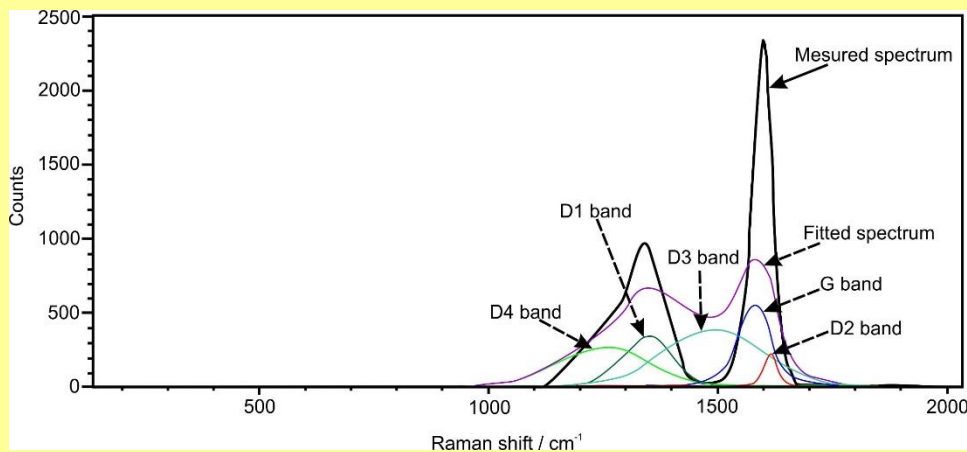


Thermal maturity of carbonaceous material from Mbuji-Mayi Supergroup (Kasaï, DRC).



■ Baludikay B.K.
Phd student
Storme J-Y.
Baudet D.
François C.
Javaux E.J.

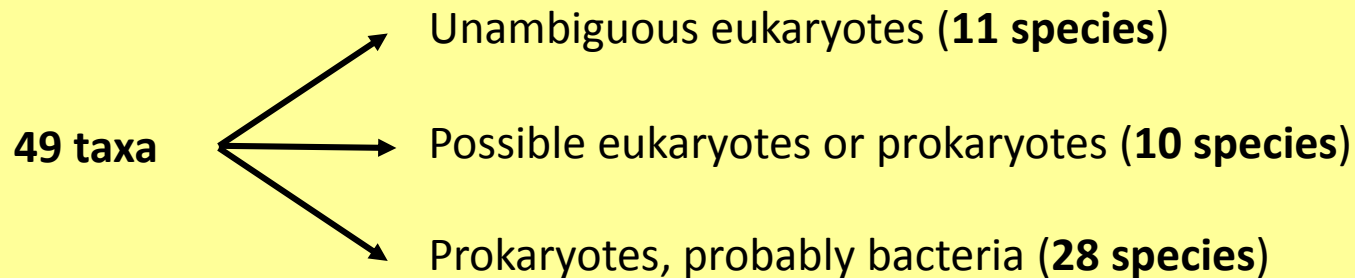
Research objectives

- To characterize the microfossil assemblage from Mbuji-Mayi Supergroup;
- To establish the biostratigraphy of Mbuji-Mayi Supergroup;
- To characterize the kerogen thermal maturity (**this talk**);
- To understand the paleoecology relative to redox conditions of paleoenvironments.



Summary of preliminary results

- To characterize the microfossil assemblage of Mbuji-Mayi Supergroup;
- To establish the biostratigraphy of Mbuji-Mayi Supergroup;



Baludikay et al. (in review)



Summary of preliminary results

**(1) Unambiguous eukaryotes
(11 species)**

Wall Ornamentation

Processes expanding from
wall surface

Recalcitrant composition

Large cell size



Summary of preliminary results

(1) Unambiguous eukaryotes
(All microfossils with a level
of morphological complexity,
11 species)

