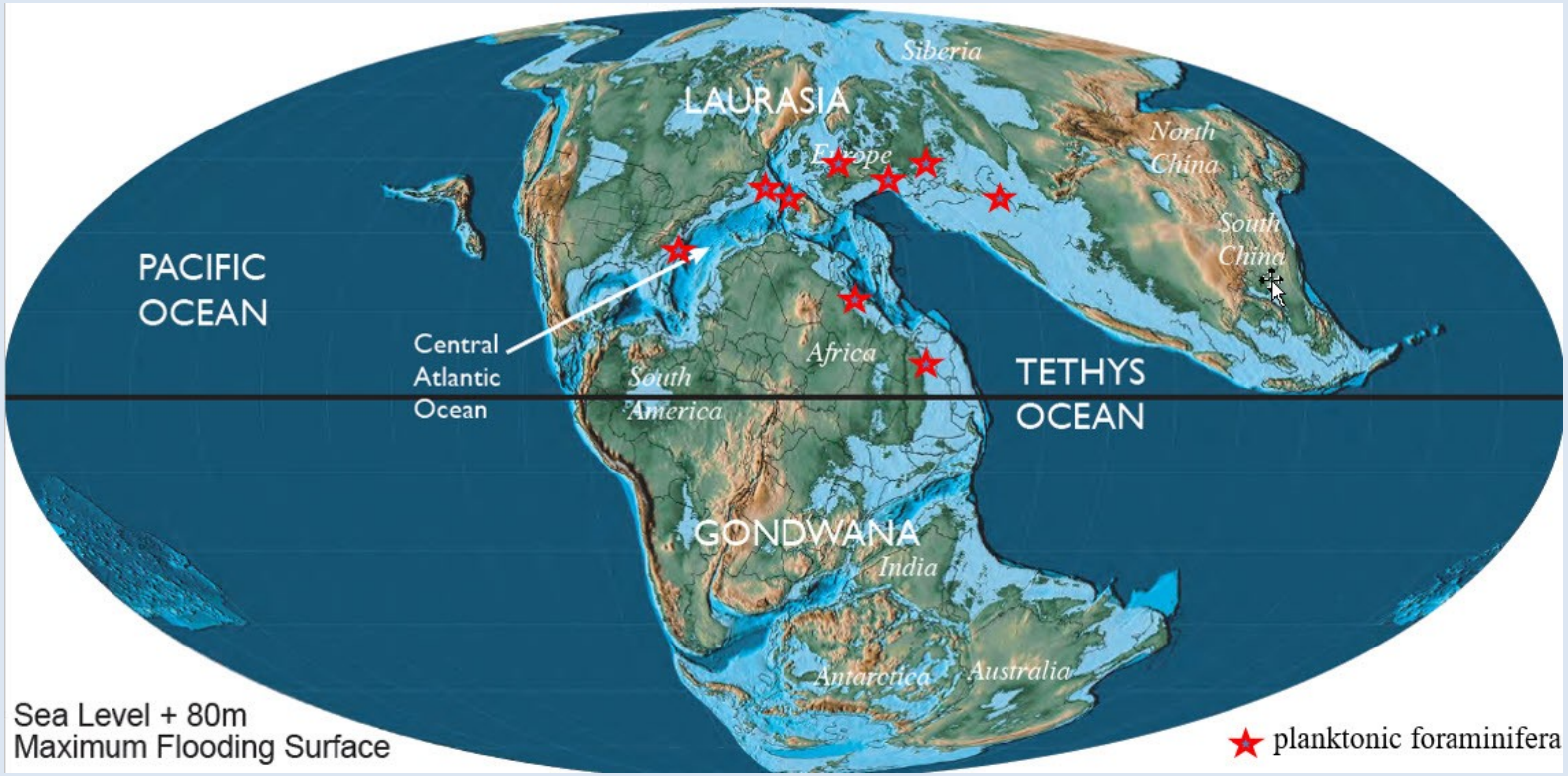
1978

Deep Sea Drilling Project Leg 76
Blake Bahama Basin, in 6.5km waterdepth.

