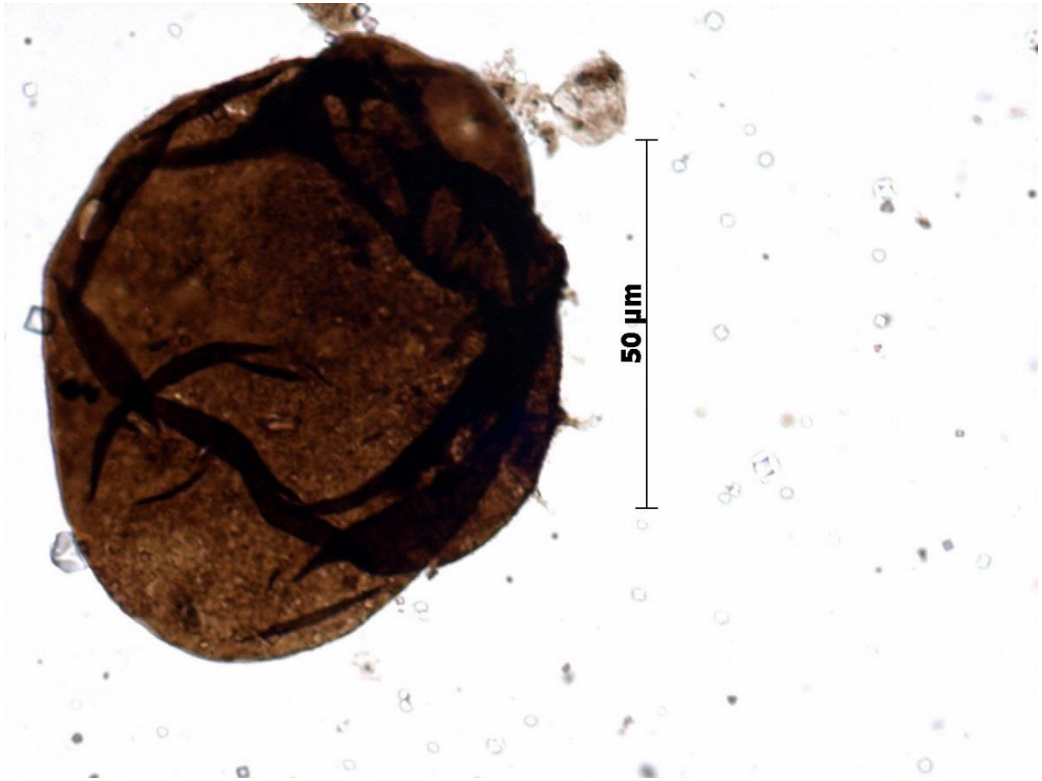
Organic-walled microfossil assemblage and Chemostratigraphy of the Mbuji-Mayi Supergroup (Democratic Republic of Congo): Evidence for a Late Mesoproterozoic–Early Neoproterozoic age.



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5th International Geologica Belgica Meeting
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Mother Earth
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MUSÉE ROYAL DE L'AFRIQUE CENTRALE

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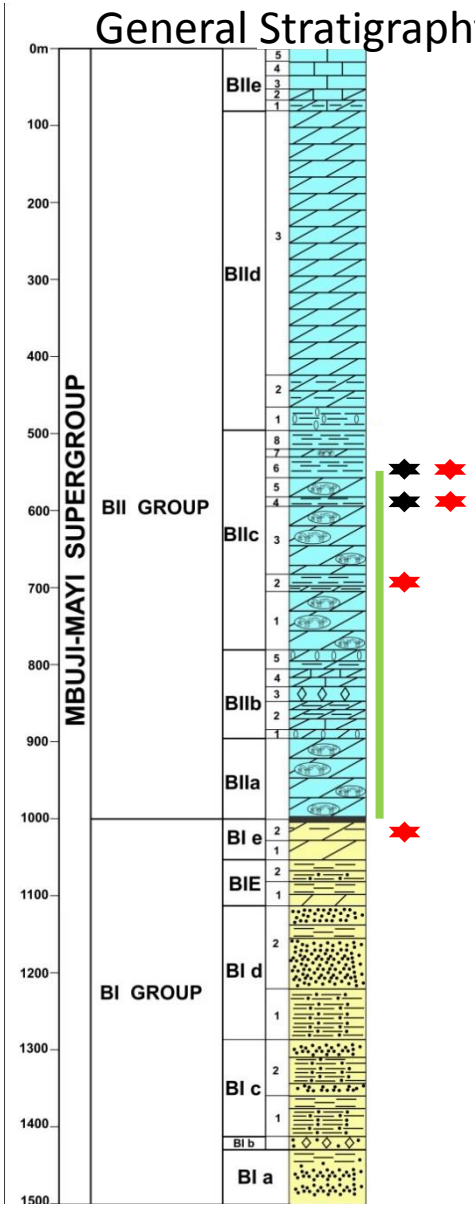
Research objectives

- To characterise the microfossil assemblage of Mbuji-Mayi Supergroup;
- To establish the biostratigraphy of Mbuji-Mayi Supergroup;
- To understand the paleoecology relative to redox conditions of paleoenvironments;
- To characterize the kerogen thermal maturity .