Wall Ornamentation

Processes expanding from
wall surface

Recalcitrant composition

Large cell size

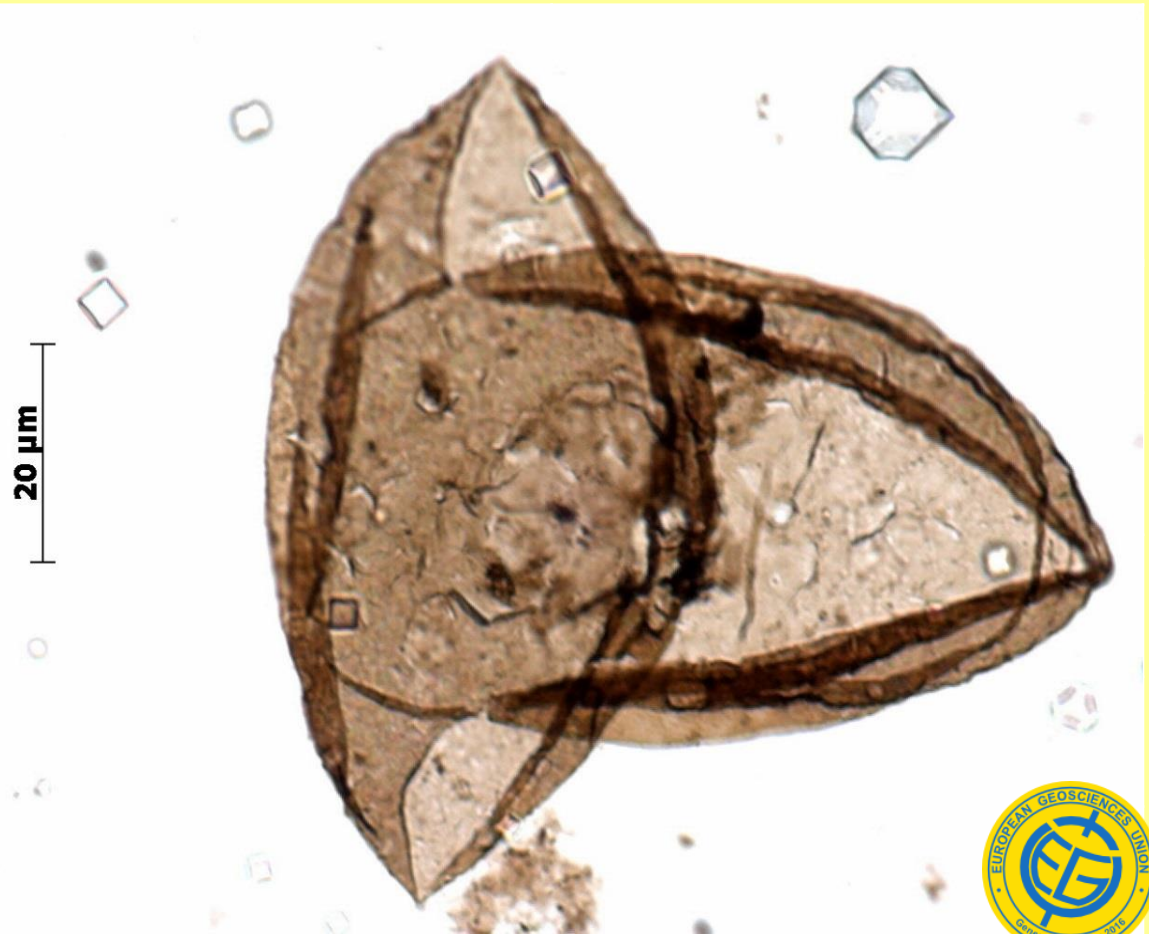


Summary of preliminary results

(2) Possible eukaryotes or prokaryotes : 10 species

Smooth-walled vesicles that do not preserve enough characters to place them unambiguously among eukaryotes and could as well be prokaryotic.

(Leiosphere with desenkystment structure)

