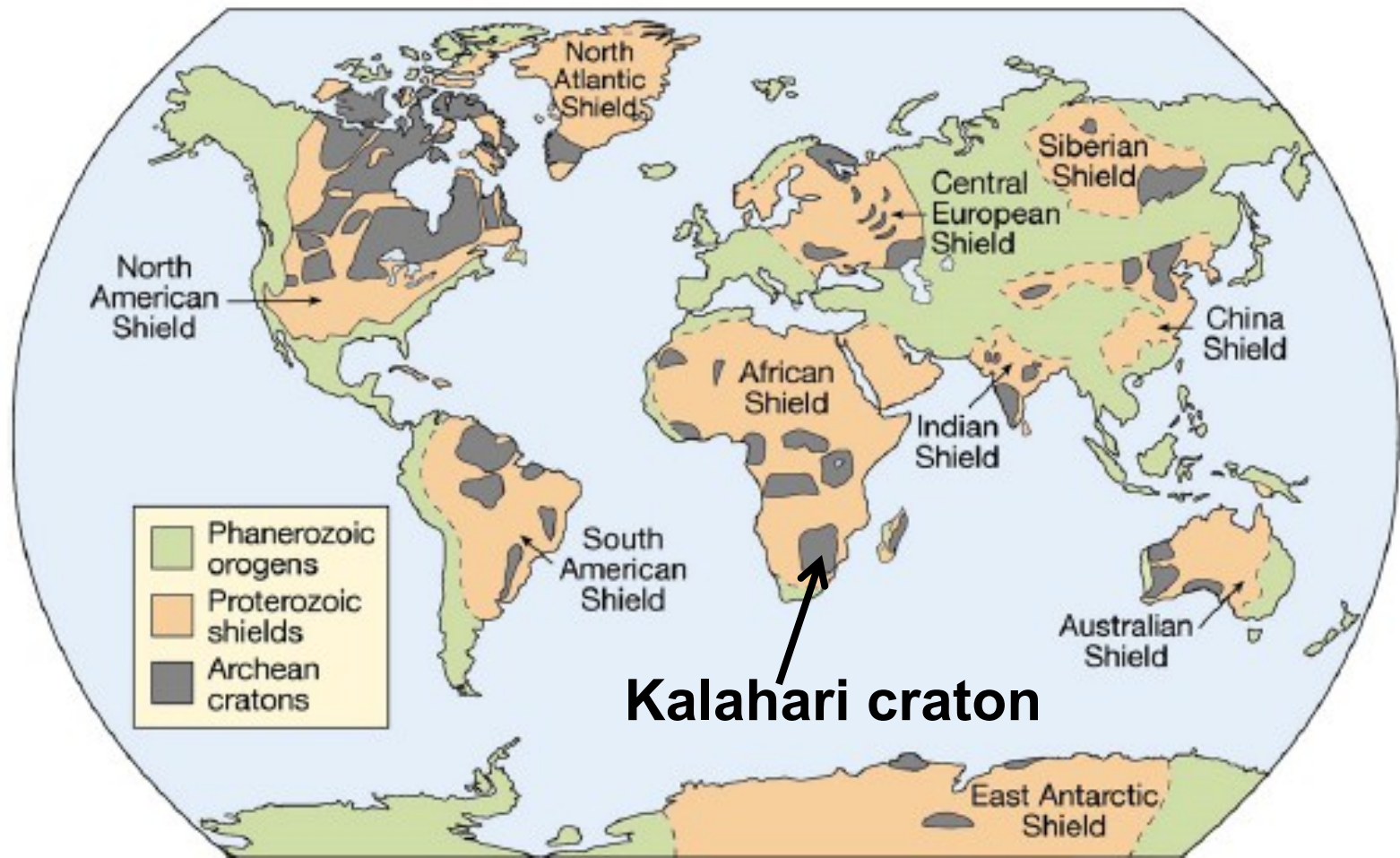


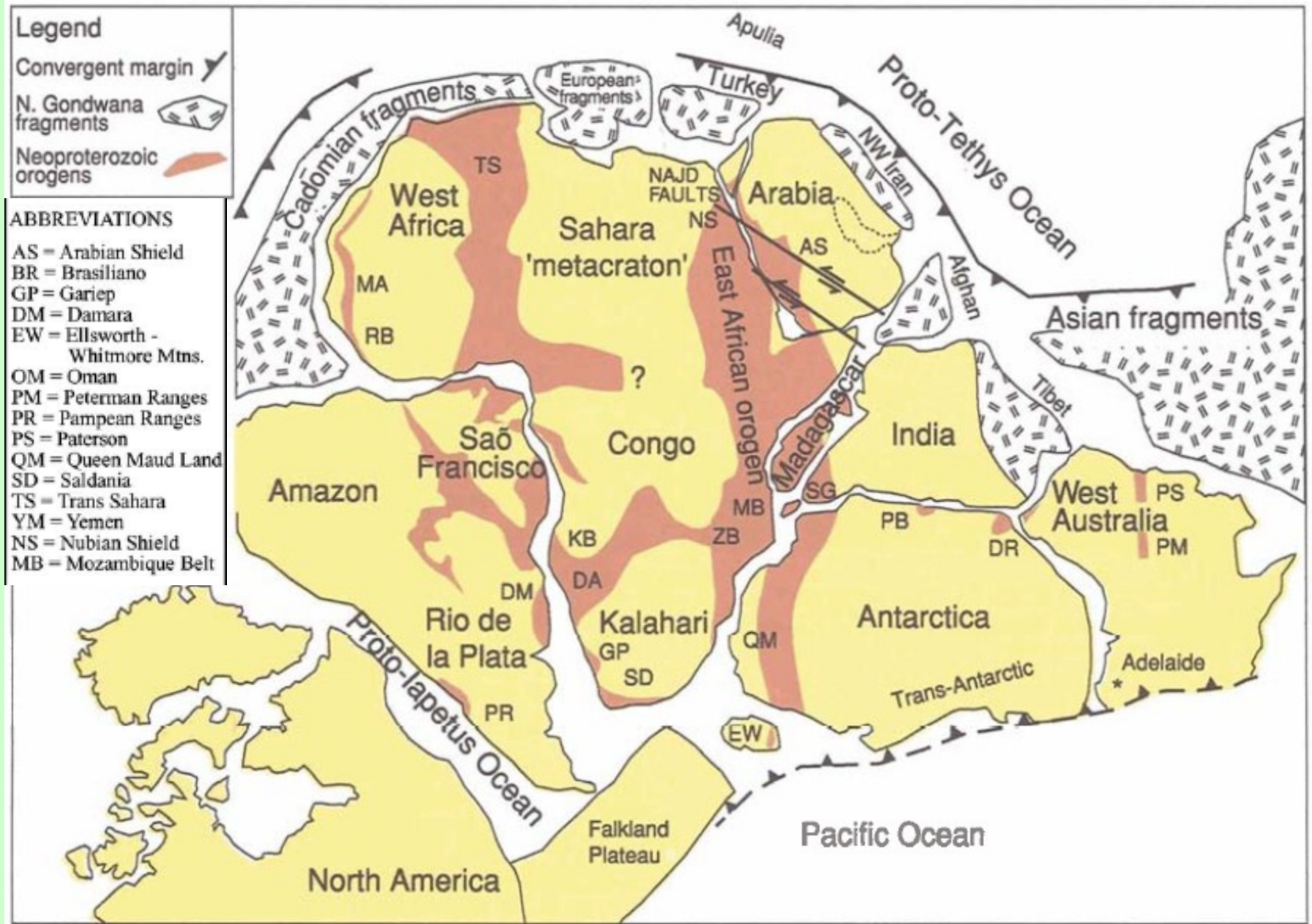
Petrogenesis of Cr-enriched chromites from Prince Mine, Mashava Igneous Complex

