



Crystal chemistry of tourmalines from Mozambican pegmatites

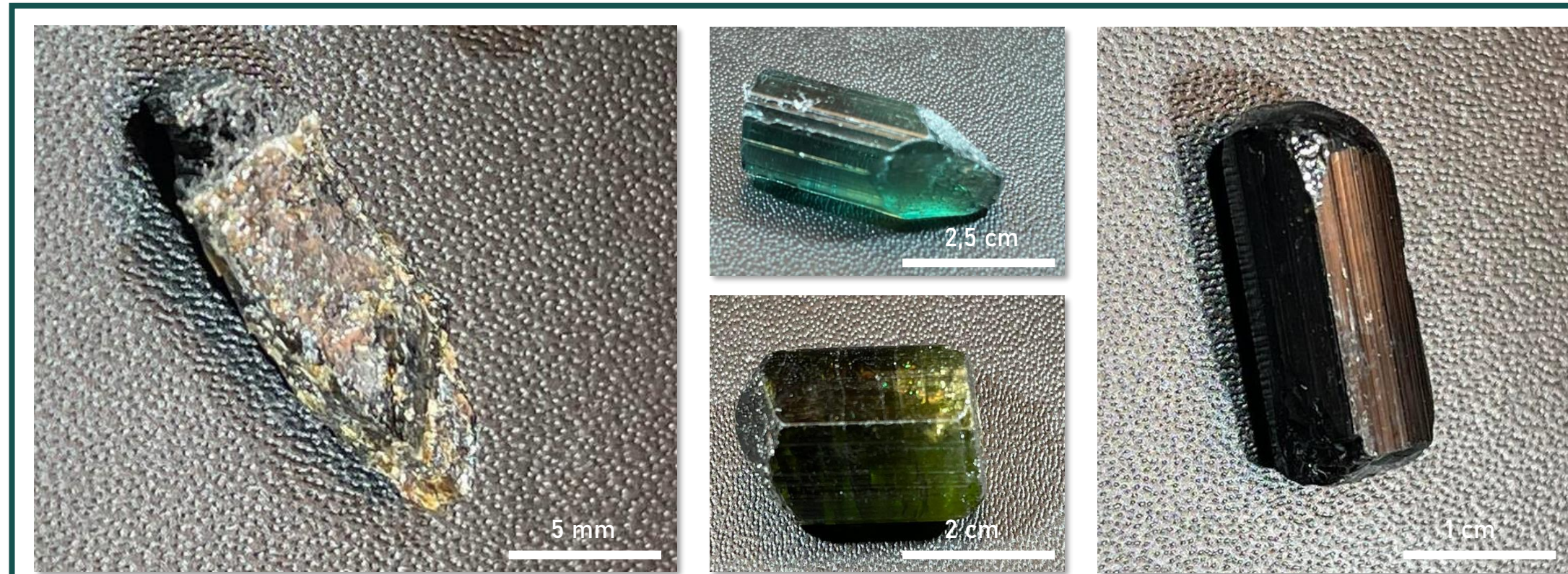
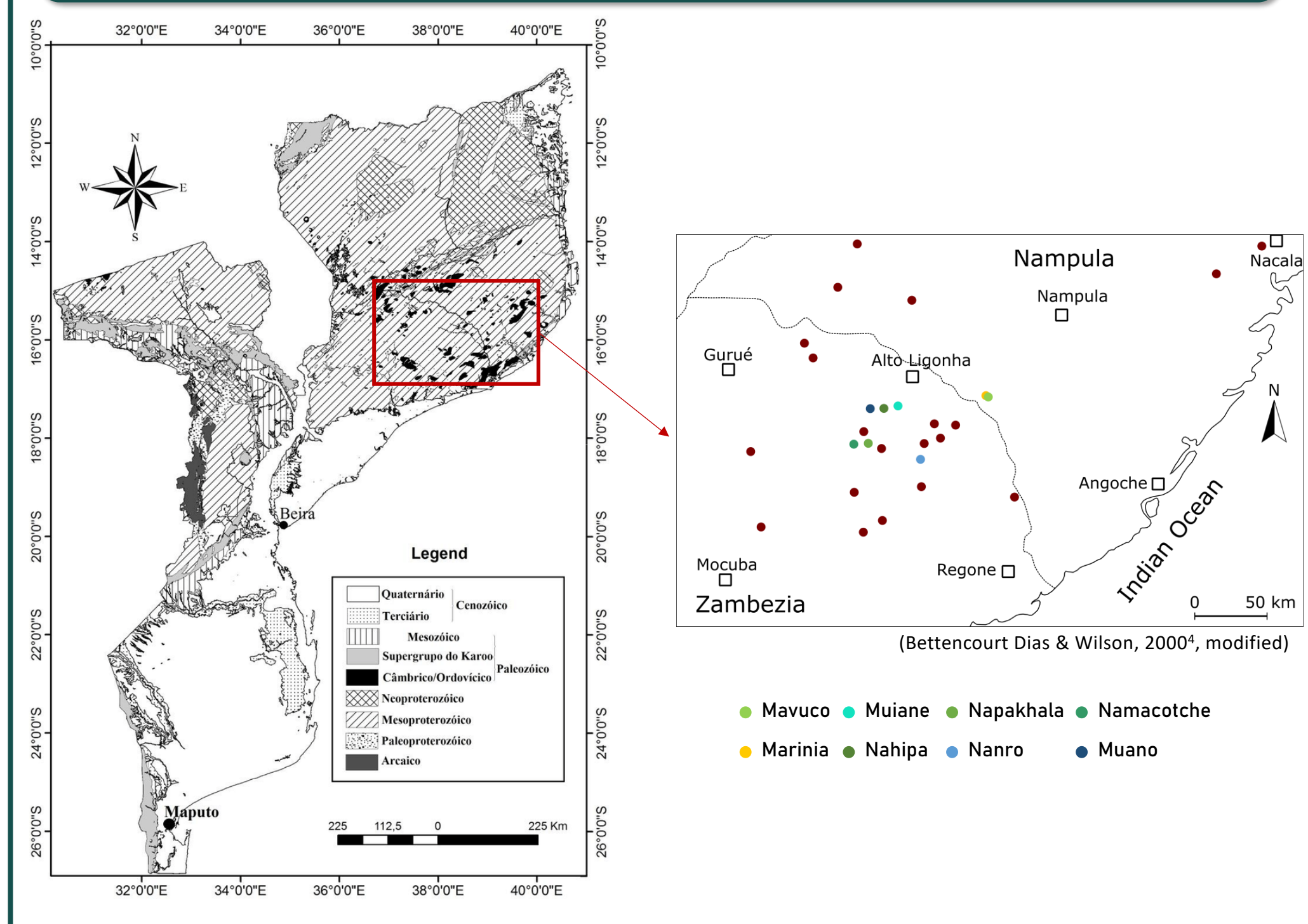