Previous studies

General Stratigraphy



Bertrand-Sarfati, 1972 → Stromatolites

Maithy, 1975 → 41 taxa
Baudet, 1987 → 34 taxa

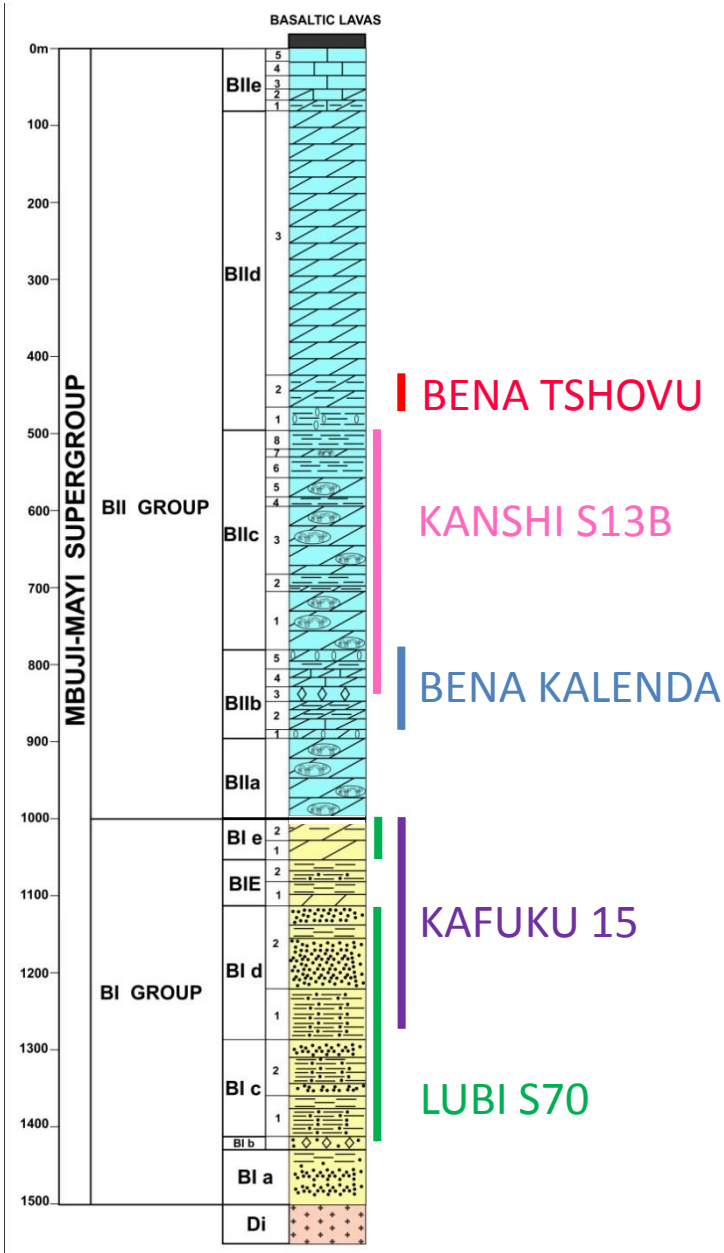
] Organic-walled microfossils

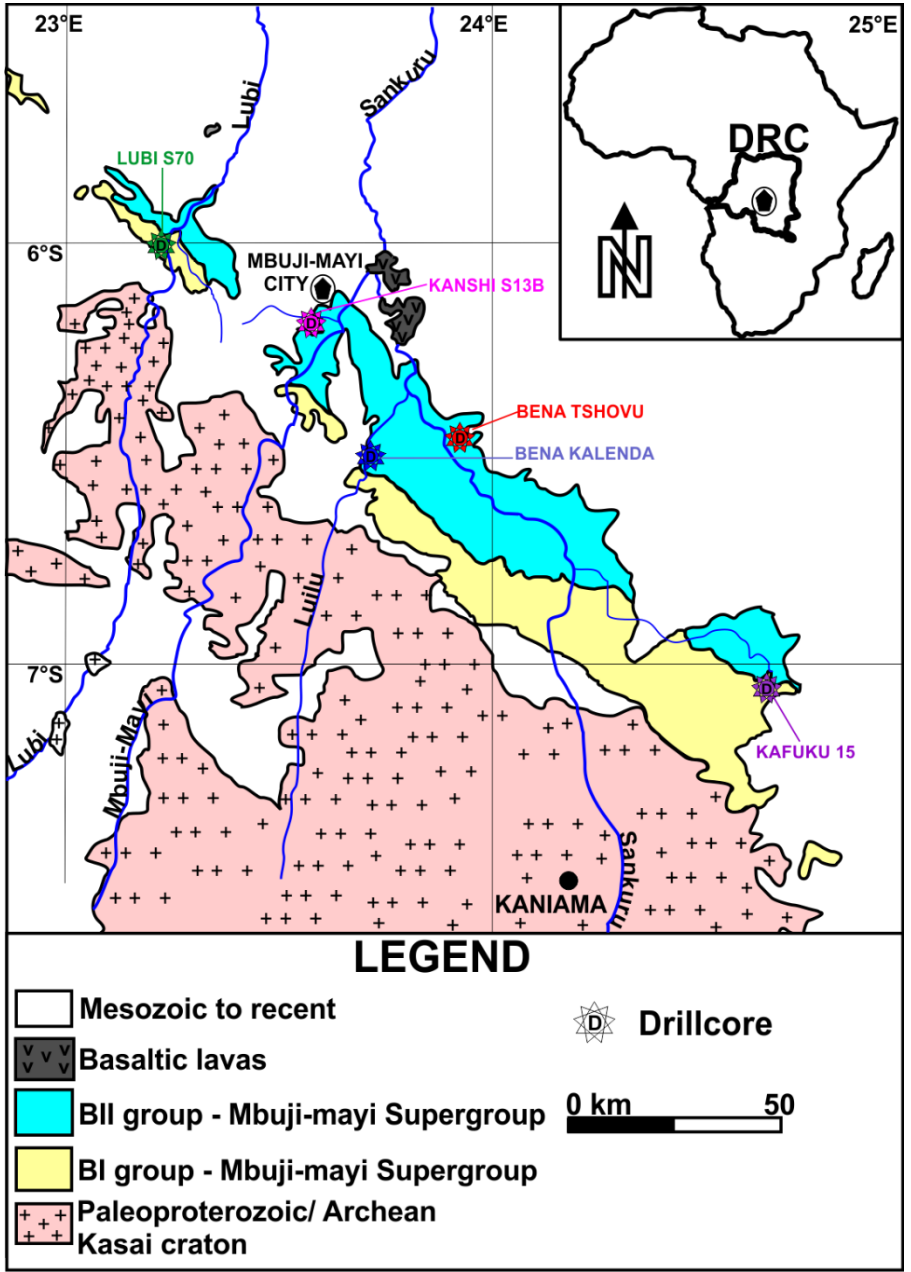
Following our taxonomic revision, *Baludikay et al. (in review)*:
22 taxa (Maithy) and
8 taxa (Baudet)

Carbonate sequence

Silico-clastic sequence

Five drill cores were sampled for this study.