Jeff Chaumba

University of North Carolina, Pembroke

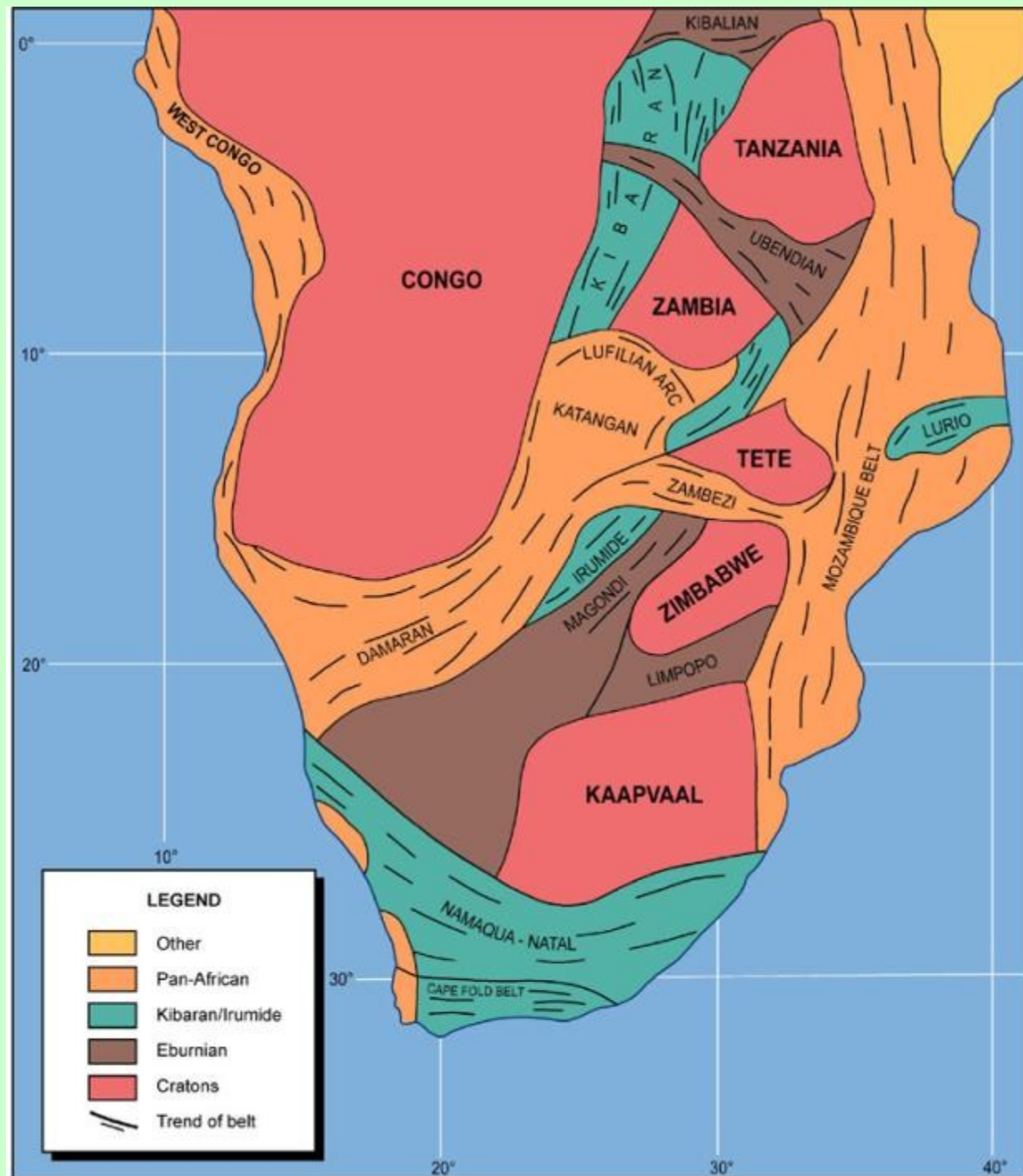


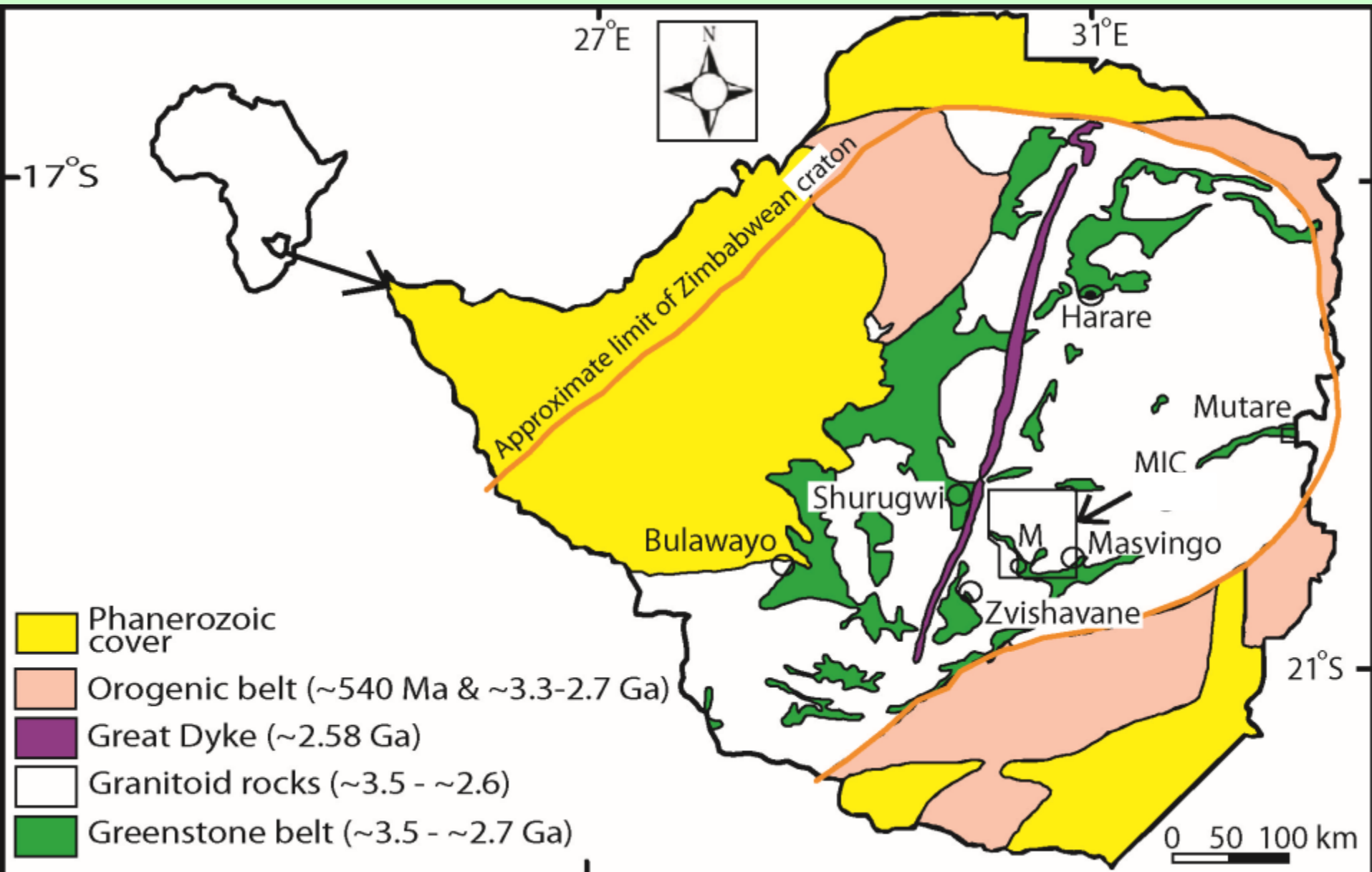
Furnes et al. (2015)



Gondwana at end of Neoproterozoic time (~540 Ma) (Kusky et al., 2003)

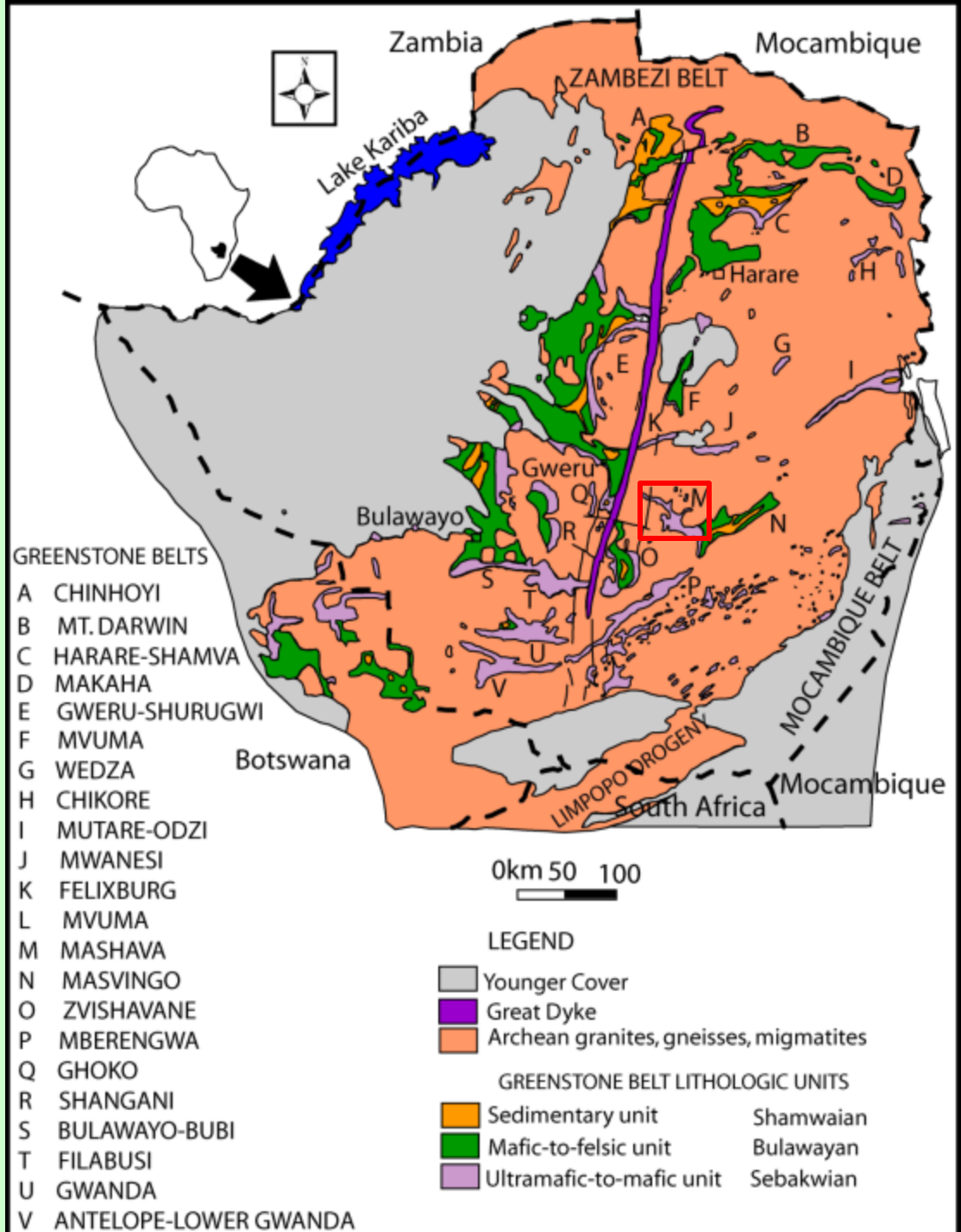
Cratons and orogenic belts





Simple 3-fold (?)
classification of
Archean granite-
greenstone terrane
of Zimbabwe

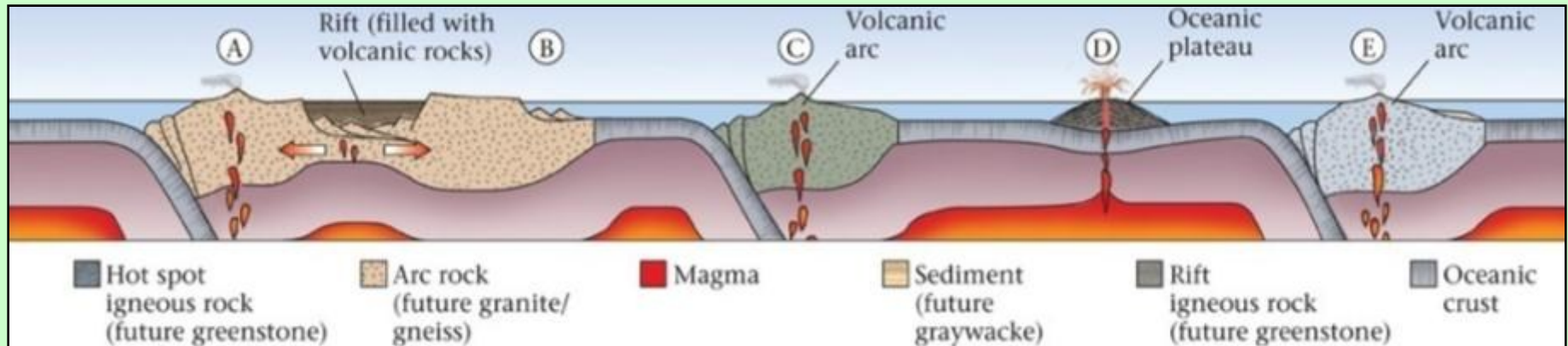
Numerous
'layered mafic
intrusions' **sills**
associated with
some of the
greenstone belts



From magma Ocean during the Hadean Eon (4.56 - 3.85 Ga)



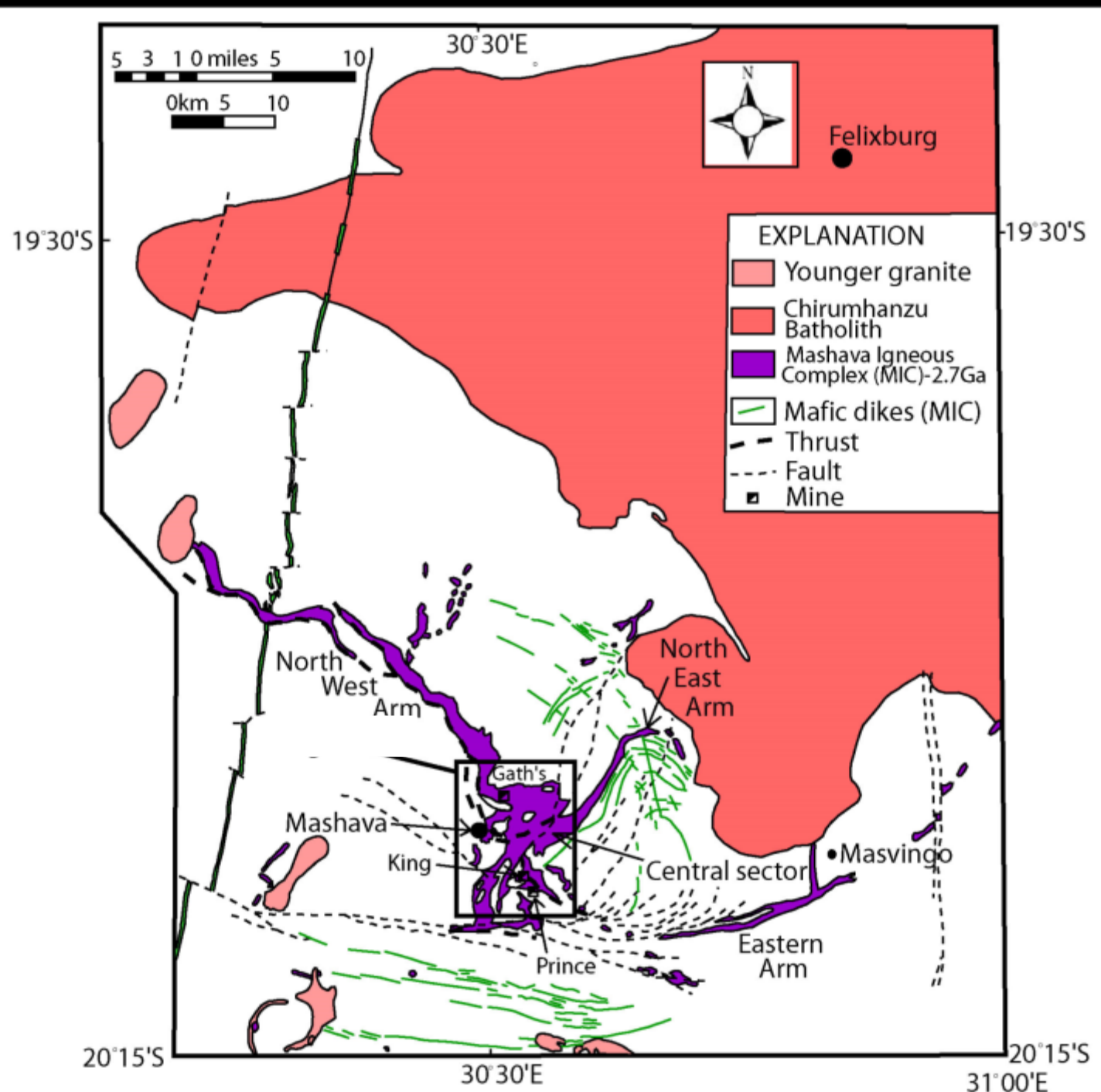
To crust forming during the Archean



In the Archean, island arcs & hot spot volcanoes built small blocks of buoyant crust. Rifting of these blocks may have produced flood basalts, & erosion of them produced sediment.