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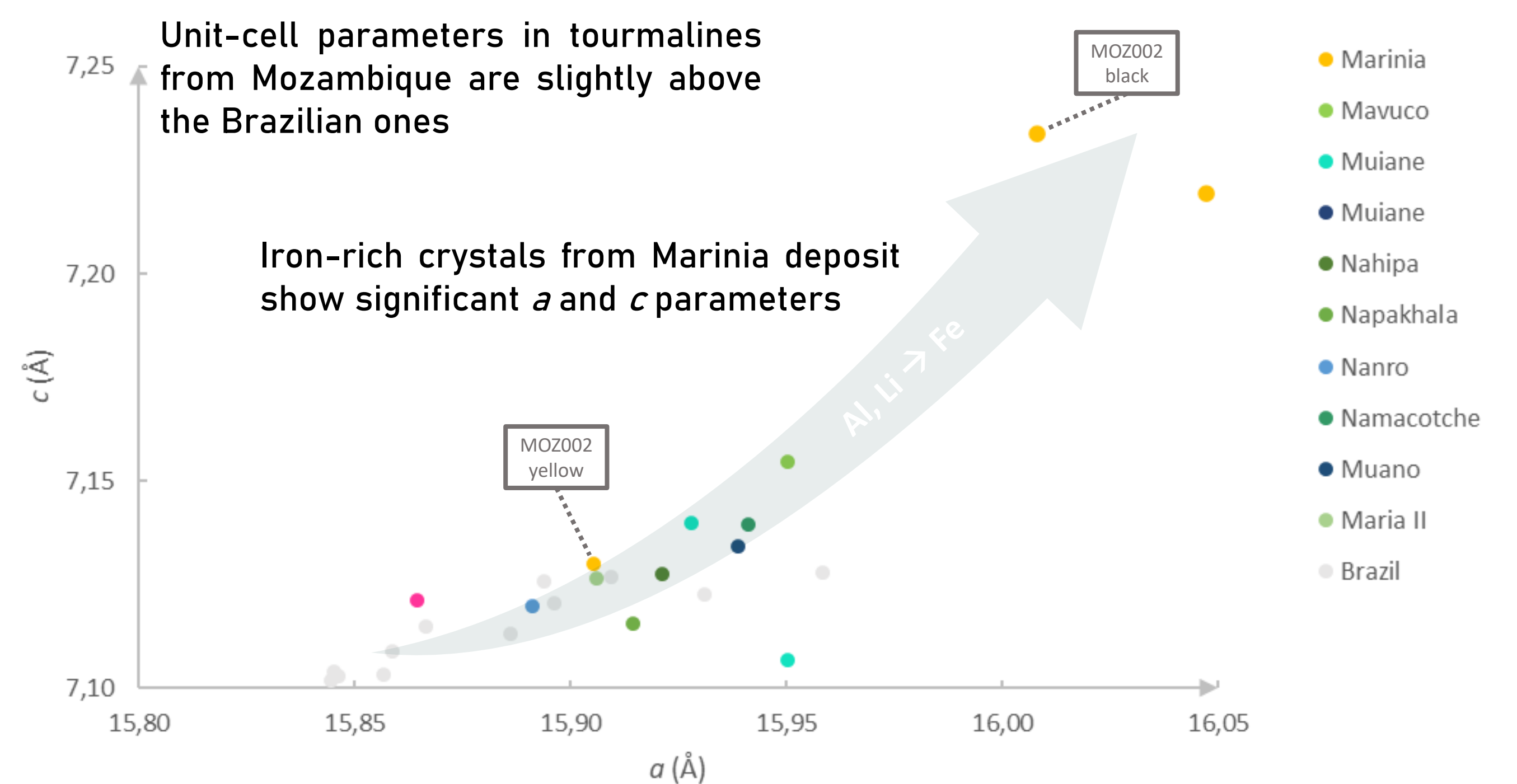
Introduction