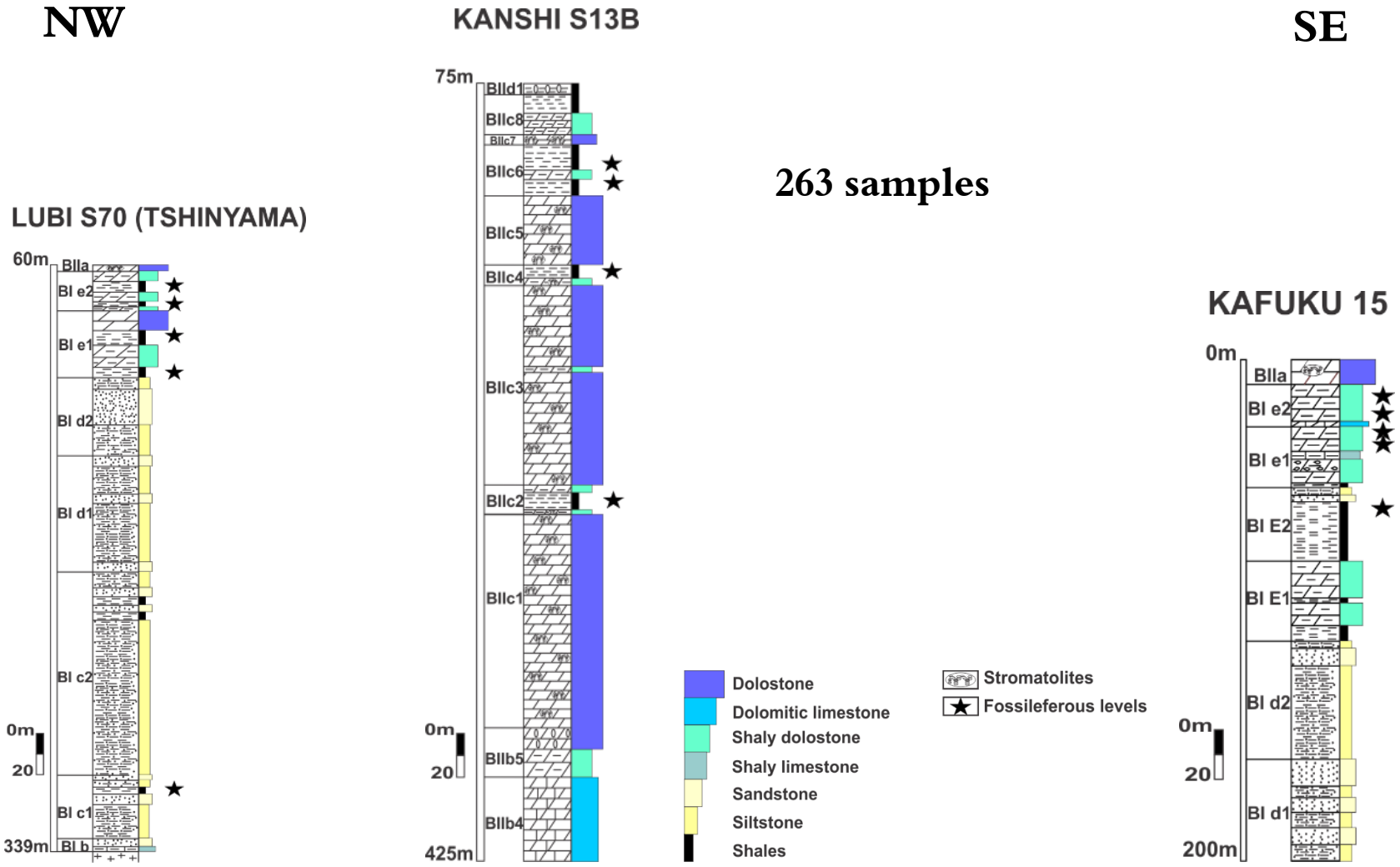




Only three drill cores contain microfossils.

NW

SE



52 taxa belonging to 31 genera were identified.

(1) Wall structure and surface ornamentation;

(2) Processes that extend from vesicle walls;

(3) Excystment structures (openings through which cysts liberate their cellular contents);

(4) Wall ultrastructure (trilaminar structure) and

(5) Wall chemistry.

52 taxa belonging to 31 genera were identified.

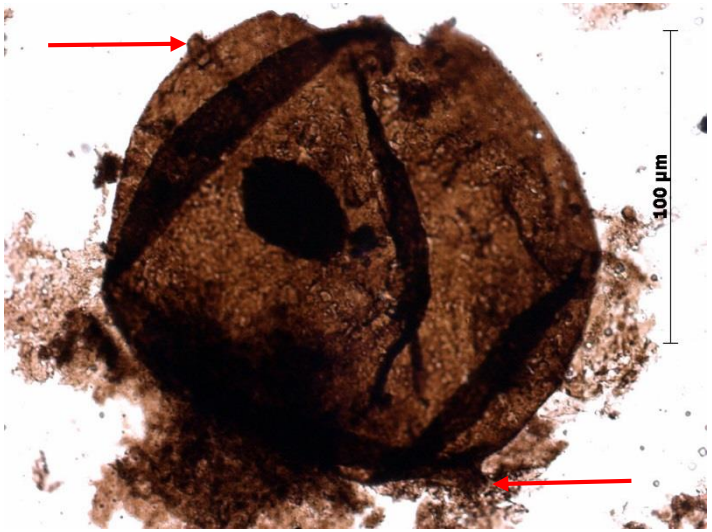
(10) Unambiguous eukaryotes

(13) Possible eukaryotes

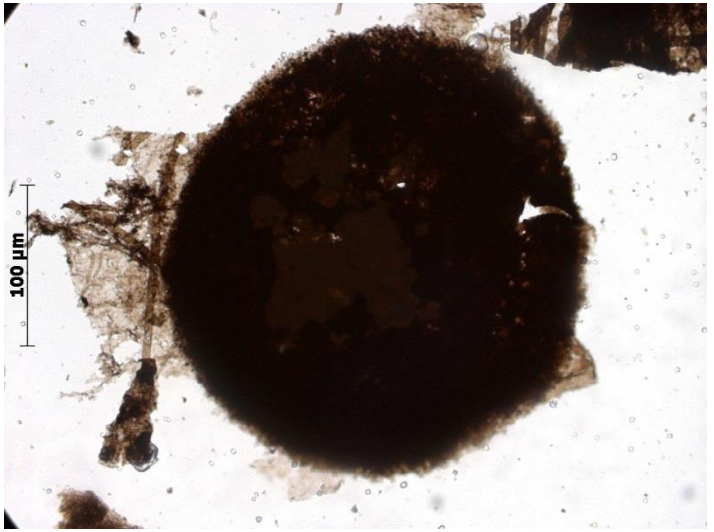
(29) Prokaryotes, probably bacteria.

52 taxa belonging to 31 genera were identified.