Mashava Igneous Complex

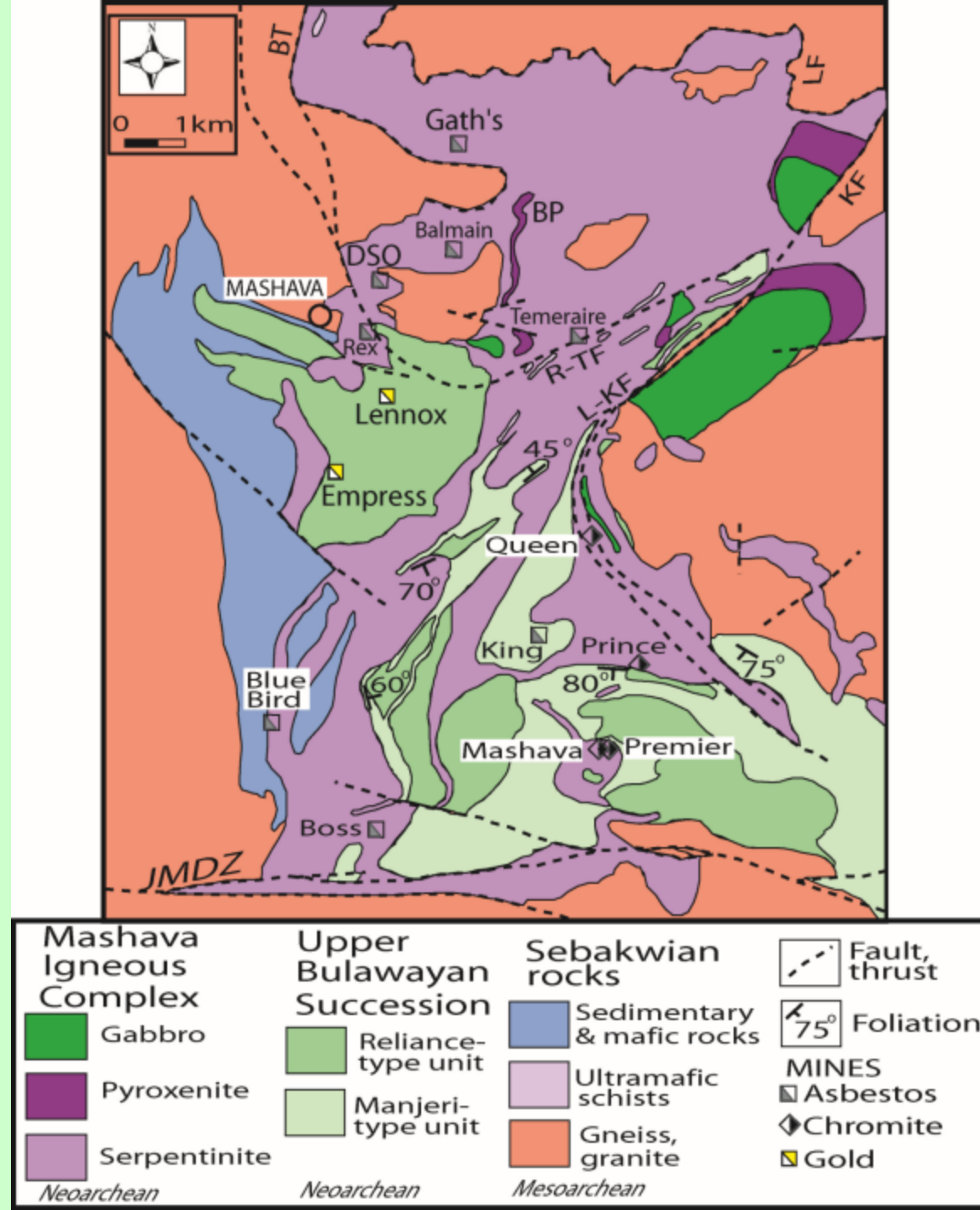
Mined for
i. asbestos,
ii. chromite,
iii. gold

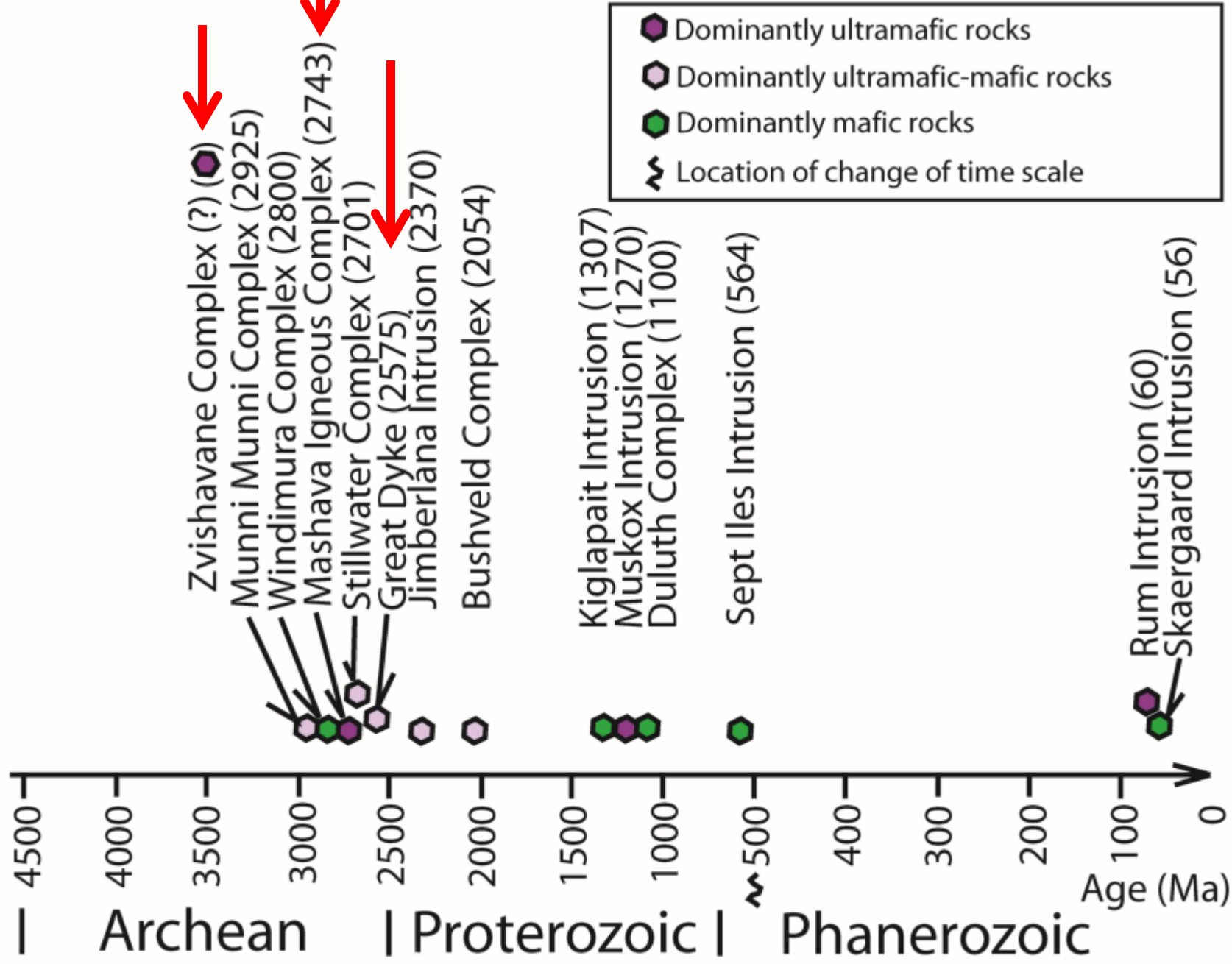


Shown are major

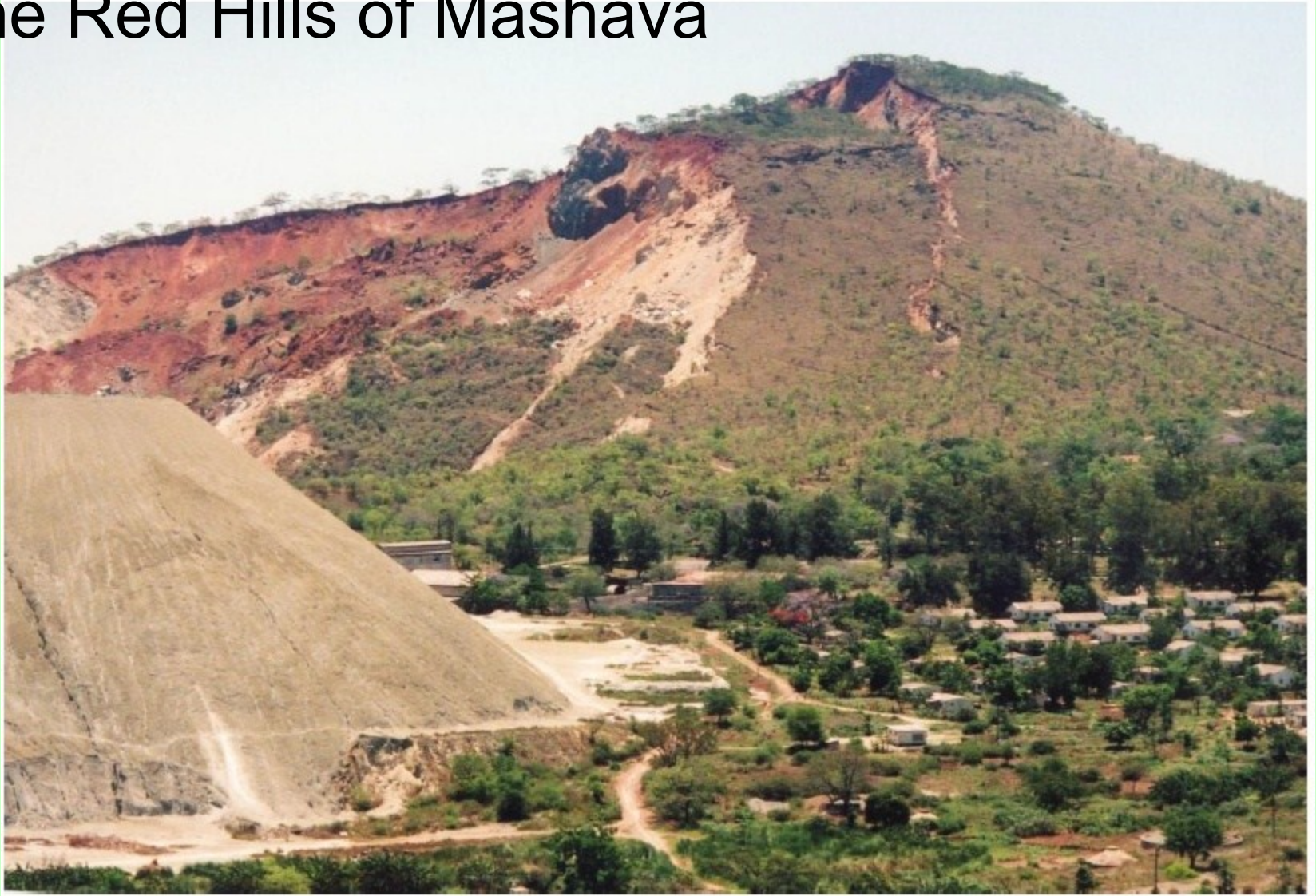
- i. asbestos,
- ii. chromite,
- iii. gold