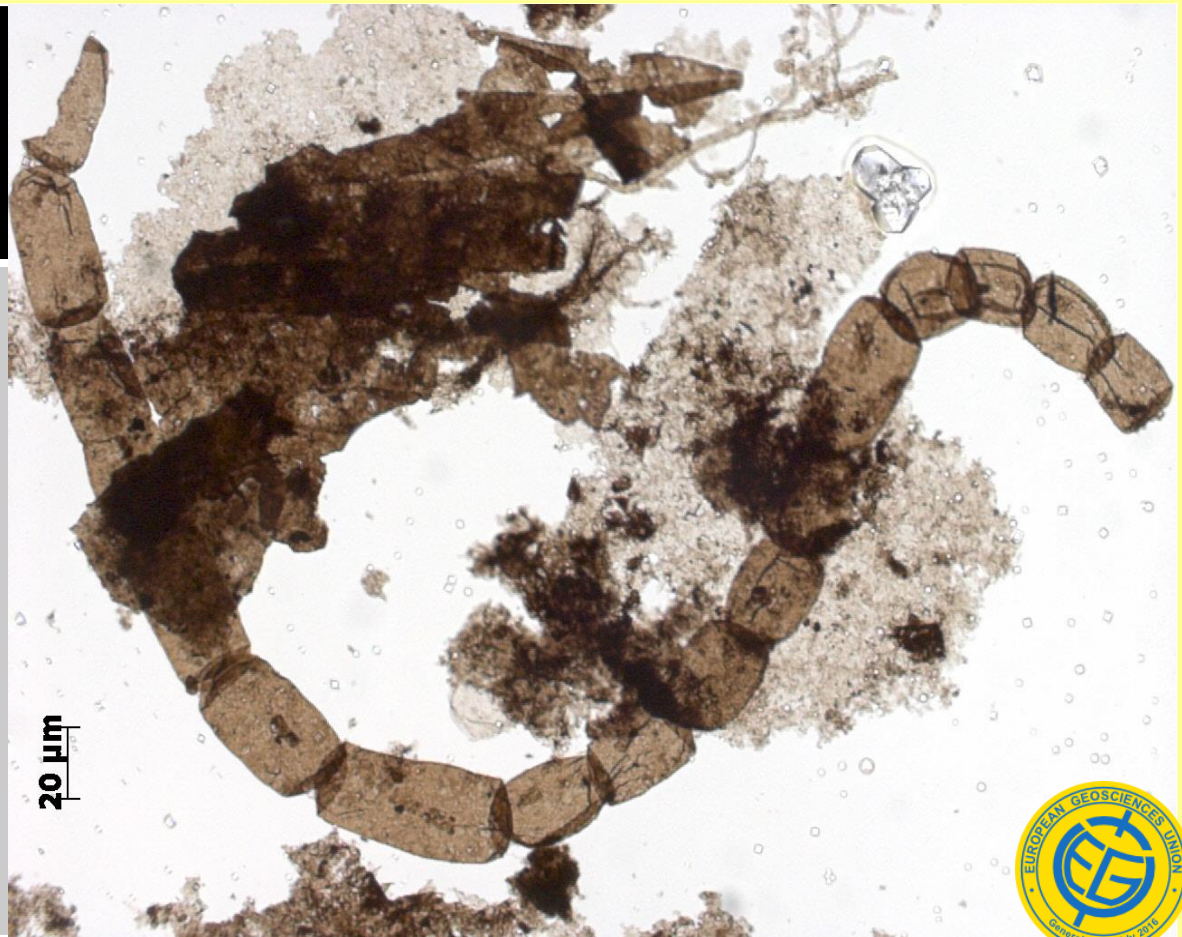


Summary of preliminary results

(2) Possible eukaryotes or prokaryotes : 10 species

Smooth-walled vesicles that do not preserve enough characters to place them unambiguously among eukaryotes and could as well be prokaryotic.

(Multicellular chain)



Summary of preliminary results

(3) Prokaryotes, probably bacteria : 28 species

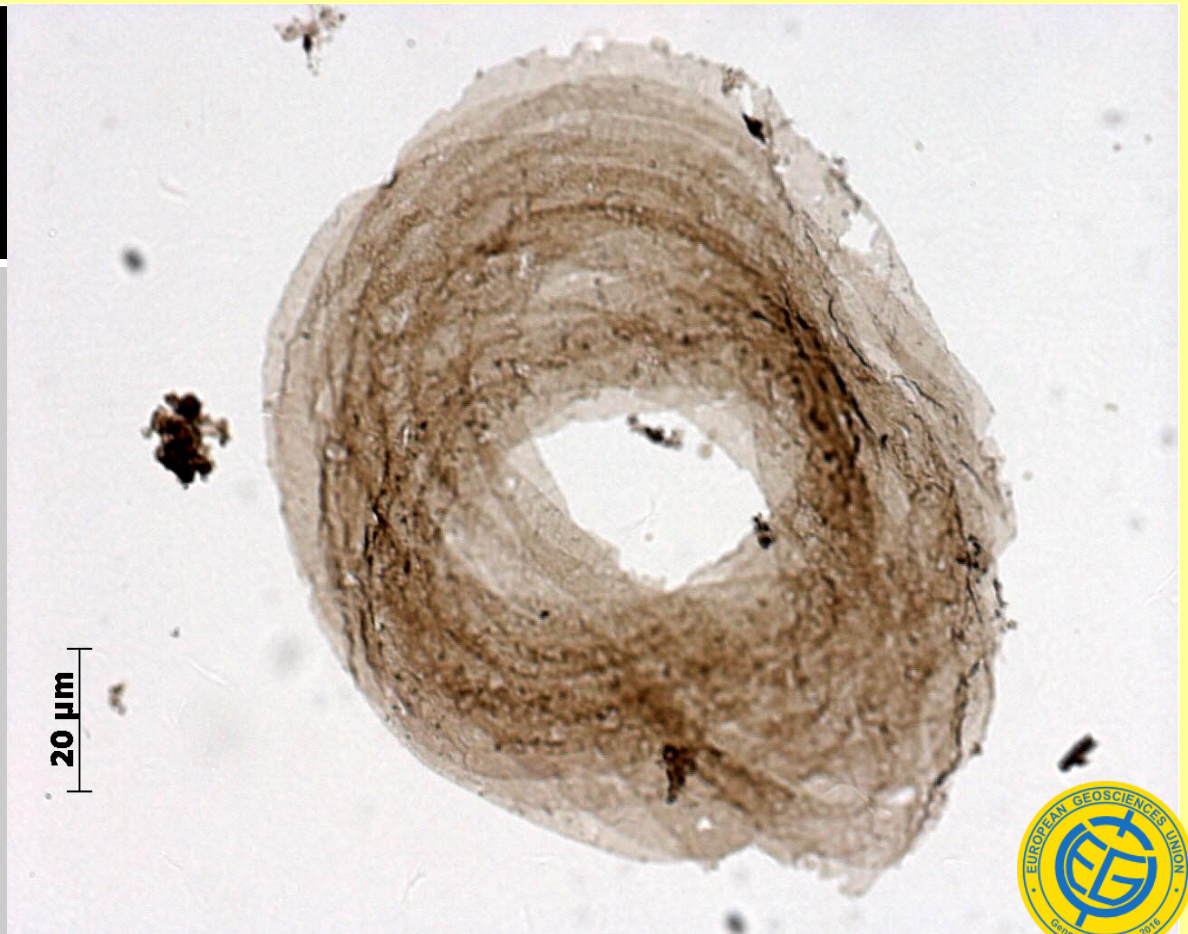
Microfossils with simple organization and occurring in **filamentous colonial aggregates**, or filamentous and coccoidal forms.



Summary of preliminary results

(3) Prokaryotes, probably bacteria : 28 species

Microfossils with simple organization and occurring in filamentous colonial aggregates, or **filamentous** and coccoidal forms.