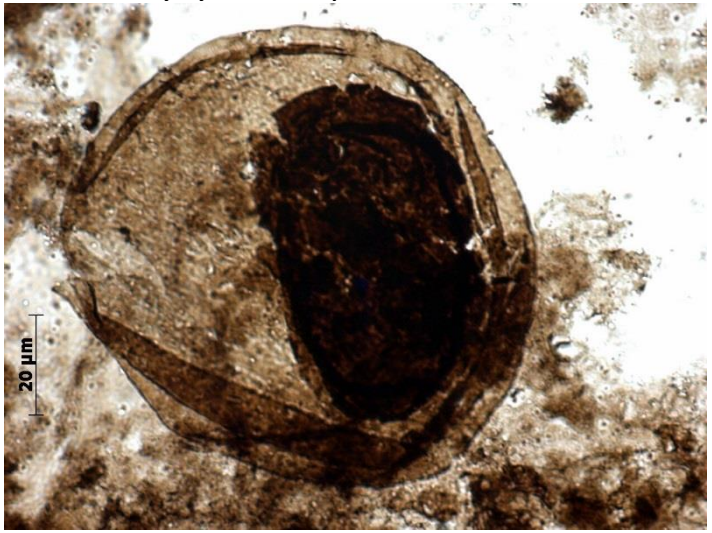
Unambiguous eukaryotes



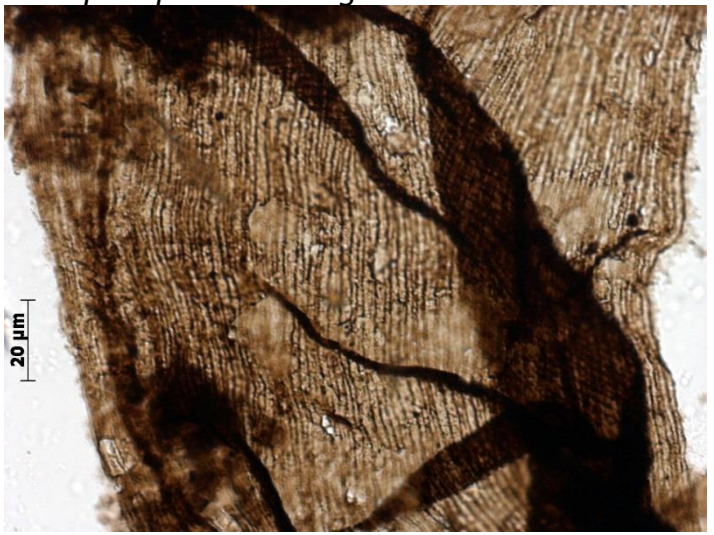
Trachyhystrichosphaera aimika



Lophosphaeridium granulatum



Pterospermopsimorpha pileiformis

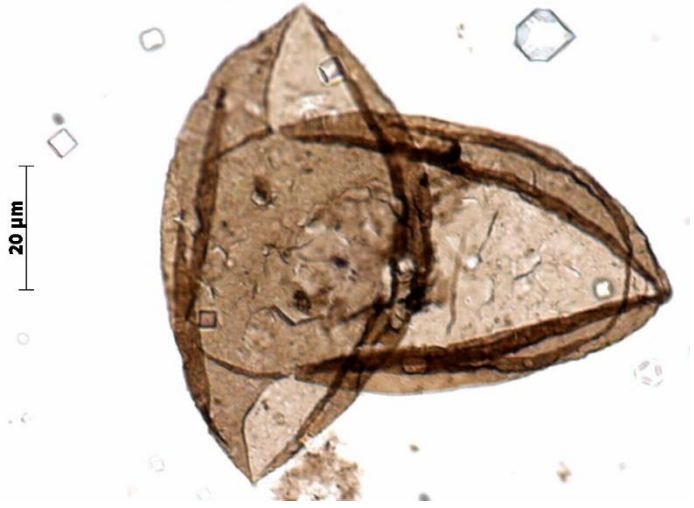


Valeria elongata

52 taxa belonging to 31 genera were identified.