mines

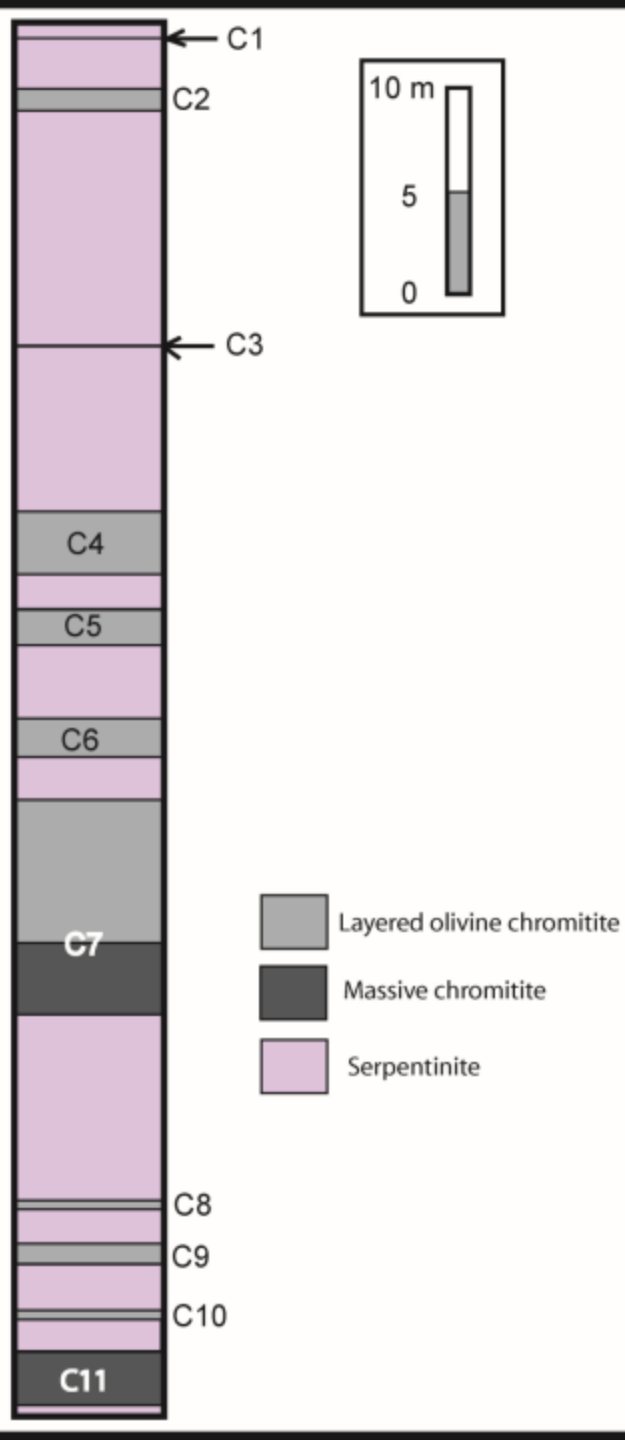




Mashava means 'red' in **Shona** language, for the Red Hills of Mashava

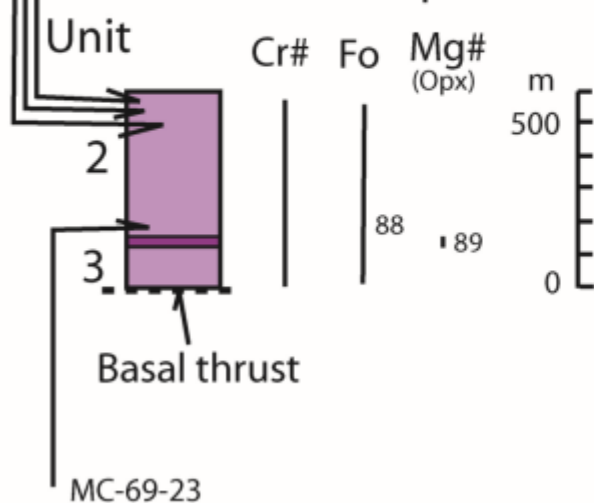


Caving/subsidence of the surface at Gath's Mine (Asbestos)