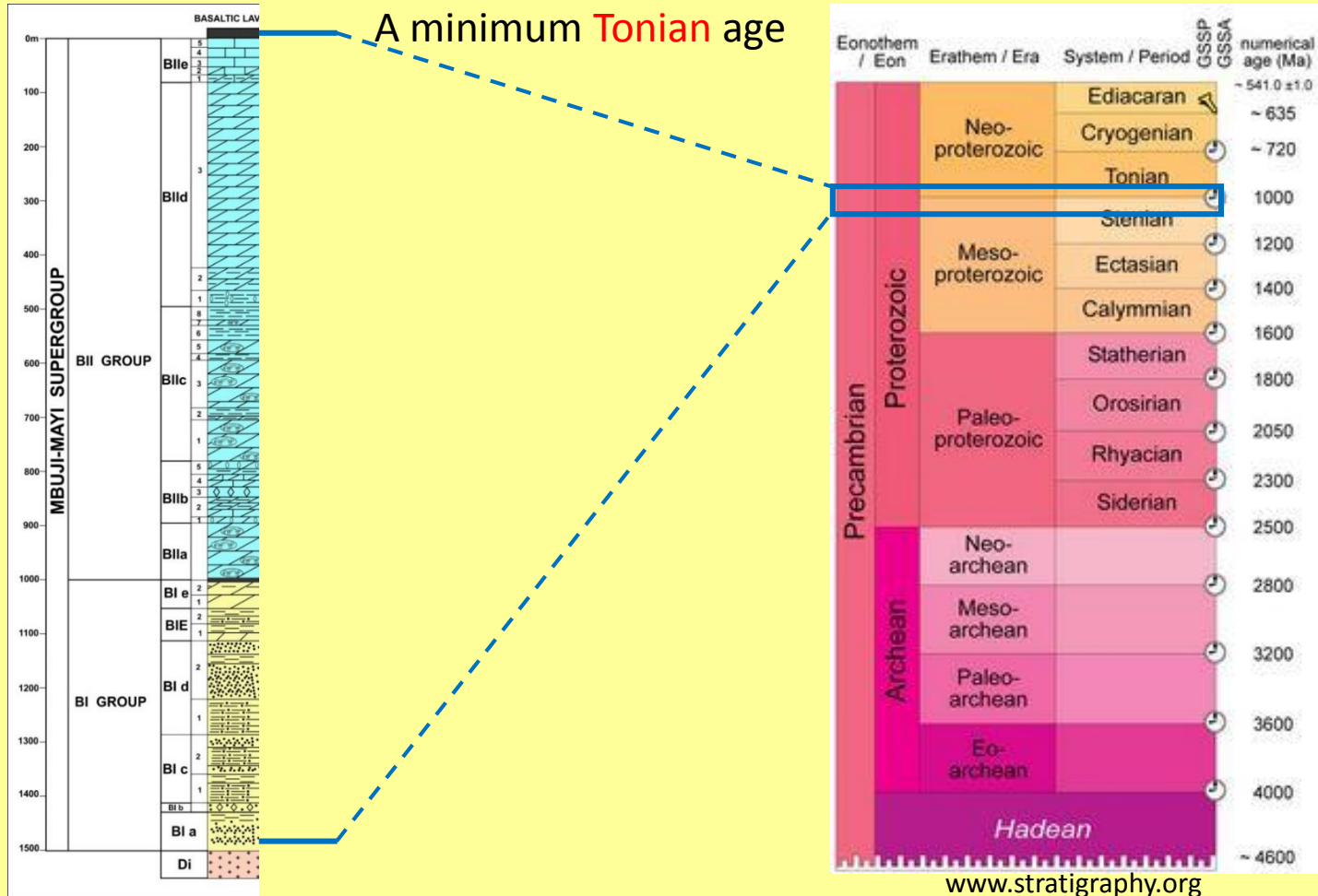
Summary of preliminary results

(3) Prokaryotes, probably bacteria : 28 species

Microfossils with simple organization and occurring in filamentous colonial aggregates, or filamentous and **cocoidal forms**.