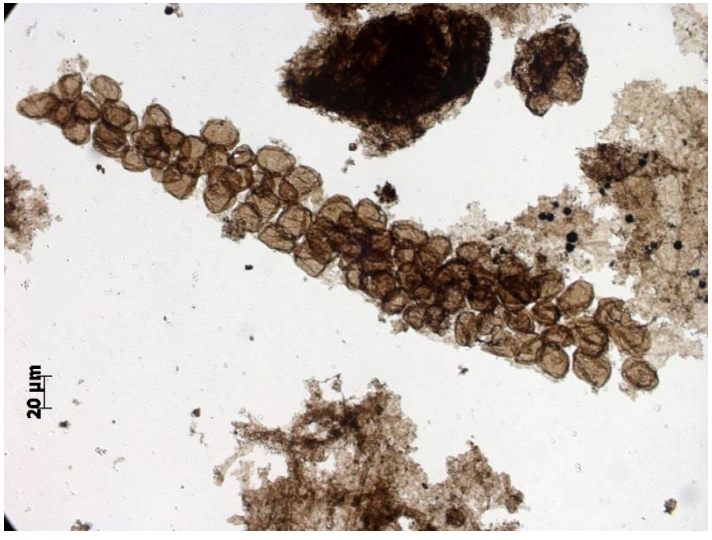
Possible eukaryotes

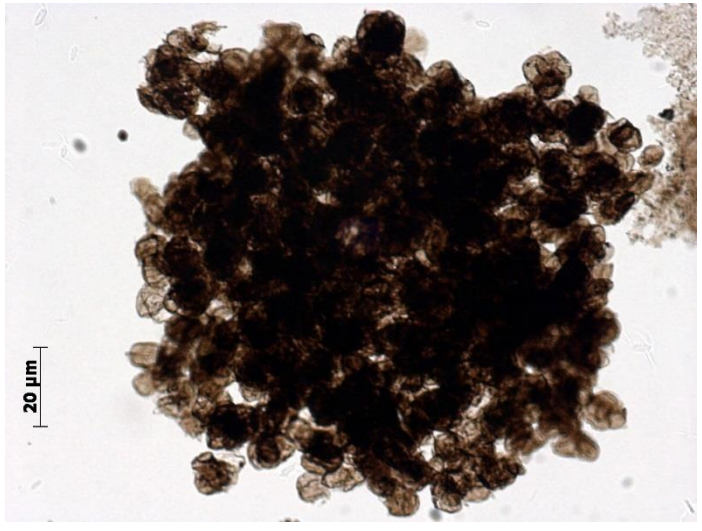
Leiosphaeridia crassa



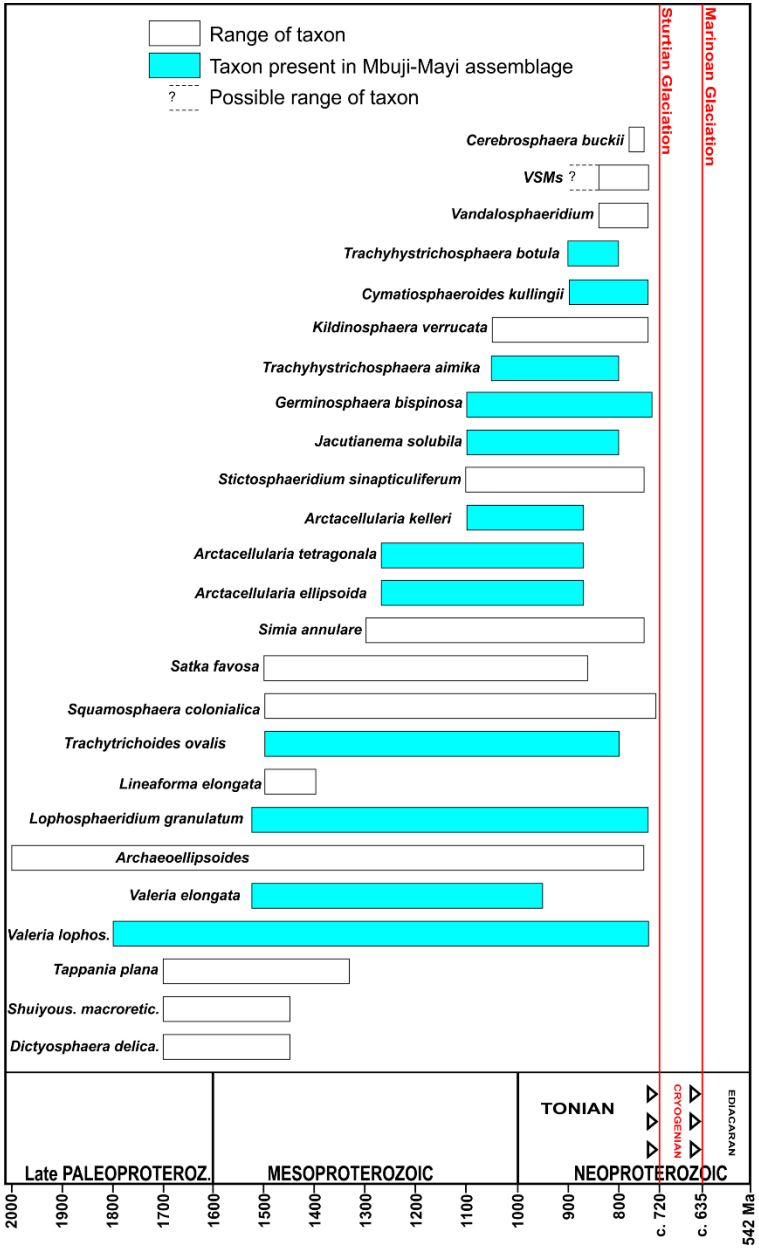
Arctacellularia tetragonala

Prokaryotes, probably bacteria





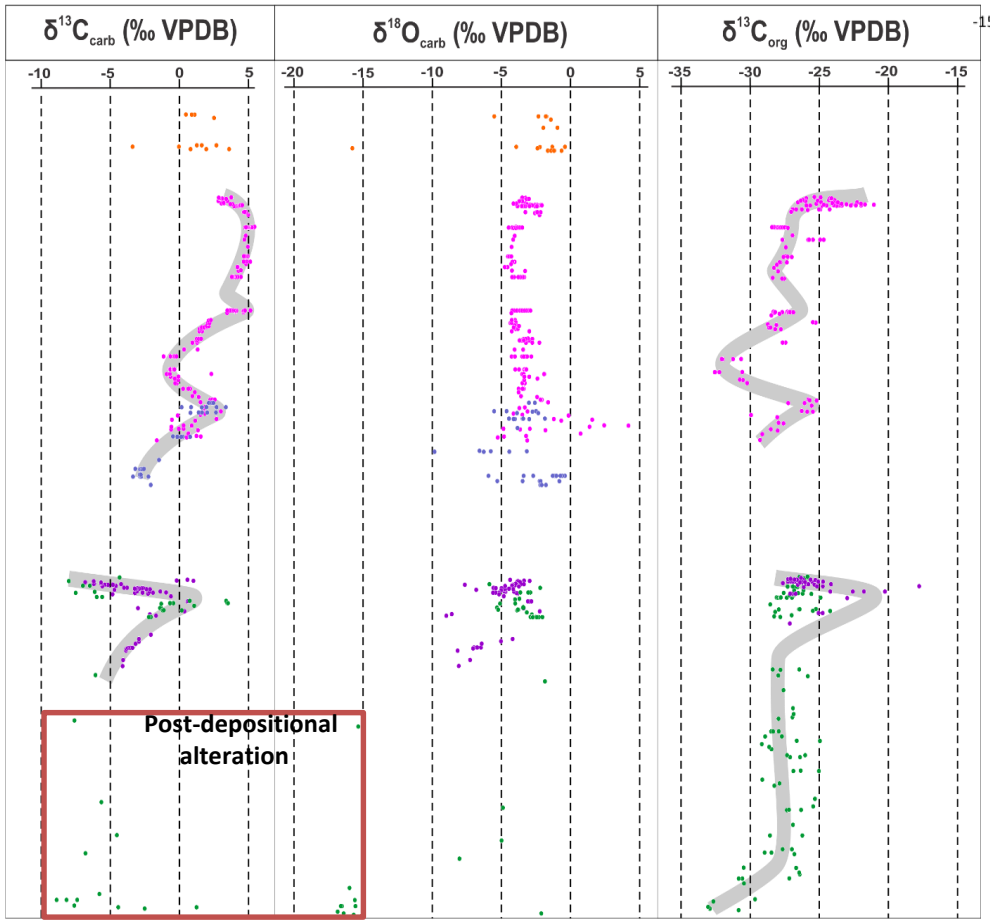
Mbuji-Mayi microfossil assemblage is broadly constrained in the latest Mesoproterozoic to early Neoproterozoic (Tonian).



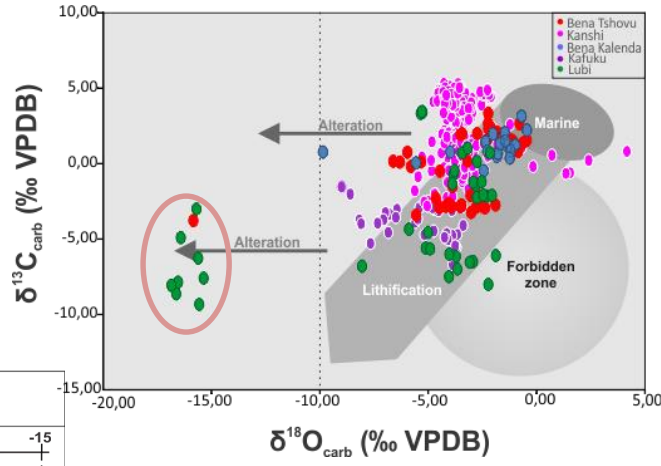
Baludikay et al. (in review)

Chemostratigraphy tools.