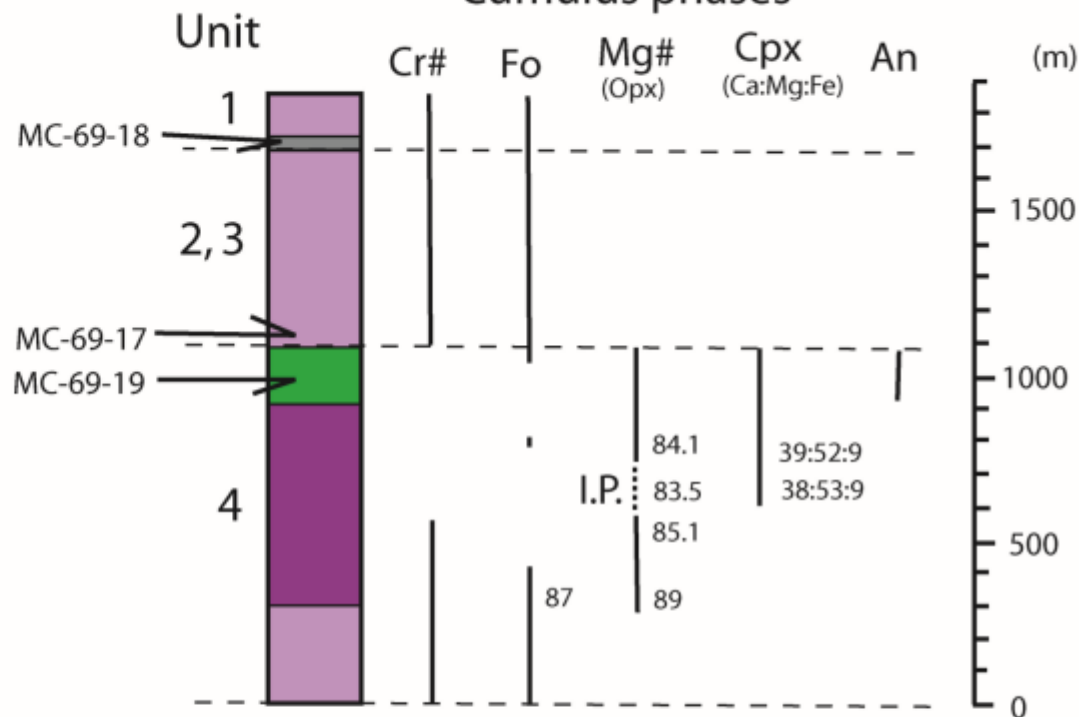
NORTHWEST ARM

MC-69-21
MC-69-24
MC-69-22 Cumulus phases



CENTRAL SECTOR

Cumulus phases



LEGEND

- Norite
- Chromitite horizons
- Pyroxenite
- Serpentinite

(a) Massive and friable chromitite



MC-69-18B

(b) Massive and friable chromitite



MC-69-18ii

(c) Serpentinized chromitite



Olivine/serpentine

MC-69-18C

Chromite

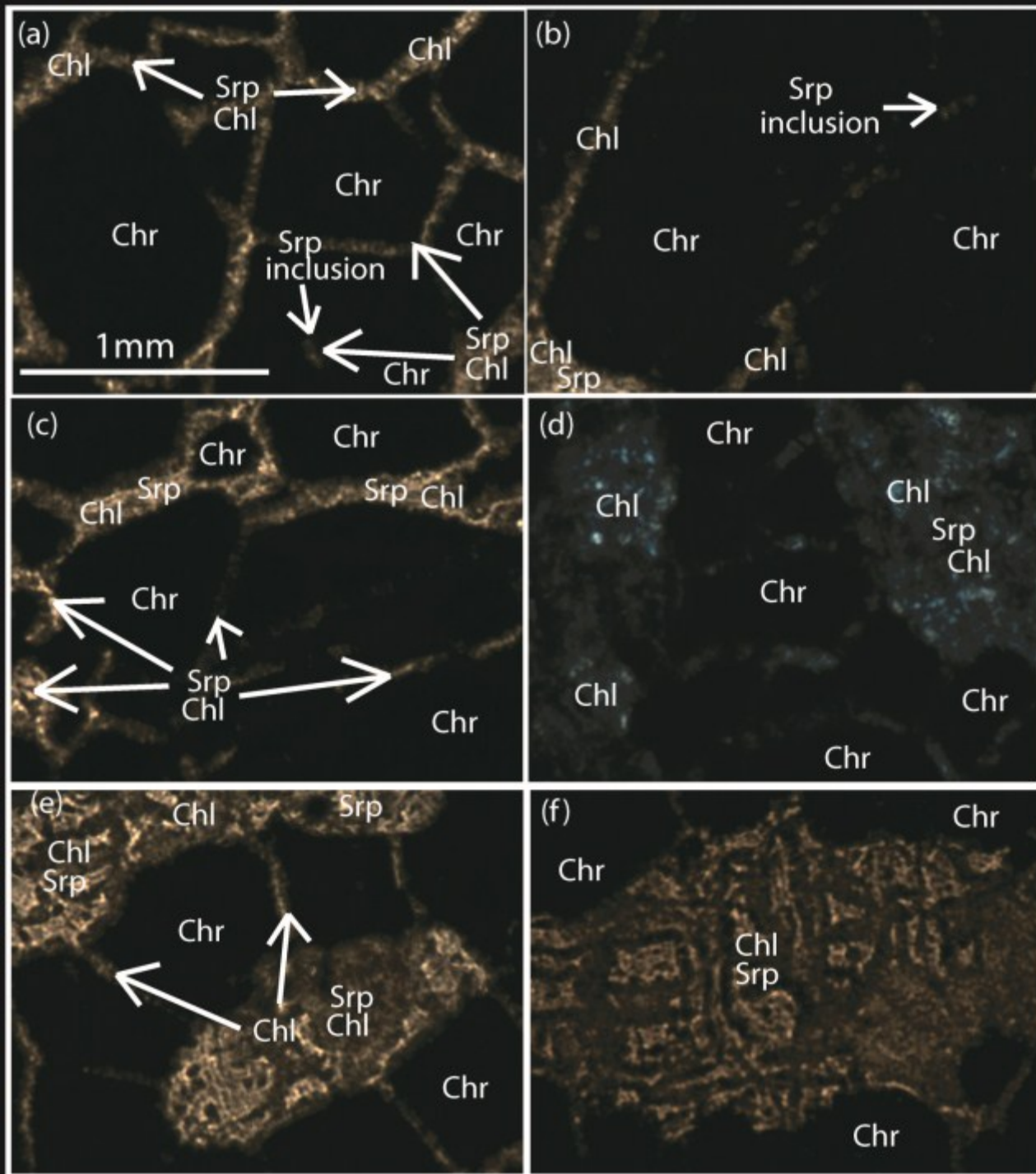
(d) Layered chromitite

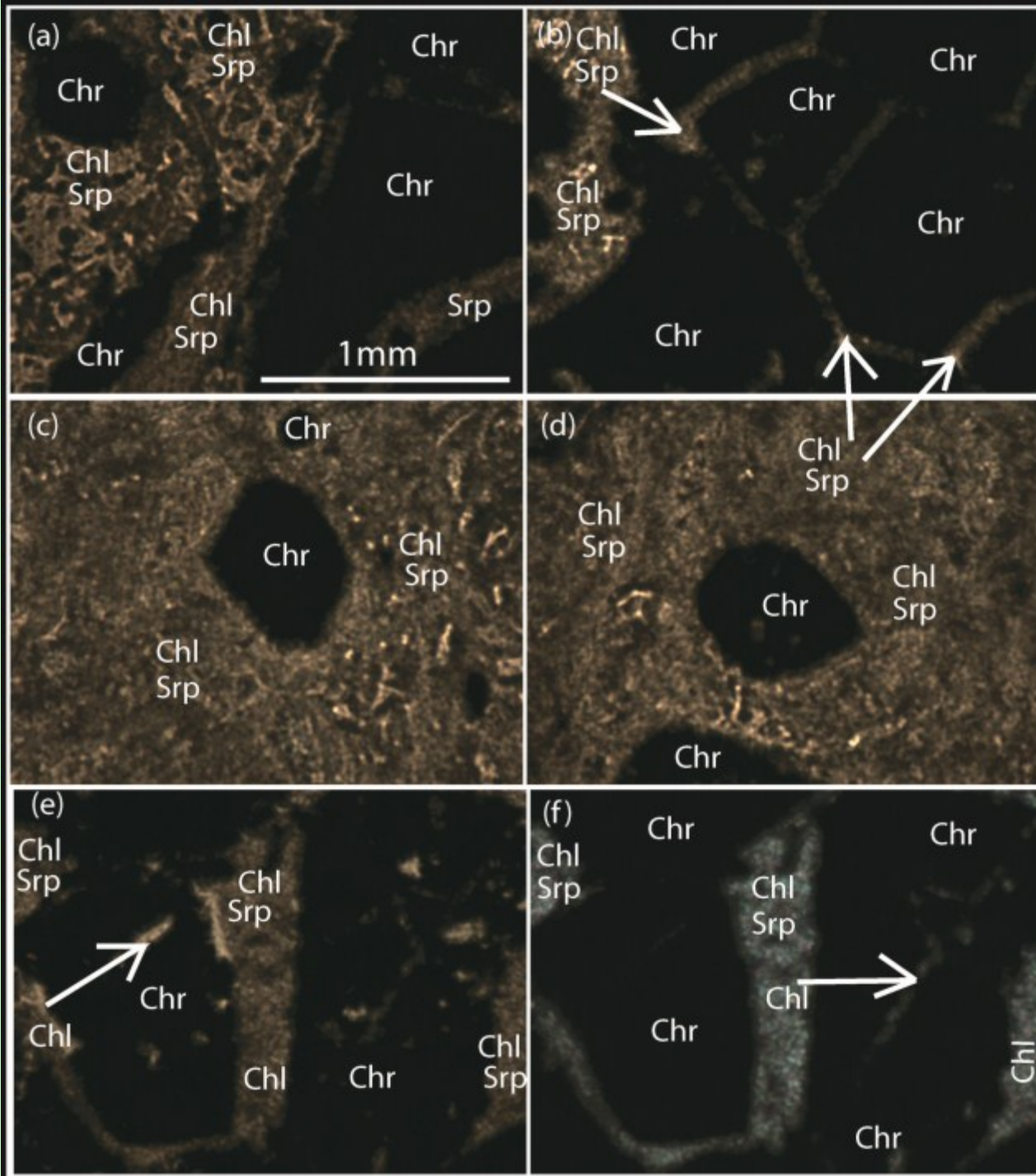
Massive
chromitite
layers

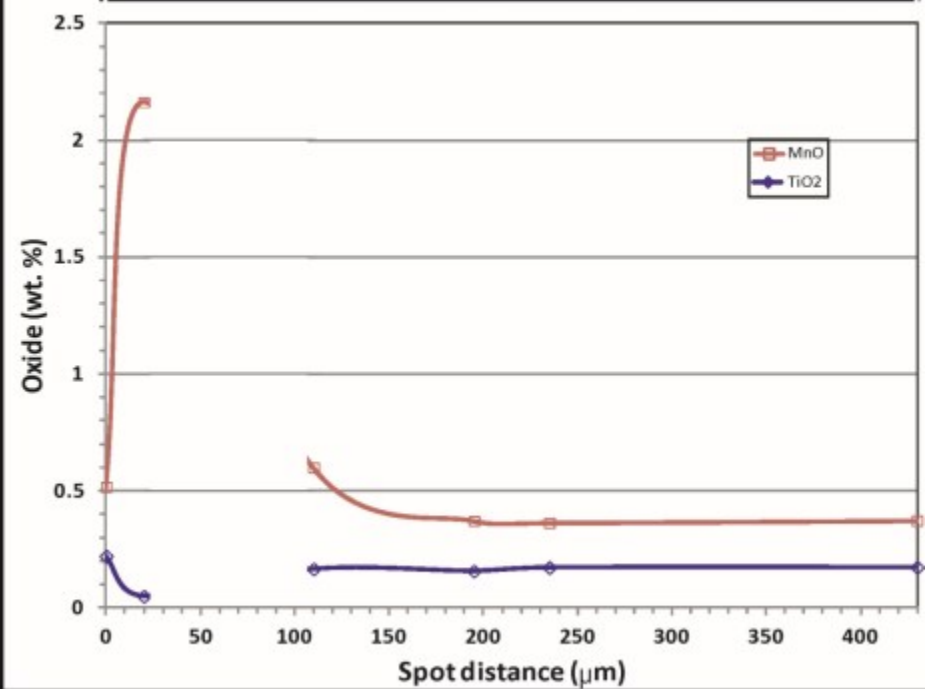
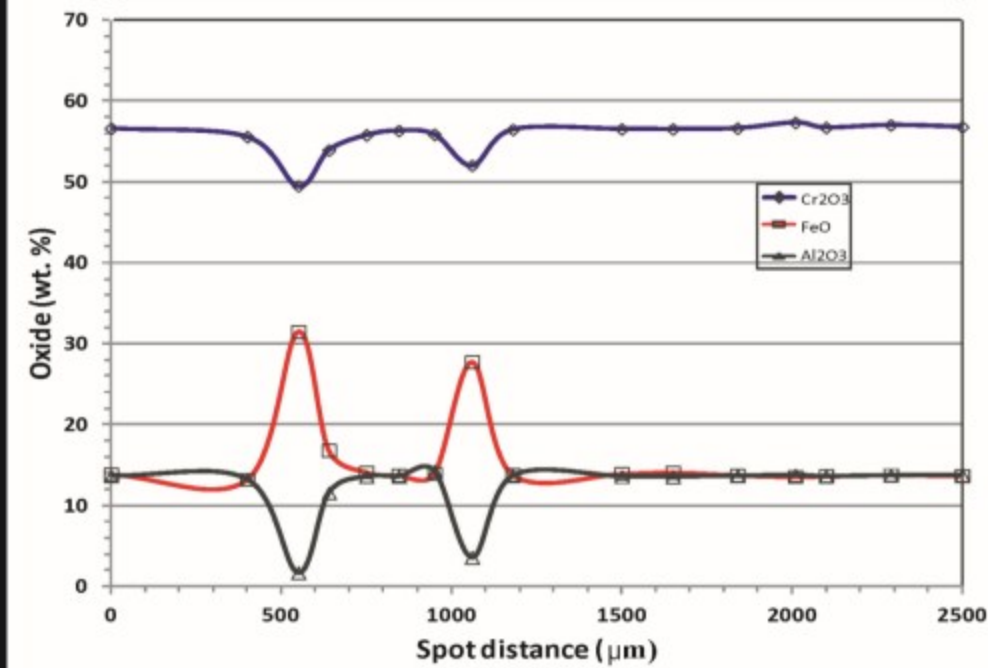
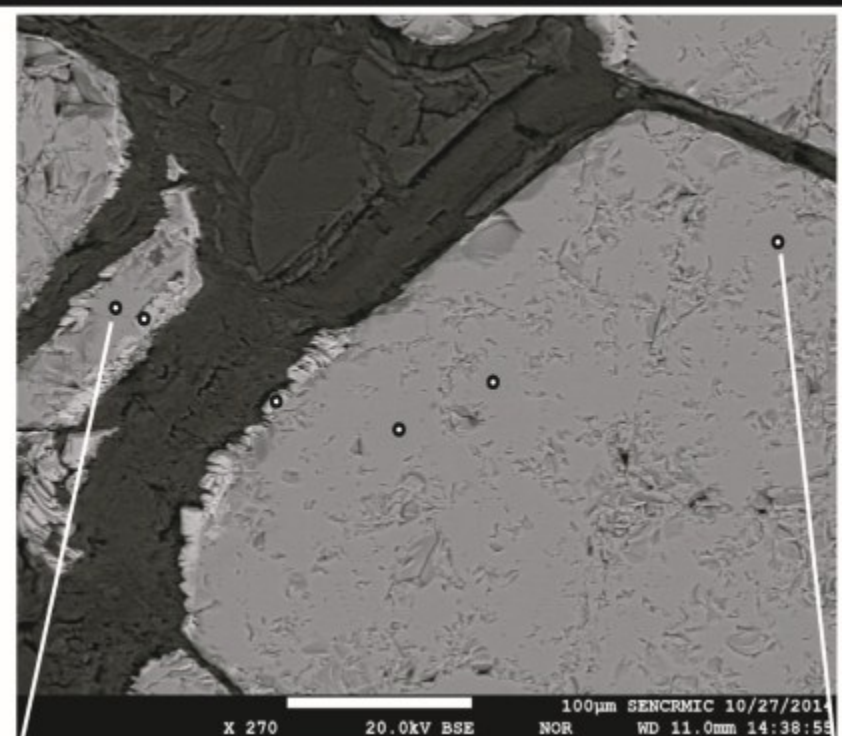
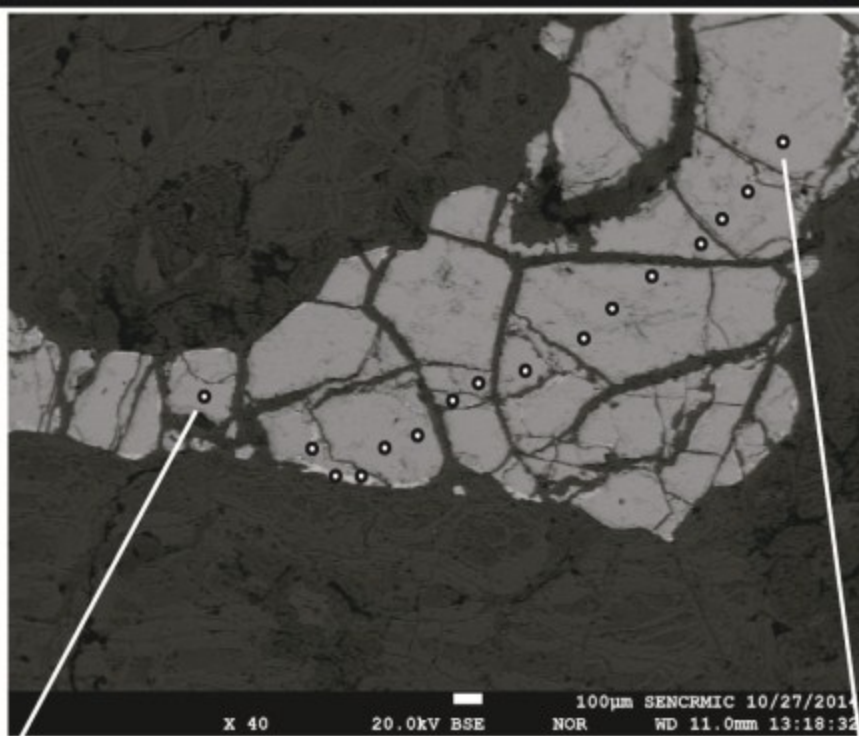