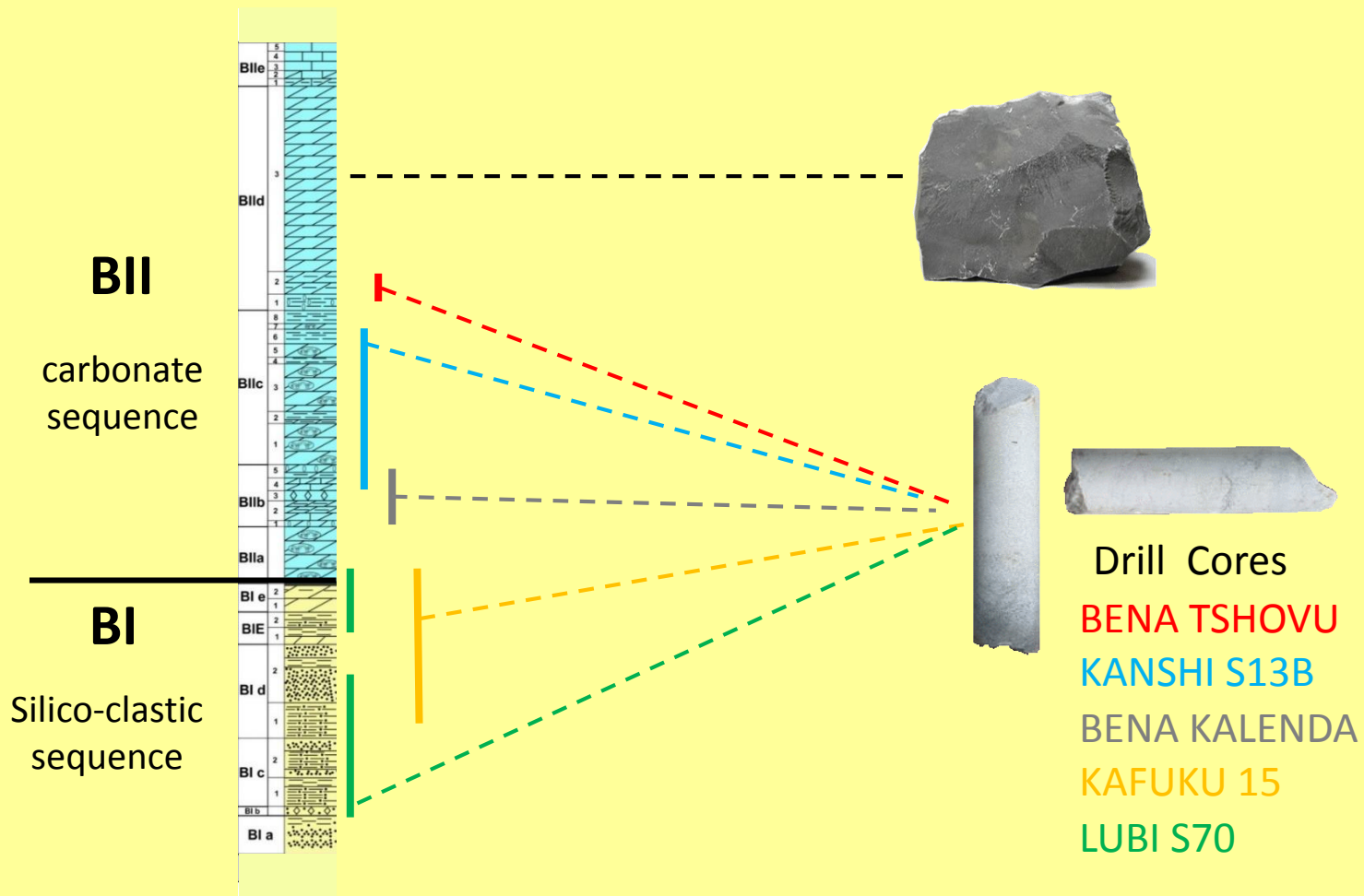


Summary of preliminary results



Kerogen thermal maturity

Sample were taken on drill cores (39) and field specimen (1)