332 samples



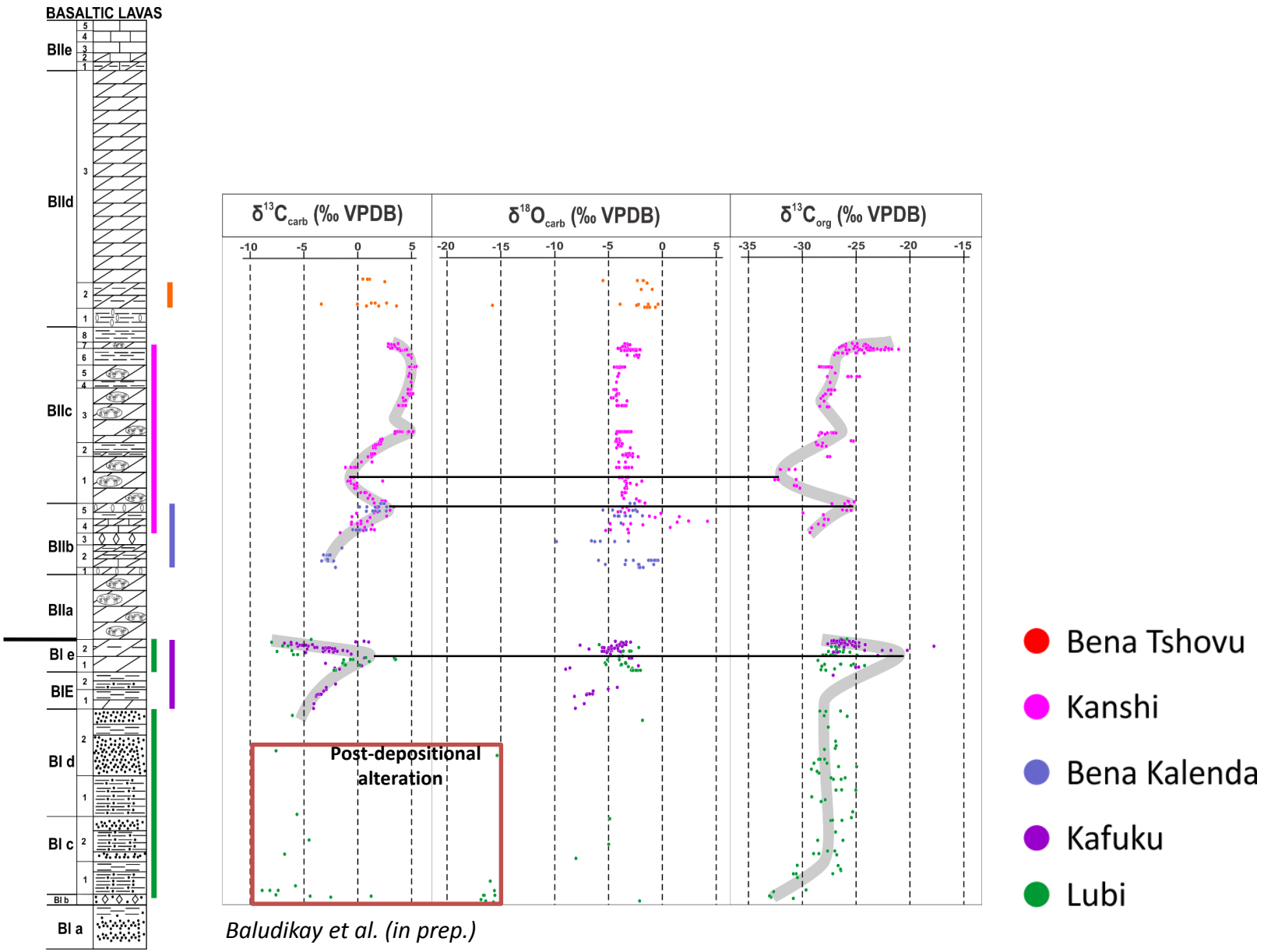
Baludikay et al. (in prep.)



Modified from Knauth et al., 2009

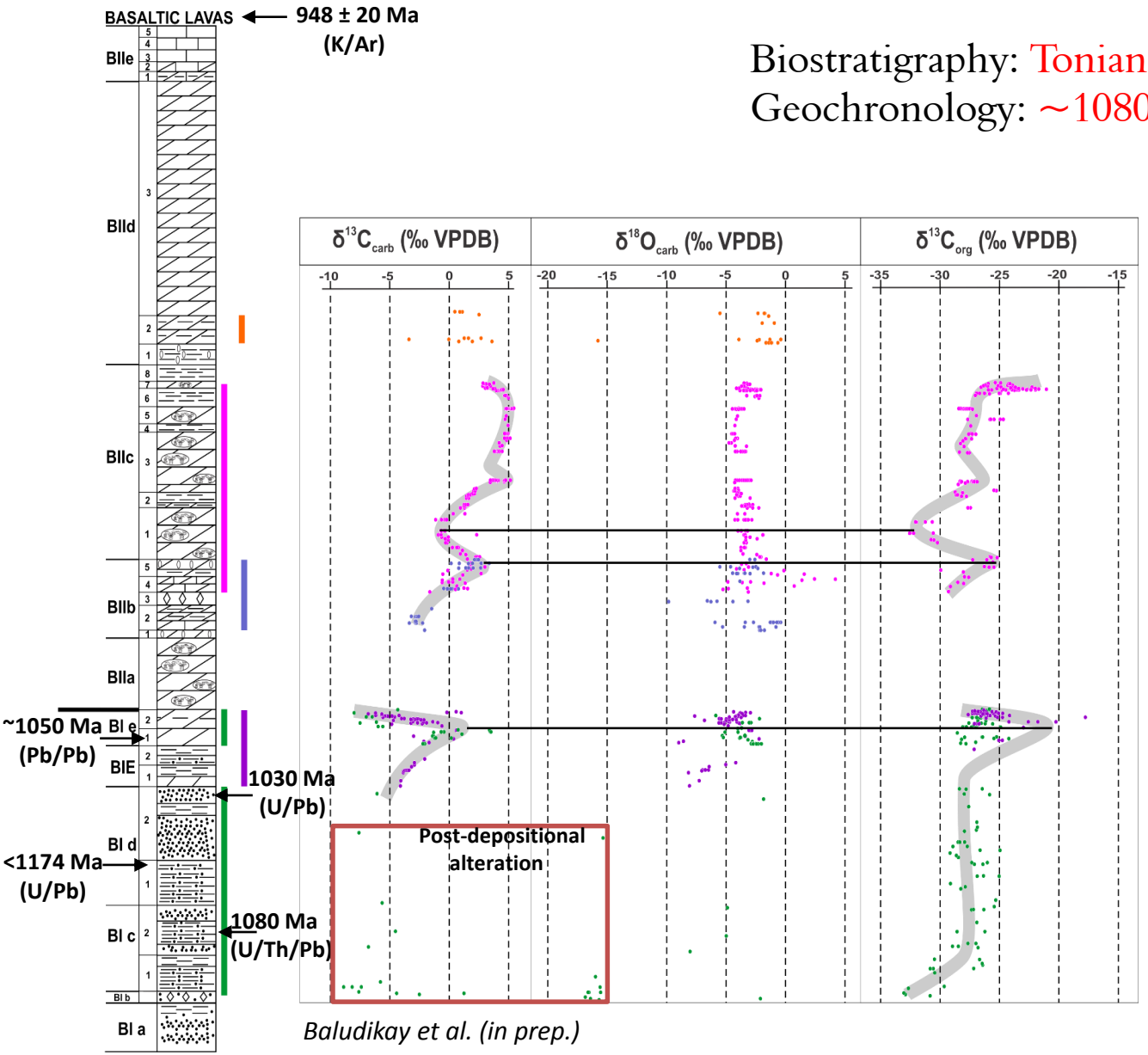
- Bena Tshovu
- Kanshi
- Bena Kalenda
- Kafuku
- Lubi

Chemostratigraphy tools.