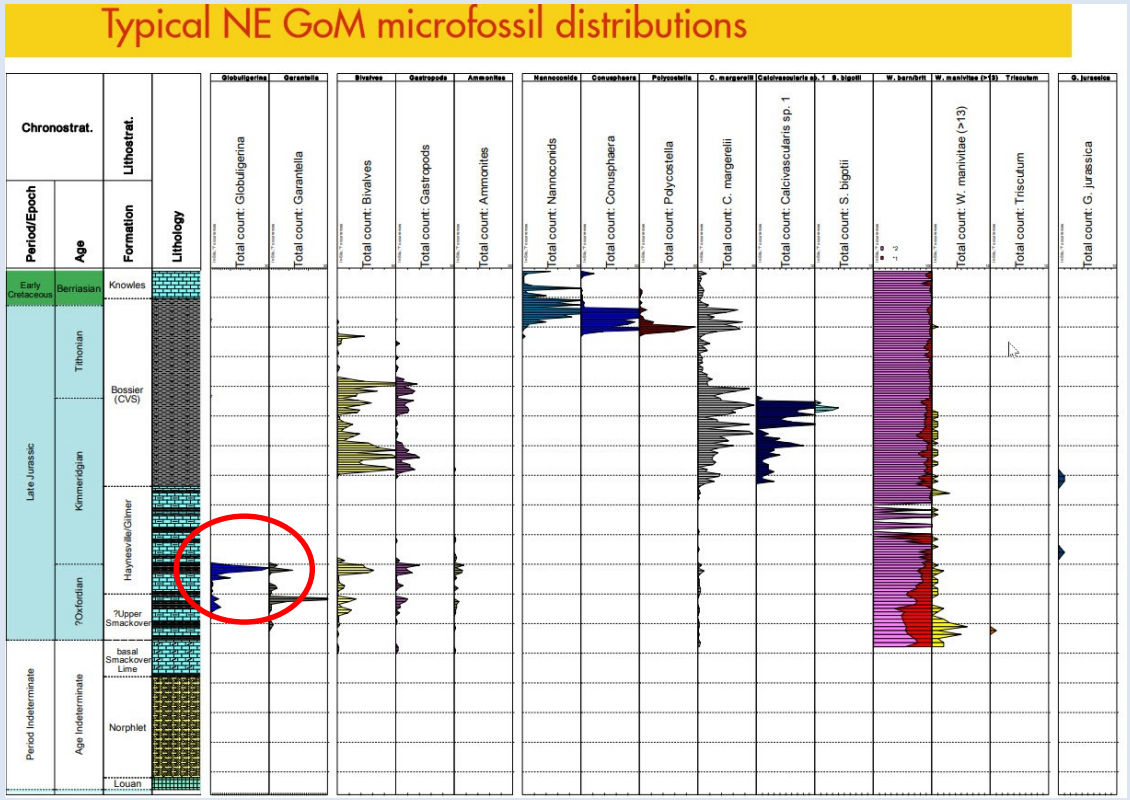
Bathonian oceanic basement after 2.5 months
drilling/coring with 9 re-entries
and 2 casing jobs.

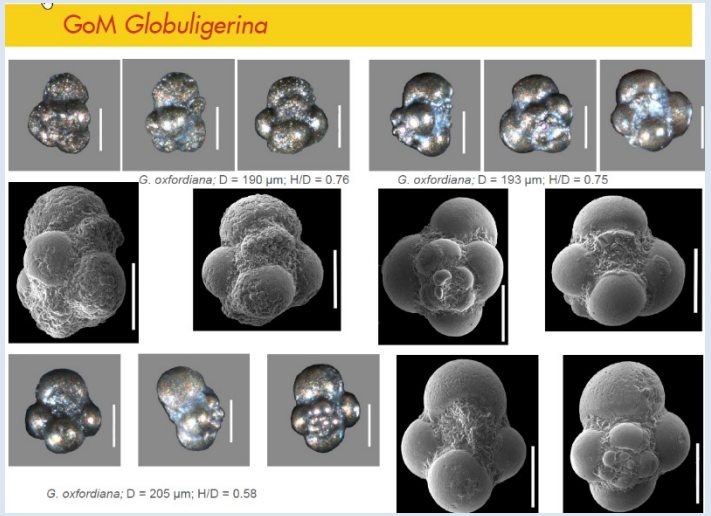
Paleobiogeography of Kimmeridgian planktonic foraminifera

Relatively ‘near shore’ marine in Tethys, subTethys



Taxa are useful markers in wells in Gulf of Mexico, Grand Banks, Scotian Shelf, N and NE Africa, USSR and Middle East.