Serpentinite layer

MC-69-18D

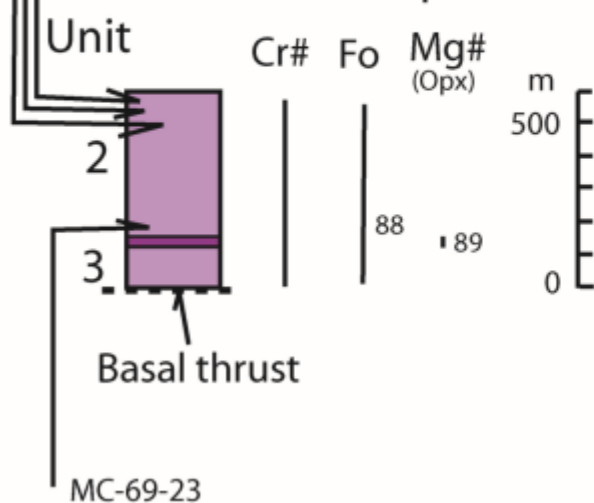






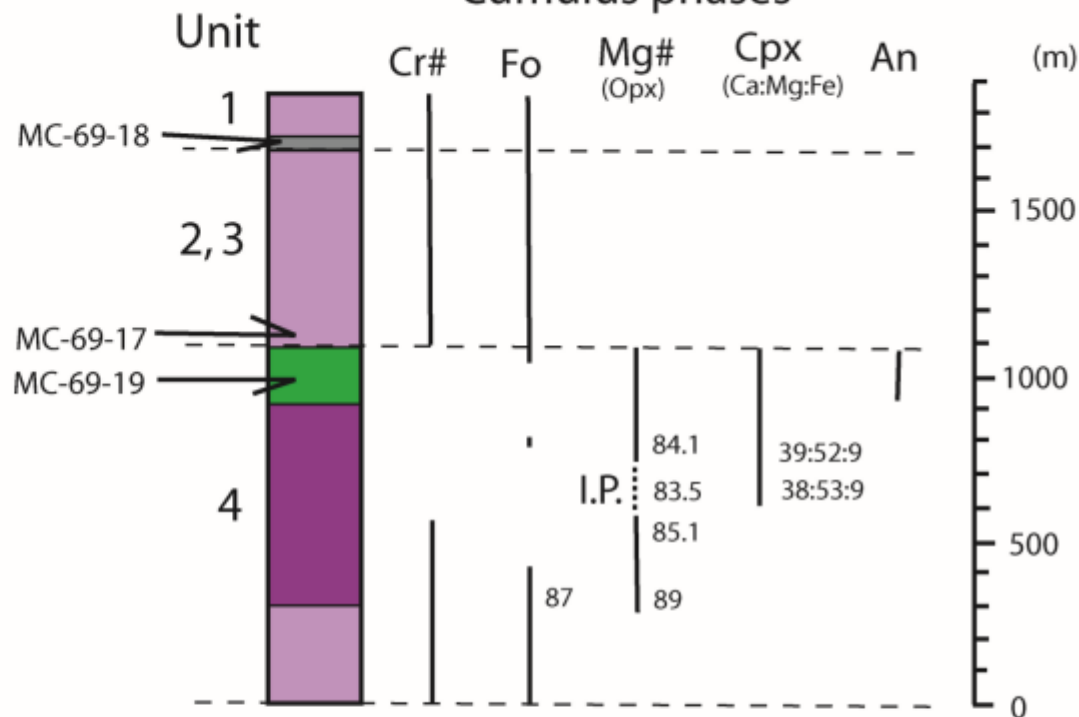
NORTHWEST ARM

MC-69-21
MC-69-24
MC-69-22 Cumulus phases



CENTRAL SECTOR

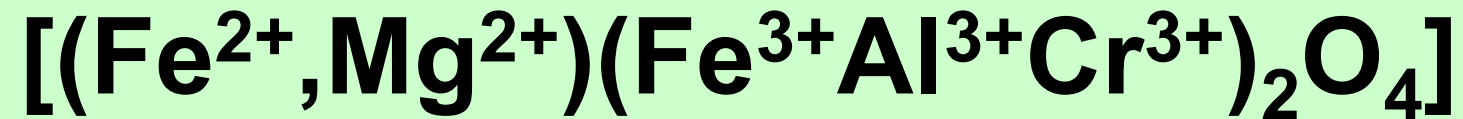
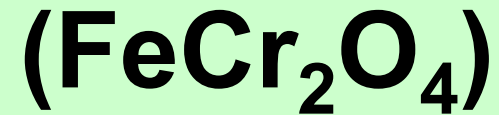
Cumulus phases