Baludikay et al. (in prep.)

Chemostratigraphy tools.

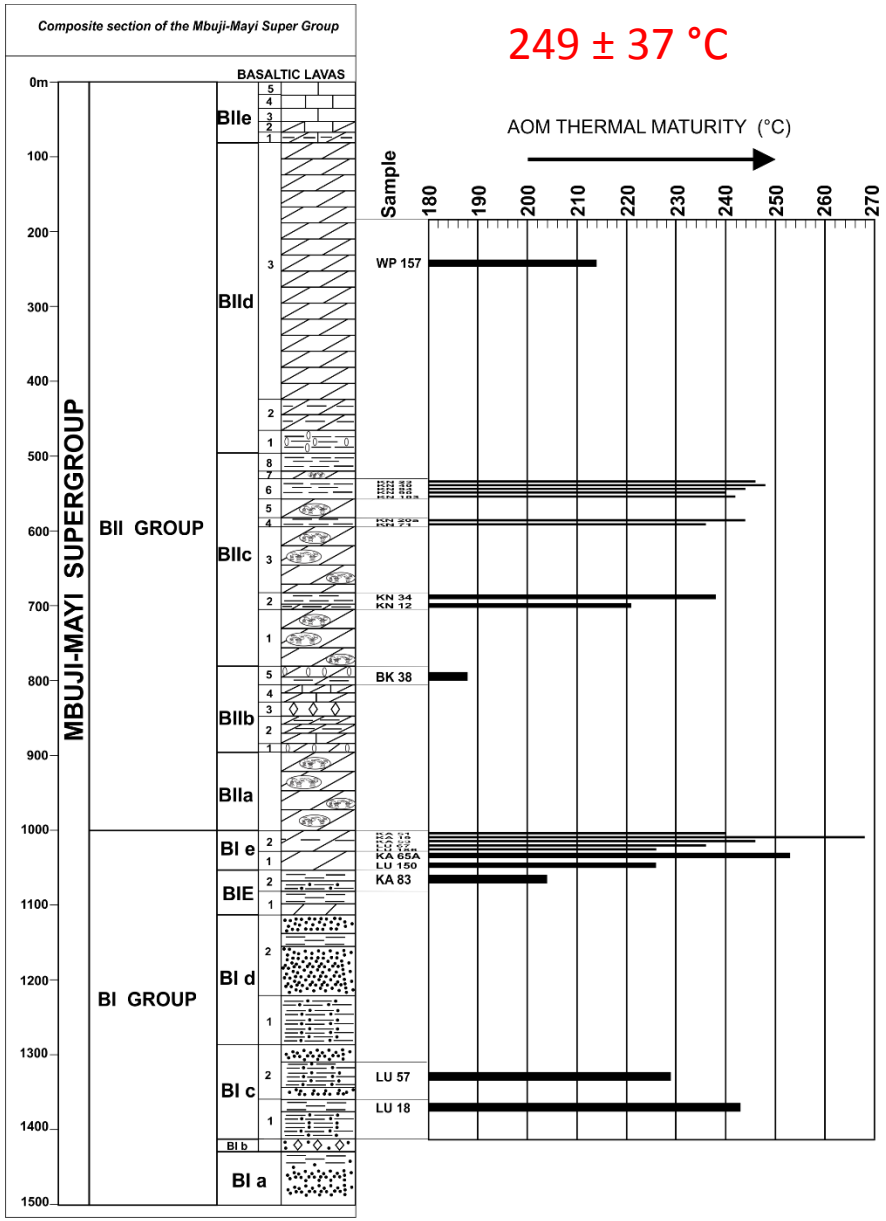


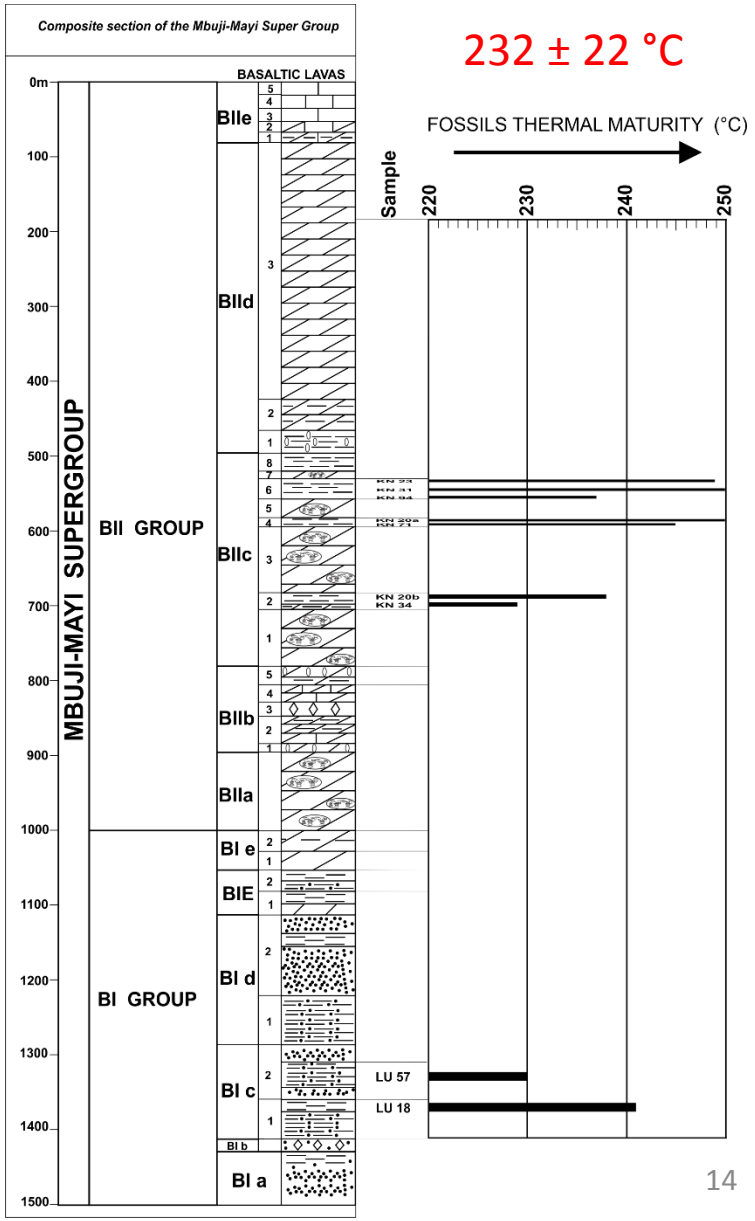
Biostratigraphy: Tonian minimum age
Geochronology: ~1080–948 Ma