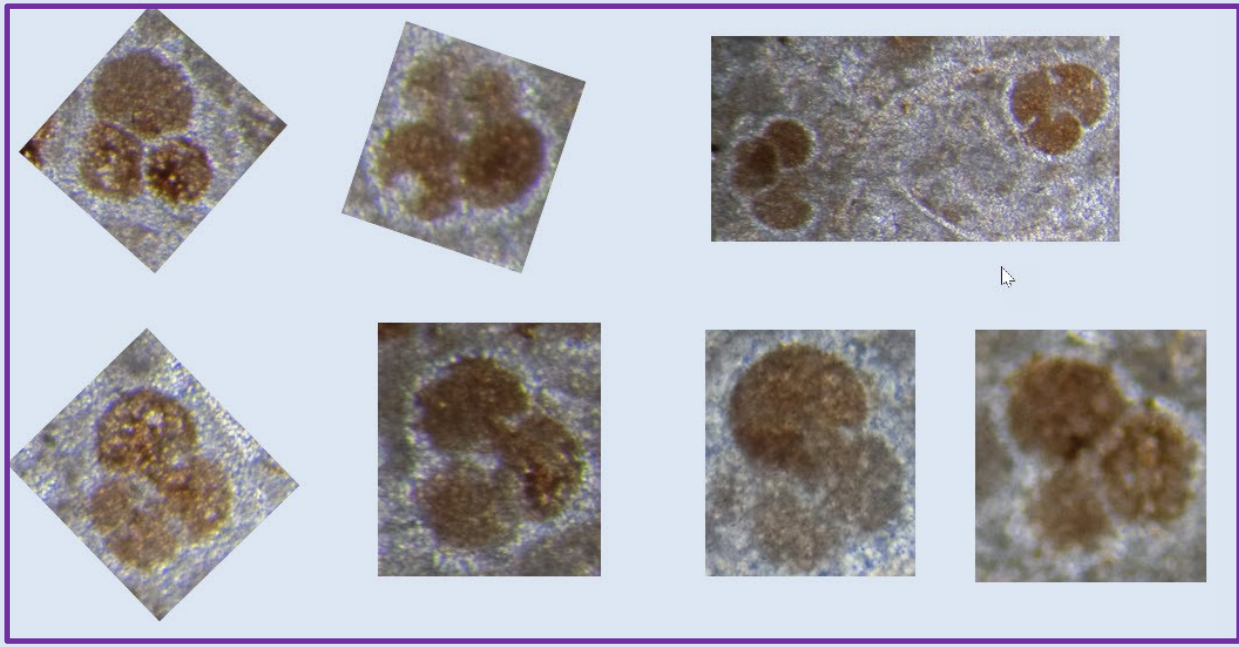
Haynesville Formation with *Globuligerina oxfordiana* and *Globuligerina bathoniana,* Oxfordian

Robert Campbell, Shell

New Record of Upper Jurassic Planktonic Foraminifera from the Northeastern Gulf of Mexico

Massive and hard limestones, Austria (Jurassic; no stratigraphic details)

Globuligerina bathoniana
(Bajocian – Kimmeridgian)



? Globuligerina glinskikhae (Late Bajocian – early Bathonian)

Prof. Diethard Sanders
Insbruck, Austria

Middle and Upper Jurassic Strata of the Gotnia Basin, Onshore Kuwait: Sedimentology, Sequence Stratigraphy, Integrated Biostratigraphy and Palaeoenvironments, Part 1

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Kuwait Oil Company (KOC) Exploration Group Exploration Studies Kuwait, 2018