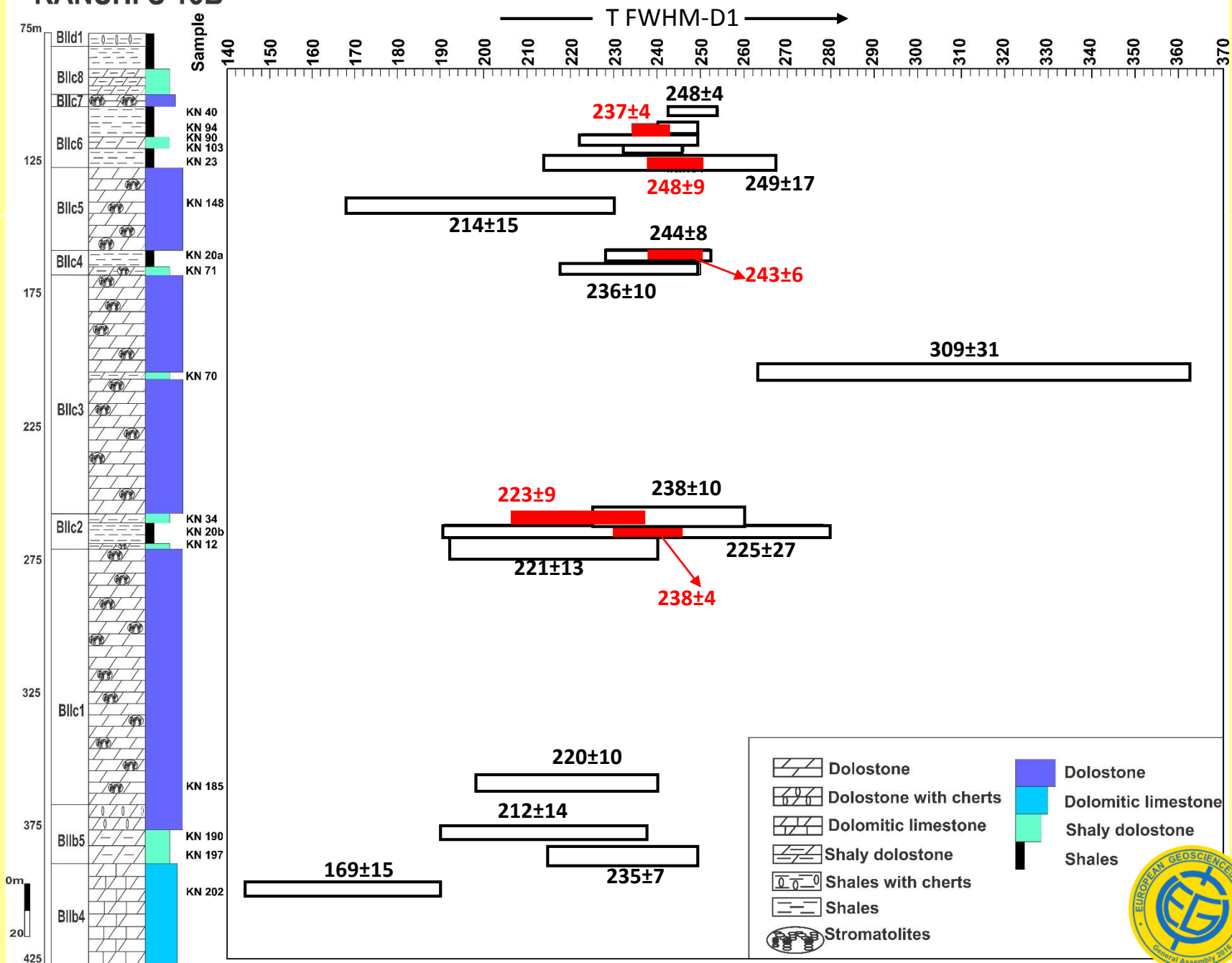


RAMAN GEOTHERMOMETERS

BEYSSAC 300-650°C	RAHL 100-700°C	LAHFID 180-340°C	LAHFID 180-340°C	KOUKETSU 150-400°C	KOUKETSU 150-400°C	Sample	Location
T_{R2}	T_{R1R2}	T_{RA1}	T_{RA2}	T FWHMD1	T FWHMD2		
451±11	422±11	25±27	86±13	216±9	277±32	WP157	Field specimen
432±40	430±42	-10±51	70±22	198±16	254±31	BT 24	Bena Tshovu
460±16	429±26	57±43	103±22	249±17	391±88	KN 23	Kanshi S13B
484±14	503±20	-8±20	71±12	190±11	226±14	BK 96	Bena Kalenda
429±5	412±10	103±11	128±7	268±2	334±20	KA 19	Kafuku 15
443±15	399±22	75±36	113±20	226±14	-332±715	LU 186	Lubi S70