- Tourmalines were found in Mozambique at the dawn of the 21st century.
- Main occurrences in granitic pegmatites and secondary deposits (paleoplacers).
- In 2004, Cu-bearing elbaïtes with Paraíba-type colors were discovered in the Mavuco secondary deposit, Alto Ligonha pegmatitic district.
- Supergroup of complex trigonal borosilicates with a $R\bar{3}m$ space group.
- General formula : $XY_3Z_6[T_6O_{18}](BO_3)_3V_3W$.

Occurrences of tourmalines in Mozambique

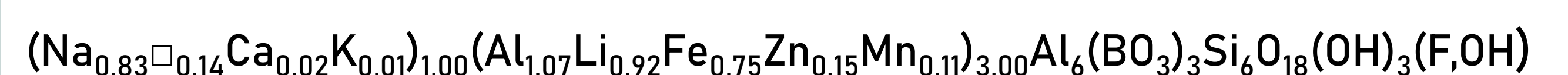


Unit-cell parameters

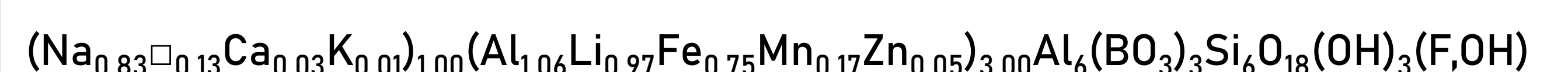


Major elements

Muano : elbaïte-schorl serie – Zn enriched (ZnO 1.24 wt%)