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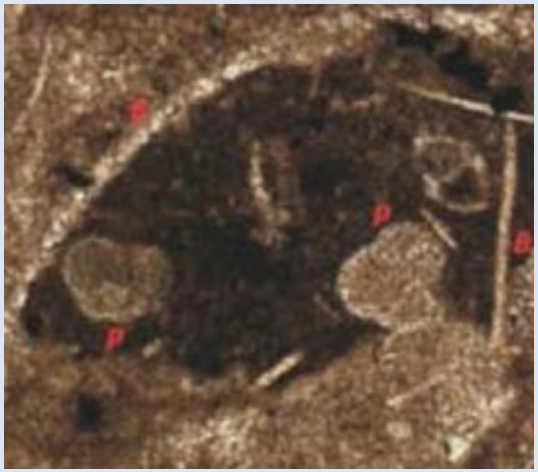
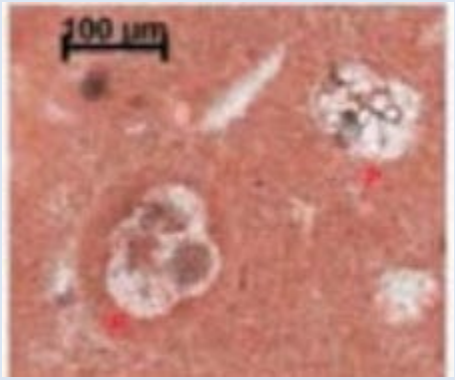
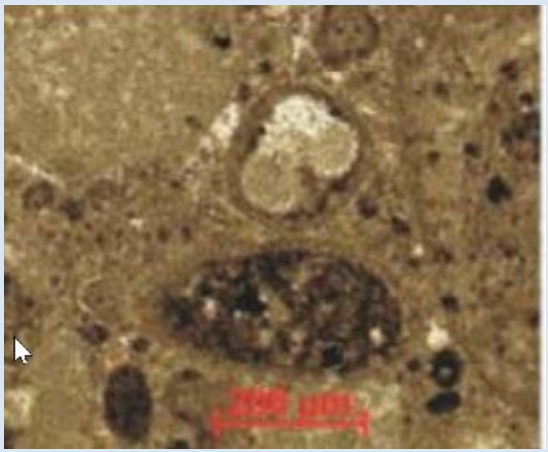


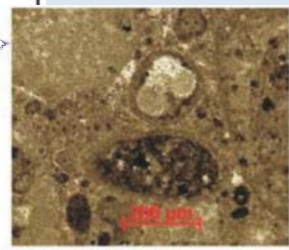




Stratigraphy, vol. 16, no. 3, text-figures 1–23, pages 165–193, 2019 https://doi.org/10.29041/strat.16.3.165-193

Lithostratigraphy	Composite Core and Log Display	Age	Standard Chronostratigraphy: Stage	Standard Chronostratigraphy: Substage	Kuwait Nannofossil Zones	Nannofossil Events	Kuwait Microfossii Zones	Microfossil Events	Kuwait Palynology Zones	Palynology Events
Makhul										
Hith Anhydrite										
Gotnia			Tithonian	Late				Bivalves, ostracods		
				Early						
Hiatus		150								
Jubaila			Kimmeridgian	Late		W. manivitae (A) W. barnesae (A)	Lenticulina-planktics	Juvenile ammonites, Micro gastropods, sparse planktonics, *Lenticulina* spp.	*Circulodinium* spp.	Sparse palynomorph recovery including *Batiacasphaera* spp. and *Systematophora* spp.
Hiatus				Early	NJT14?		Placopsilina-Textularia-Nubecularia	*Placopsilina* spp., *Textularia* sp.		*Cribroperidinium* spp.
Najmah Limestone		155					Globuligerina Oxfordiana G. bathoniana	*G. bathoniana* *G. oxfordiana*, influx of planktonics		*C. distinctum*, *E. polyplacph* *Circulodinium* spp.
Upper Najmah Shale			Oxfordian	Late	NJT13b	*L. hauffi*		*T. parvovesiculifera*		
		160		Middle		*C. deflandrei*		*Bositra* spp. (LSAO)		Interval of sparse recovery, rare sporomorphs
				Early	NJT13a		Bositra spp.-Globuligerina spp.	*Bositra* spp.	Indeterminate	
Lower Najmah Shale			Callovian	Late		*A. helvetica*				*Energlynia acollaris*
				Middle	NJT12			*G. calloviensis*		*D. sellwoodii*, *Dichadogonyaulax* / *Korystocysta* spp. (R)
Najmah-Sargelu Tr.		165		Early						
Sargelu Limestone			Bathonian	Late		*A. helvetica*	Globuligerina (calloviensis-bathoniana)	*C. dagestanica* *Alzonorbitopsella* spp. *G. calloviensis* *G. bathoniana*		
				Middle	NJT11	*C. magharensis*				
				Early		*W. barnesae*				*D. sellwoodii*, *Dichadogo* *Korystocysta* spp. (C/A)
Sargelu-Dhruma Tr.			Bajocian	Late	NJT10b		Nodosaria-Lenticulina spp.			
Dhruma				Middle	NJT10a	*C. superbus*		*Nodosaria* sp.	*Dichadogonyaulax* - *Korystocysta* spp.	*K. gochtii*
		170		Early	NJT9	*W. manivitae* *W. britannica* (r)		*Bositra* spp. (FSAO) *Lenticulina* sp.		
Marrat Upper Member			Aalenian	Late		*C. margerelii*				
				Middle						
				Early						
Marrat Middle Member		175	Toarcian	?						