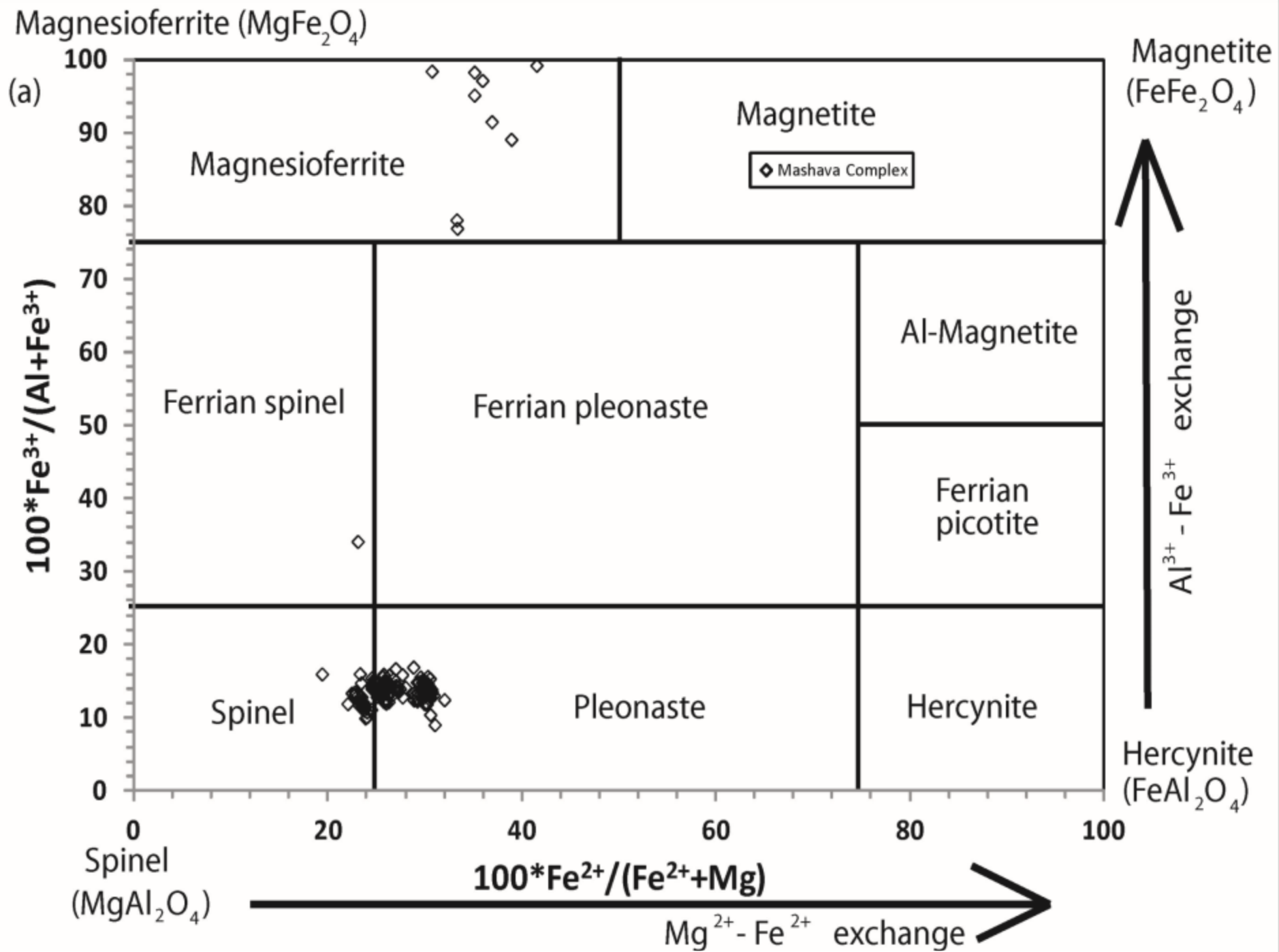


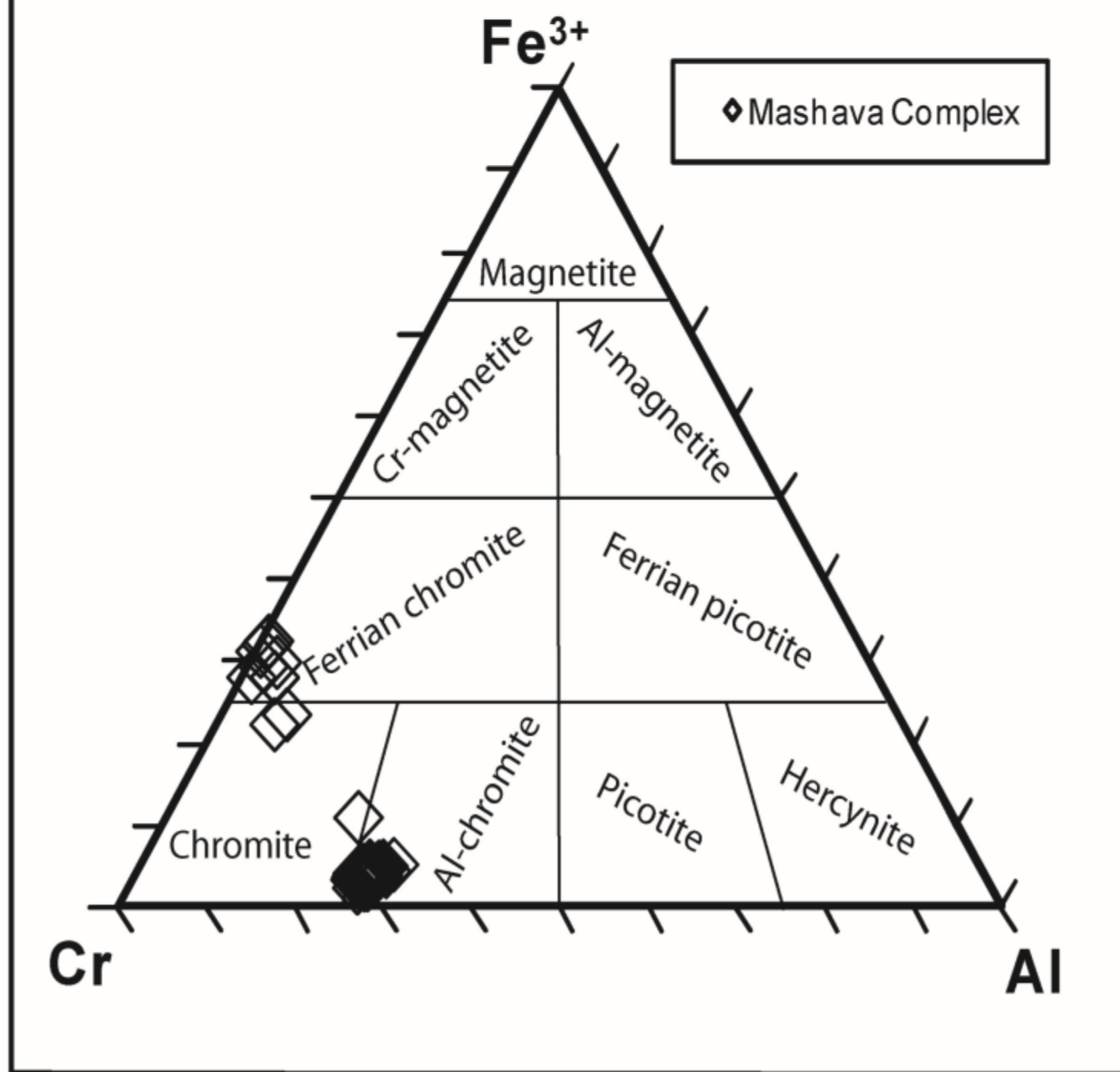
LEGEND

- Norite
- Chromitite horizons
- Pyroxenite
- Serpentinite

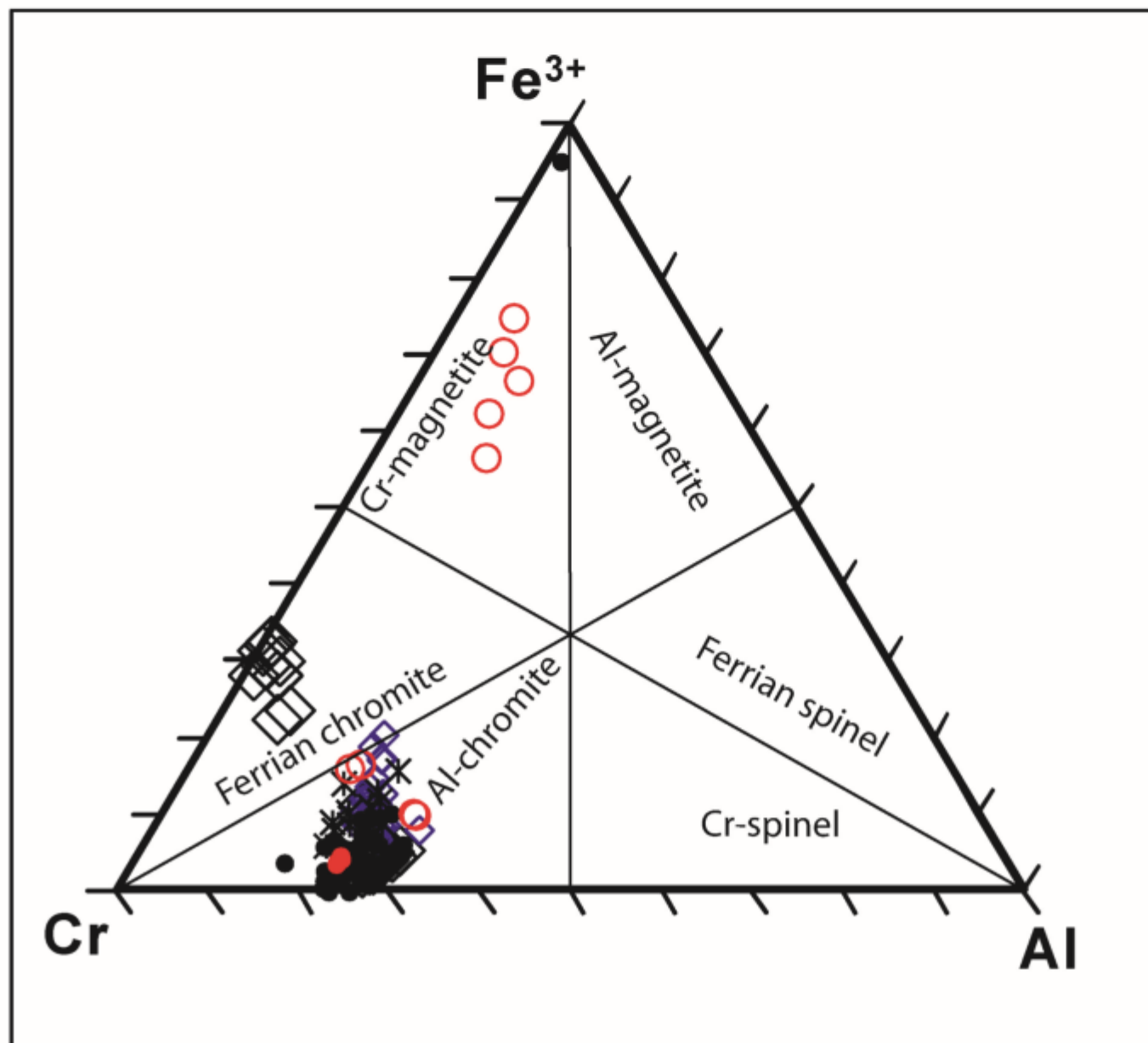
Chromite substitutions





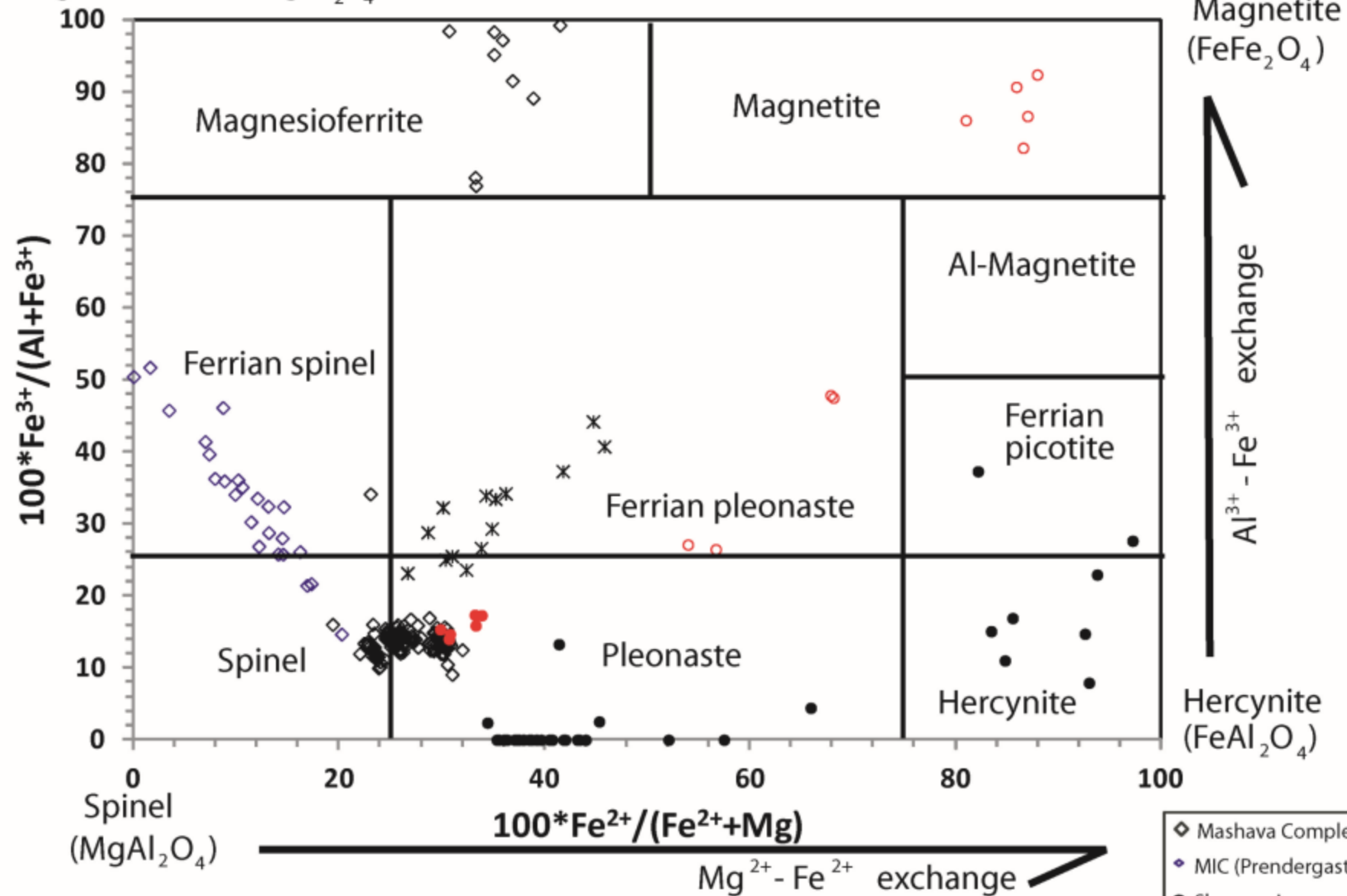


(b)



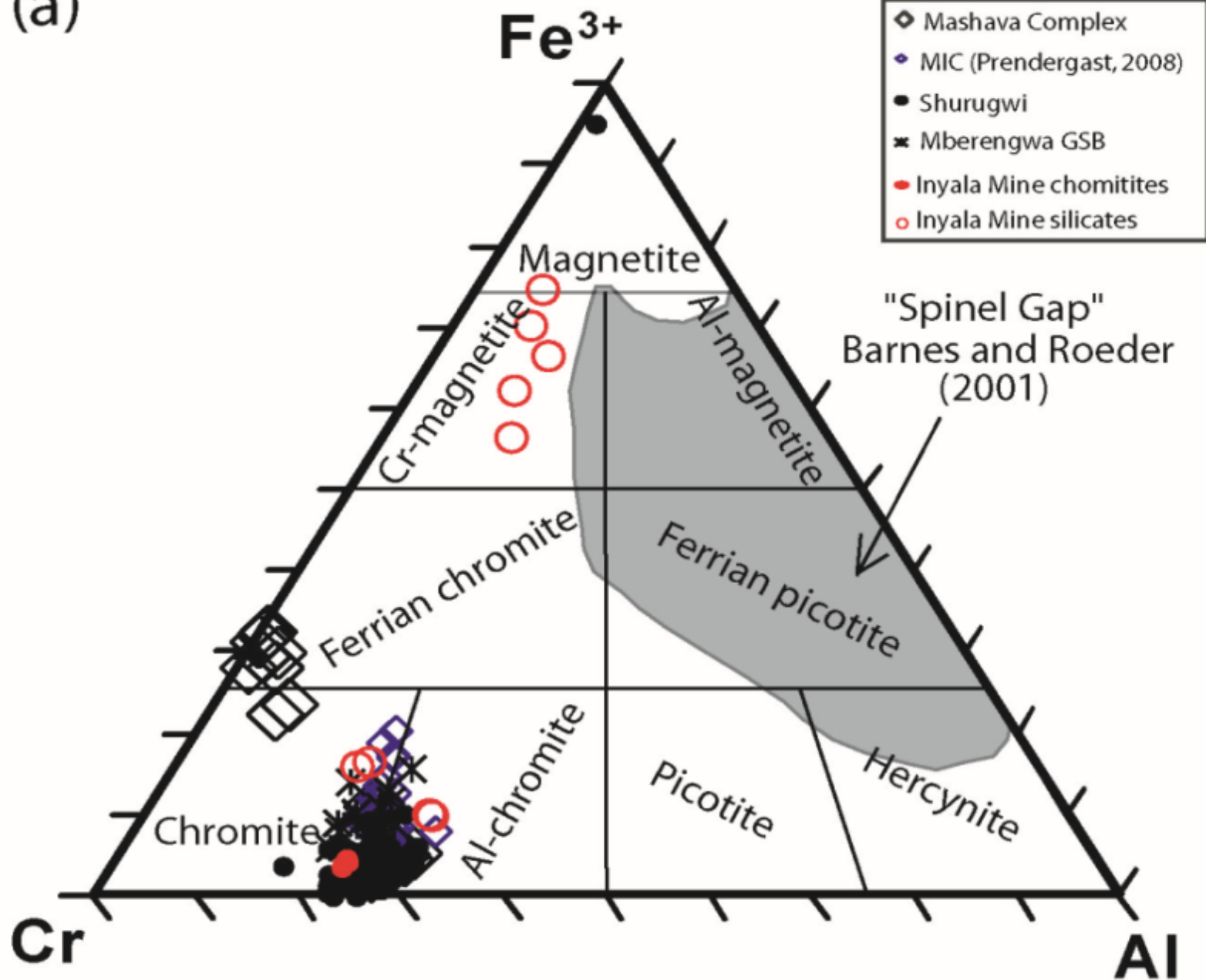
- ◇ Mashava Complex
- ◆ MIC (Prendergast, 2008)
- Shurugwi
- × Mberengwa GSB
- Inyala Mine chomites
- Inyala Mine silicates