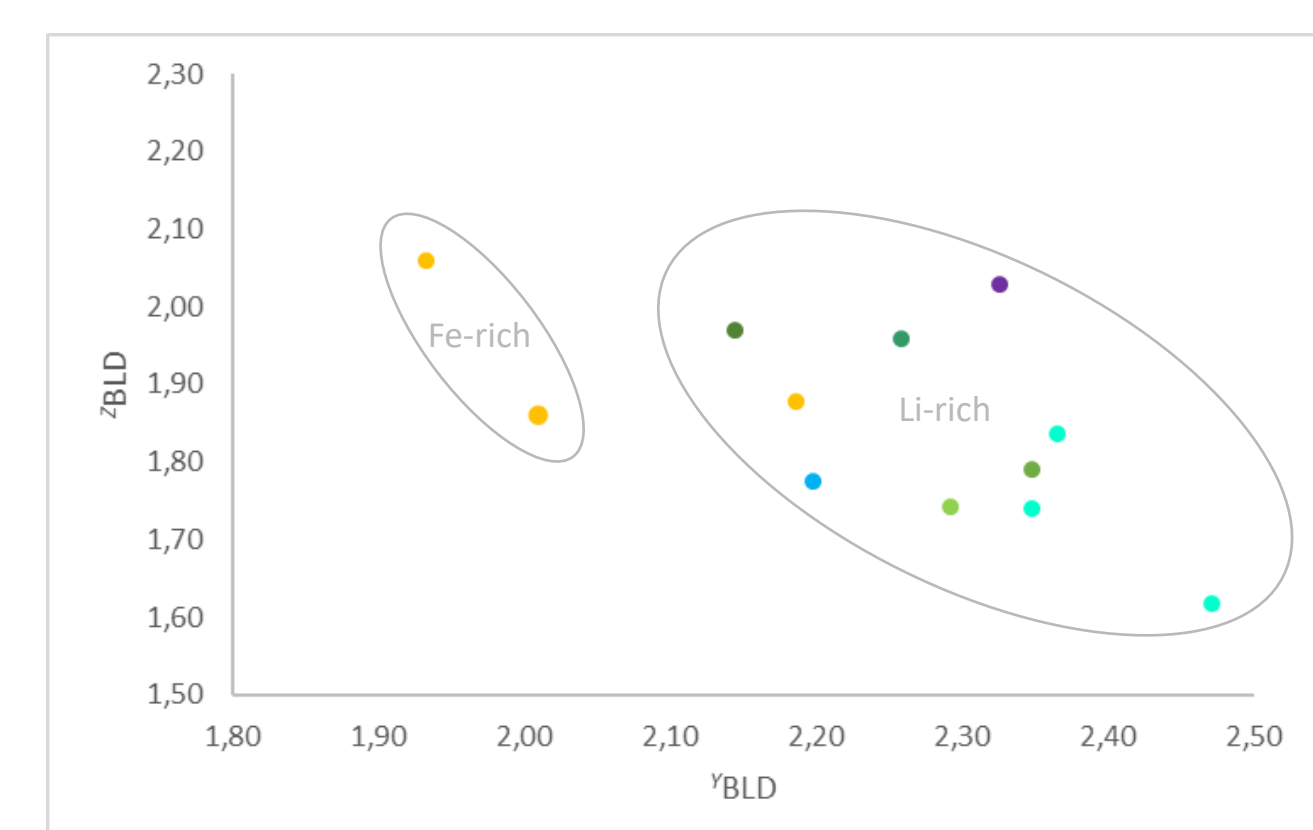
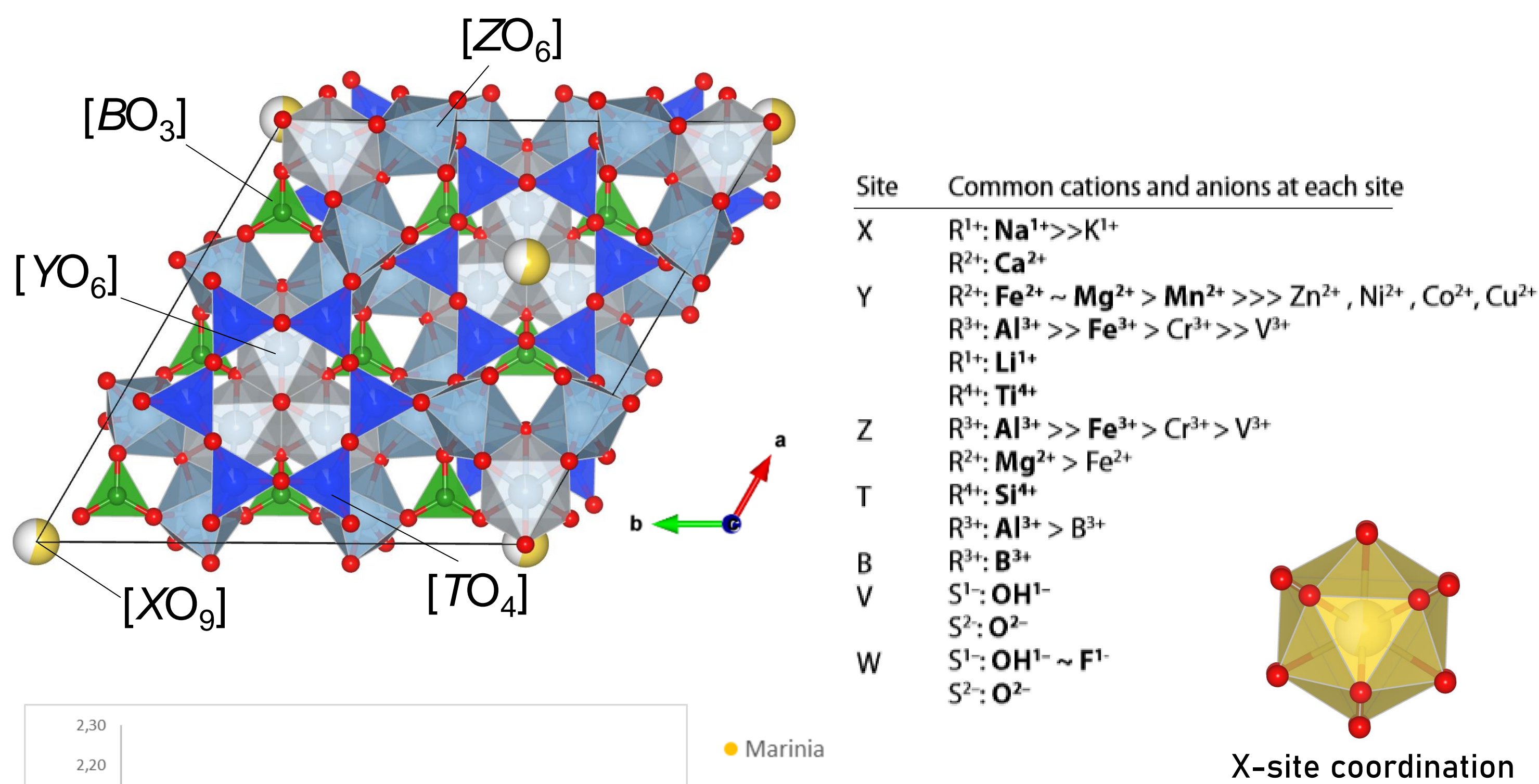
Nahipa : elbaïte-schorl serie – Mn enriched (MnO 1.23 wt%)