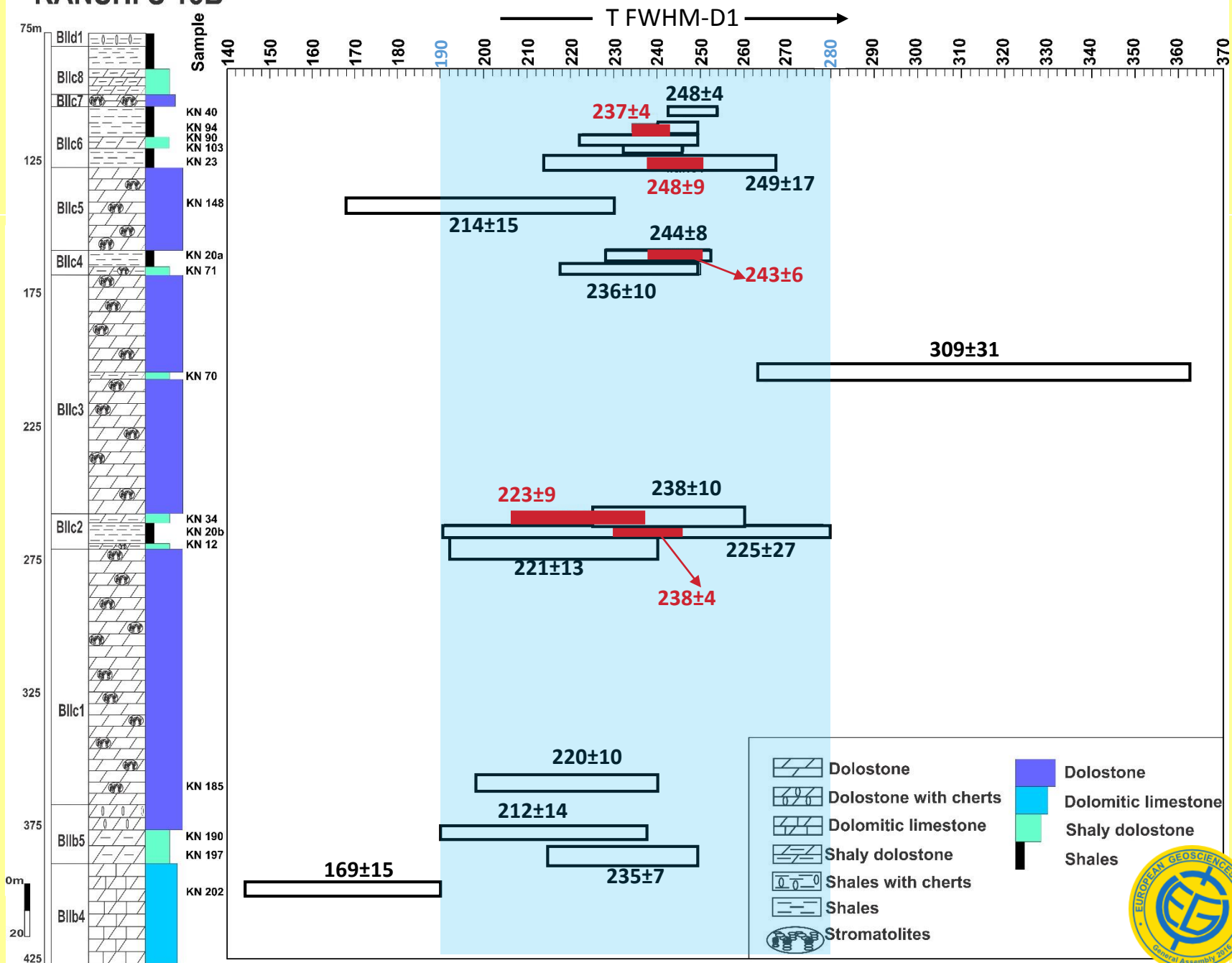
KANSHI S 13B

CM TEMPERATURES FROM AOM + FOSSILS (°C)



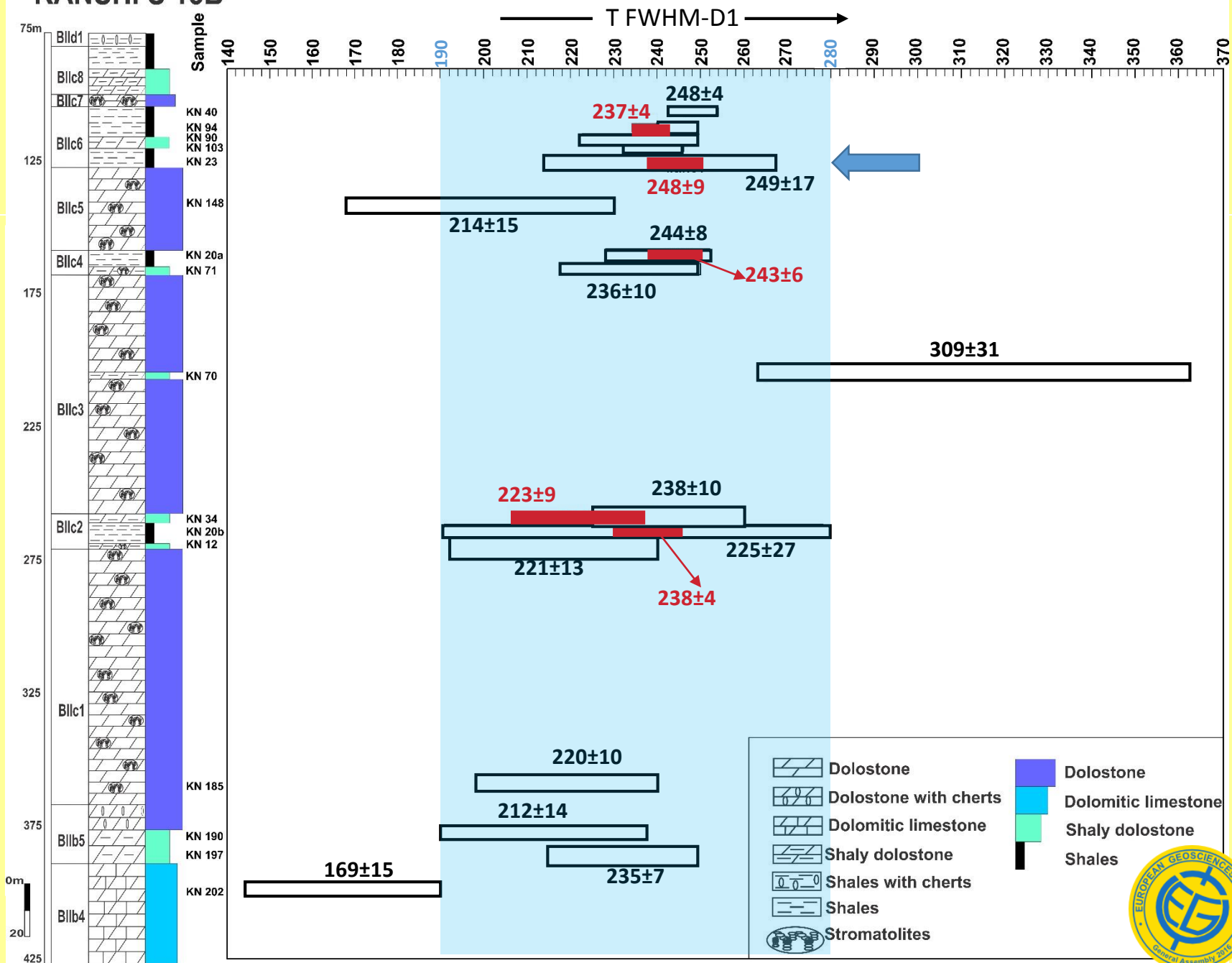
KANSHI S 13B

CM TEMPERATURES FROM AOM + FOSSILS (°C)