FO: First occurrence LO: Last occurrence (A): Acme



13763.5 (13746 feet) Peloidal wackstone with *Globuligerina calloviensis*

Non-existing Tithonian taxa and Non-existing Tithonian outcrop

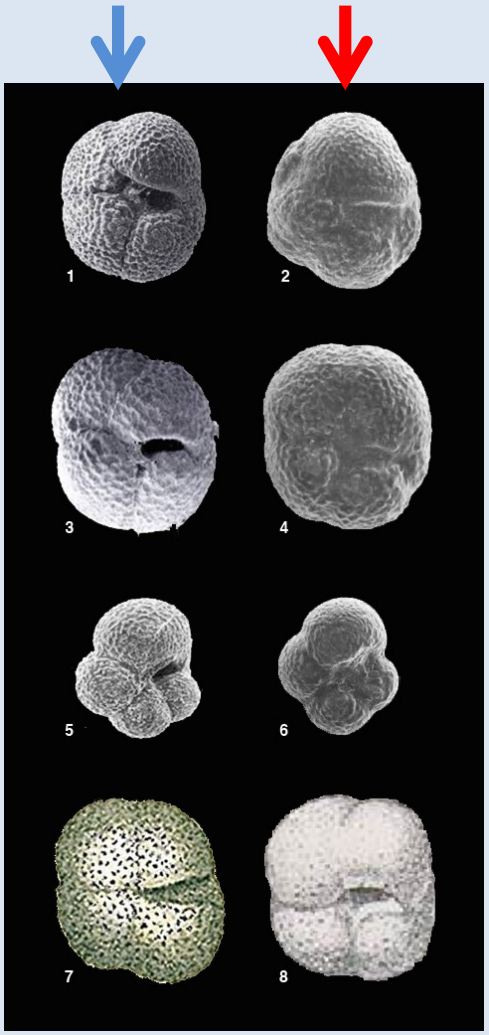
Tithonian ammonites bearing outcrop in northern Siberia with holotype of *Compactogenerina stellapolaris* (Grigelis) only contains Pleistocene *Neogloboquadrina pachyderma*.

Studying holo-and paratypes.

Ludmilla Kopaevich and Algimantas Grigelis

Galicia Bank ODP Site with Tithonian nannos and Jurassic Planktonic Forams = Miocene *Globigerina*

Tithonian outcrop in Hungary with Jurassic planktonic foraminifera: Outcrop does not exist !



All macroperforate !

CONCLUSIONS

Evolution of planktonic foraminifera from Bajocian through Tithonian, with 3 genera and 11 species was slow and modest. Spread along continental margins of Tethys –subTethys.

Industrial stratigraphic applications are promising, but limited sofar, unlike with mid-Cretaceous through Cenozoic planktonic foraminifera.

In mid Cretaceous the bugs invaded all oceans.

With thanks to my co-authors and strat advisers !

Anna Waskowska

Larisa Glinskikh

Andy Gale

David Watkins