Mavuco : liddicoatite



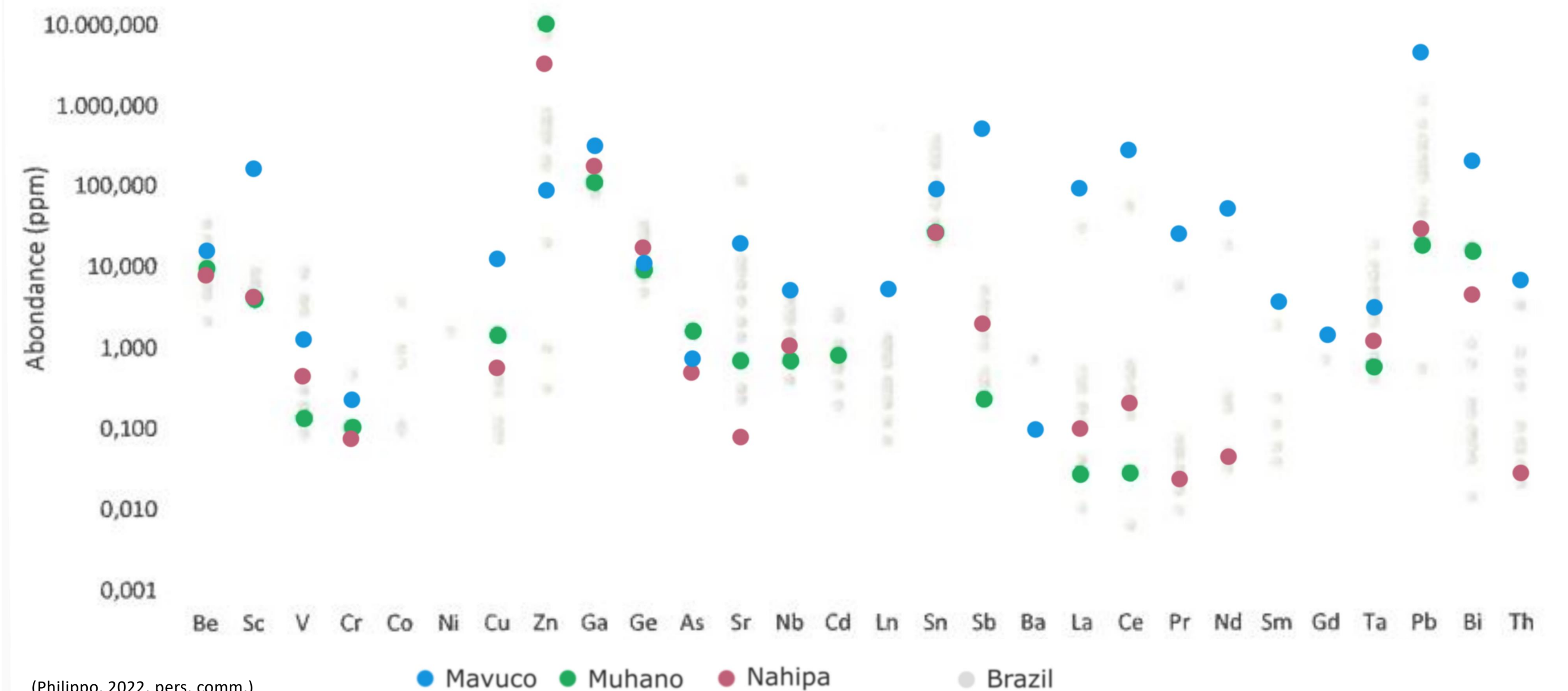
Single crystal X-ray diffraction



Inverse correlation between distortions of the Y and Z sites

Minor and trace elements

Mavuco : enrichments in Pb, Bi, Ln, Sb and REE → similar to a Brazilian Ca-rich crystal from the Lavra do Urucum pegmatite⁵



Conclusions

- Main substitutions take place on the Y crystallographic site between the major elements (Al+Li) (elbaïte) and Fe (schorl).
- Optical and compositional zonations reflect the evolving set-up conditions of granitic pegmatites.
- Atypical compositions have been identified in the Mavuco Pegmatite samples : liddicoatite
- The Fluor-liddicoatite component may be linked to an REE enrichment
- An inverse correlation has been highlighted between the distortions of Y and Z sites. Highest distortions values are observed for schorl-rich compositions

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4. Bettencourt Dias, M. & Wilson, W.E., 2000. The Alto Ligonha pegmatites, Mozambique. *The Mineralogical Record*, 31, 459–497.
5. Bomal F (2021) Master thesis, University of Liège, 66 p.