KANSHI S 13B

CM TEMPERATURES FROM AOM + FOSSILS (°C)



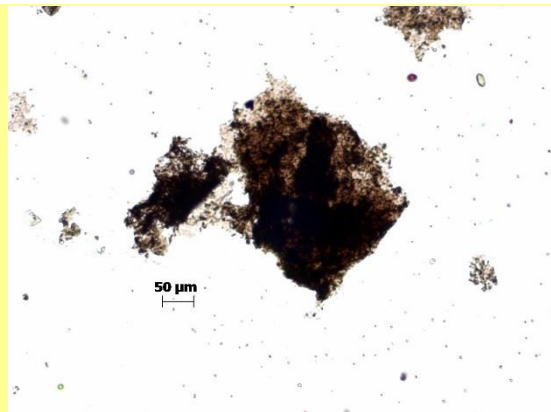
All microfossils show similar thermal maturity

KN23

AOM

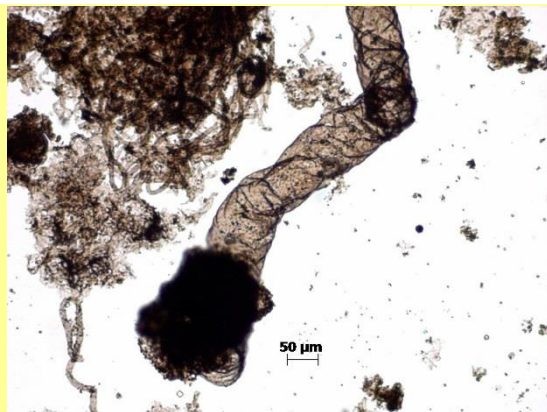
Jacutianema

Arct. tetragonala



Min.= 213.8 °C/ Max.= 265.8°C
Average= **246.1 ± 18.5°C**

L. minutissima



Min.= 240.2°C/ Max.= 255.2°C
Average= **248.4 ± 4.1°C**

L. ternata

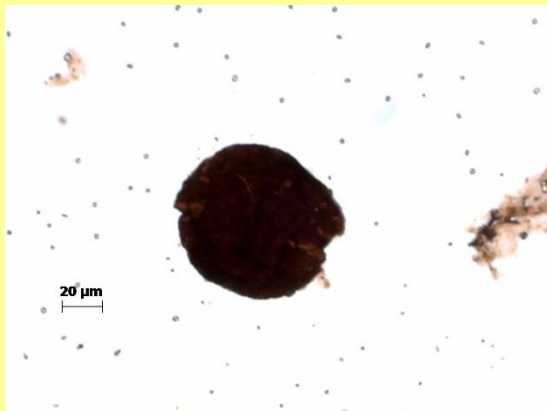


Min.= 227.4°C/ Max.= 256.3°C
Average= **242.7 ± 10.9°C**

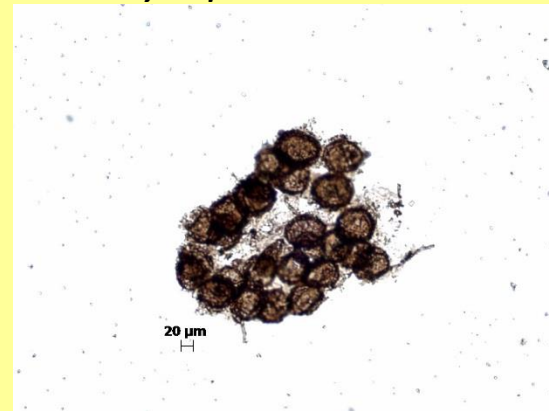
Synsphaeridium



Min.= 241.9°C/ Max.= 258.5°C
Average= **249.7 ± 4.5°C**



Min.= 202.2°C/ Max.= 264.8°C
Average= **241.1 ± 18.9°C**



Min.= 227.4°C/ Max.= 256.3°C
Average= **242.7 ± 10.9°C**

Potential of hydrocarbon generation

$$R_{mcRo}\% = 0.0537 d(G-D) - 11.21 (\equiv vRo\%)$$

Geochemistry

April 2013 Vol.58 No.11: 1285–1298

doi: 10.1007/s11434-012-5535-y

Sample maturation calculated using Raman spectroscopic parameters for solid organics: Methodology and geological applications

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Potential of hydrocarbon generation

	T°C	RmcRo%	Hc. generation
BIIId	176 - 228	1.62 – 1.75	
BIIC	168 - 309	1.03 – 2.82	
BIIB	144 - 210	0.63 - 1.32	Probable Oil window
BIIA			
BIe	172 - 250	0.62 - 2.61	
BIId	163 - 217	0.80 - 1.65	
BIc	222 - 259	1.60 - 2.01	
BIb			

Conclusions & Futur work

- Carbonaceous material from Mbuji-Mayi Supergroup are bracketed into low-grade metamorphism;
- Kouketsu geothermometers are not affected by different biological composition of organic-walled from microfossils;
- Color is not a reliable tool to estimate the kerogen thermal alteration;
- CM are likely into a maturation stage liable to generate hydrocarbon.
- Compare T° from extracted CM with those from polished thin section;



Acknowledgments

Financial supports:



Thank you for your attention