- Bena Tshovu
- Kanshi
- Bena Kalenda
- Kafuku
- Lubi

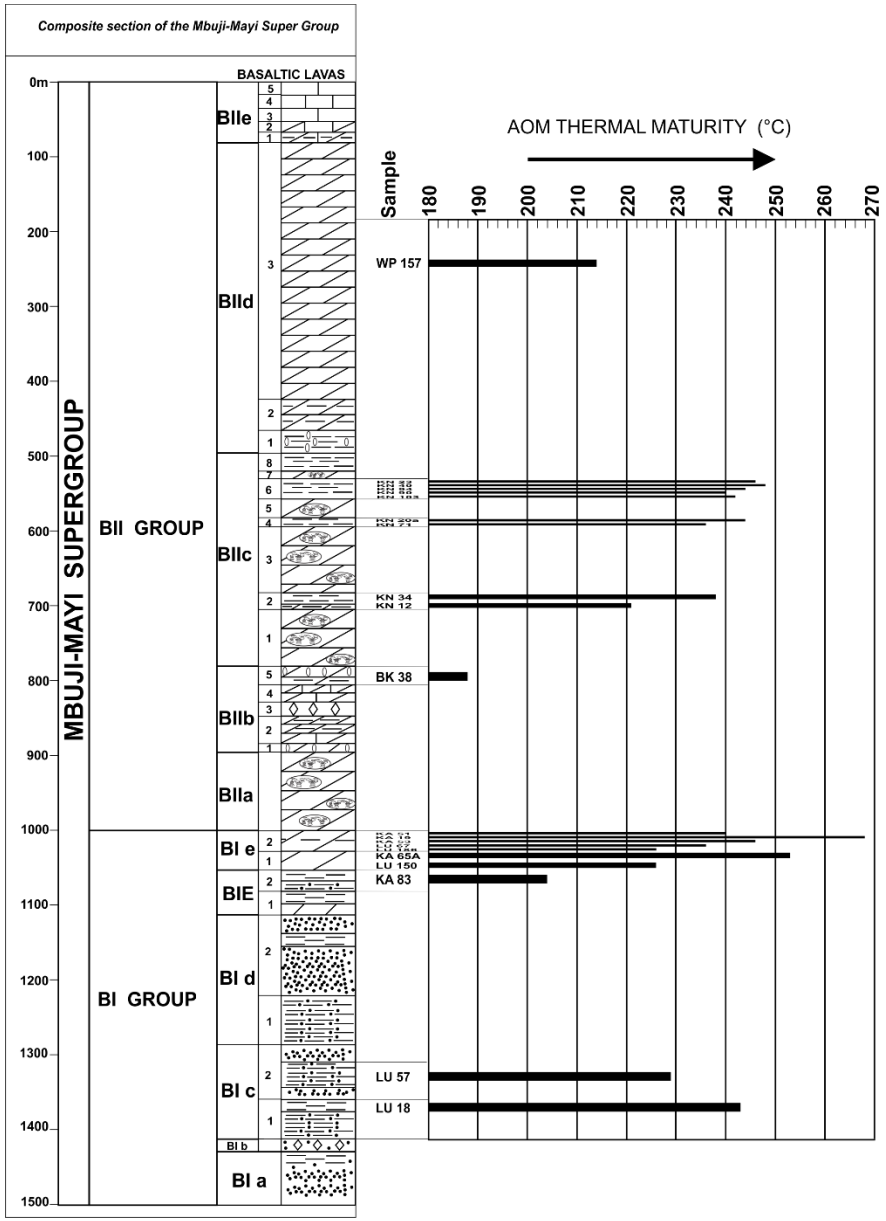
Baludikay et al. (in prep.)

Kerogen thermal maturity using Raman spectroscopic parameters.

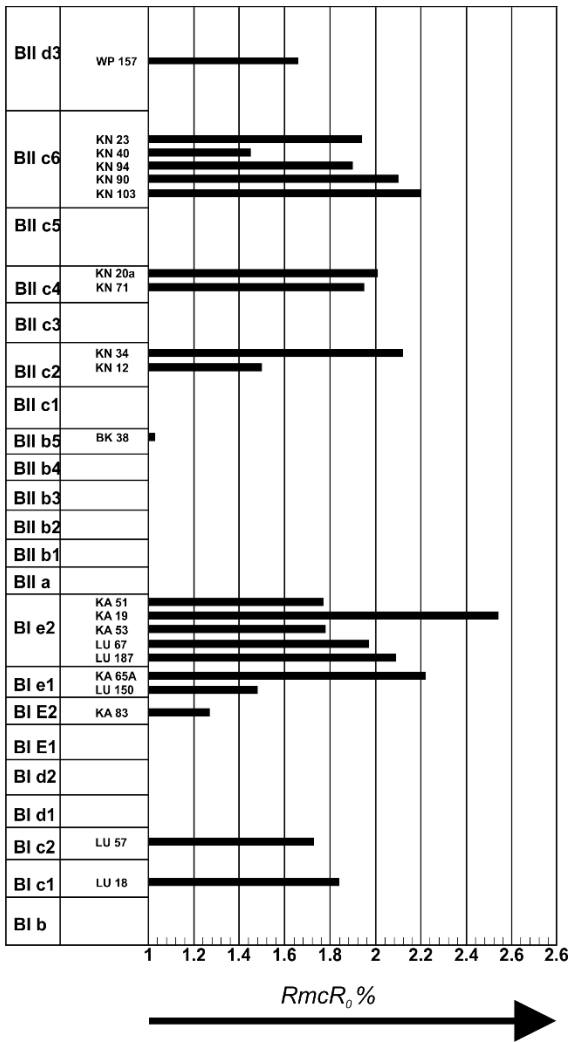




Kerogen thermal maturity using Raman spectroscopic parameters.



2.01 ± 0.42 %



Conclusions

- Mbuji-Mayi assemblage is more diverse (52 taxa) than previously reported, and likely Late Mesoproterozoic–Early Neoproterozoic in age;
- This biostratigraphic constraint is consistent with available geochronological data ;
- The moderate diversity of eukaryotes is similar to worldwide contemporaneous successions, confirming a general trend of moderate eukaryotic diversification until about 800 Ma;
- Multiproxy studies used exhibit that the Mbuji-Mayi carbonate sequence is deposited in the Late Meso.–Early Neoproterozoic interval;
- The organic matter from Mbuji-Mayi Supergroup is likely into a maturation stage corresponding to oil window.

But work in progress

- ☐ Quantitative analyses to understand the paleoecology;
- ☐ Determination of kerogen thermal maturity by Raman microspectroscopy in thin section.

Acknowledgments

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Baudet D.

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Thank you