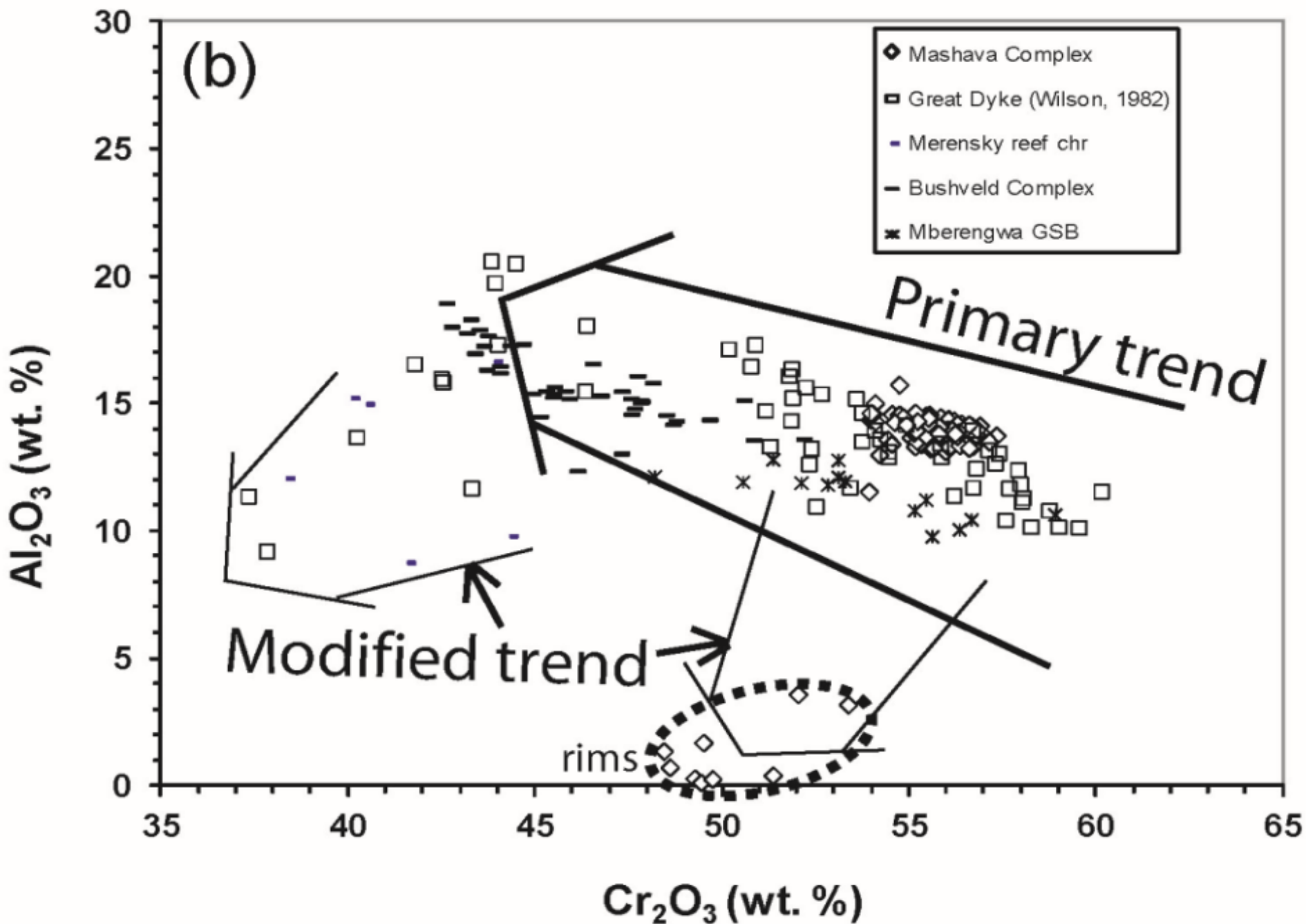
Magnesioferrite (MgFe_2O_4)

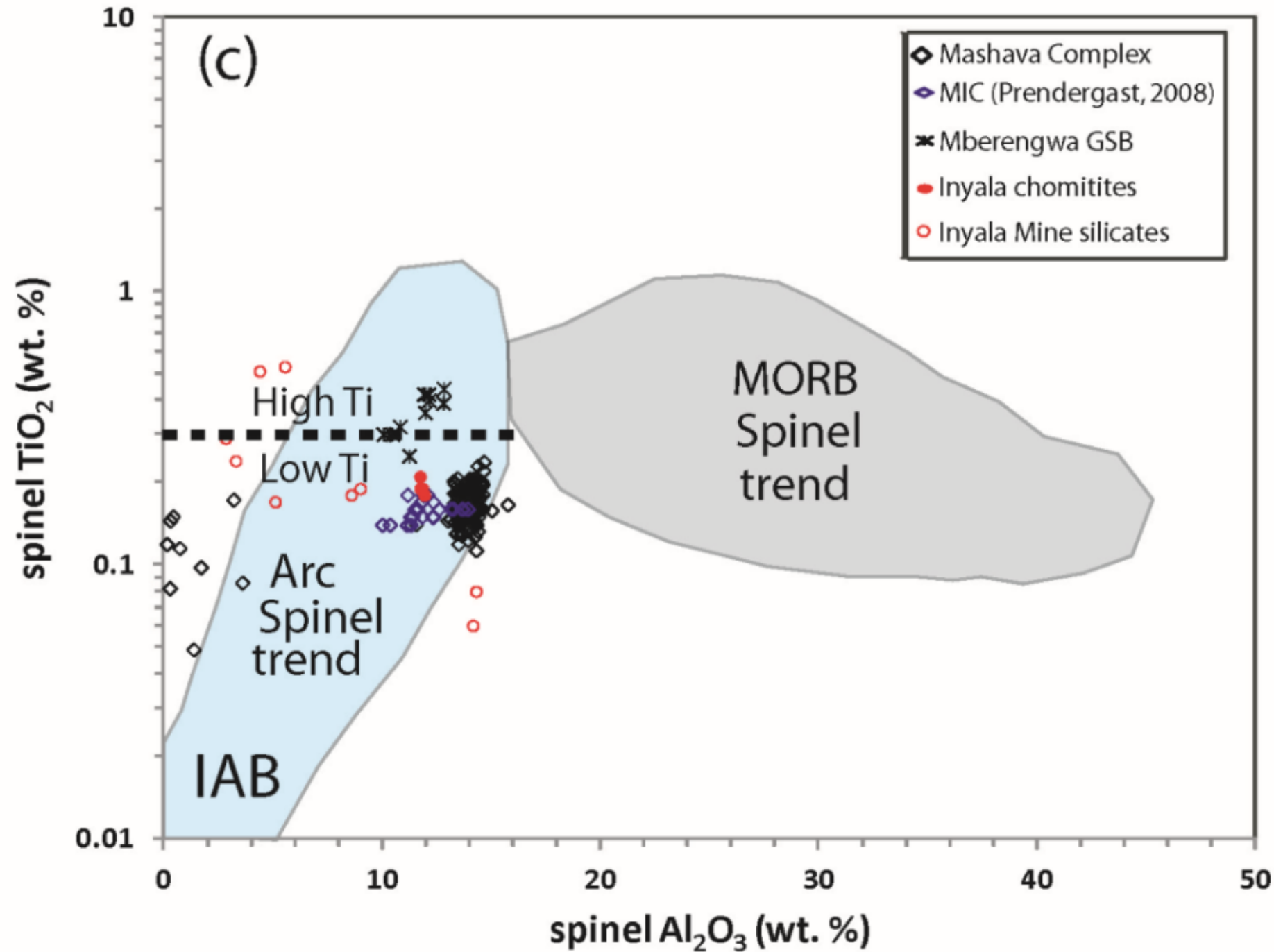


Chromite classification

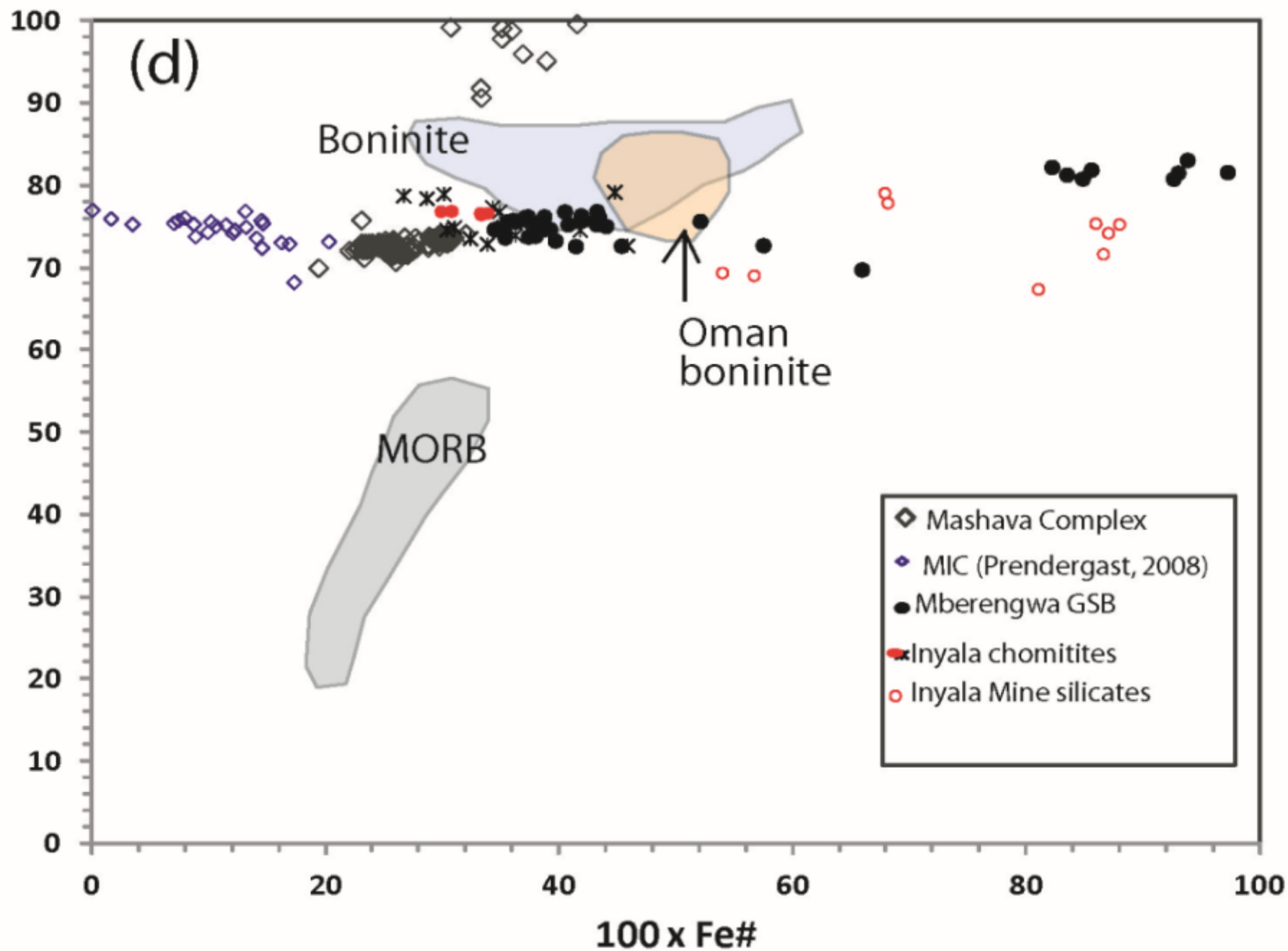
(a)

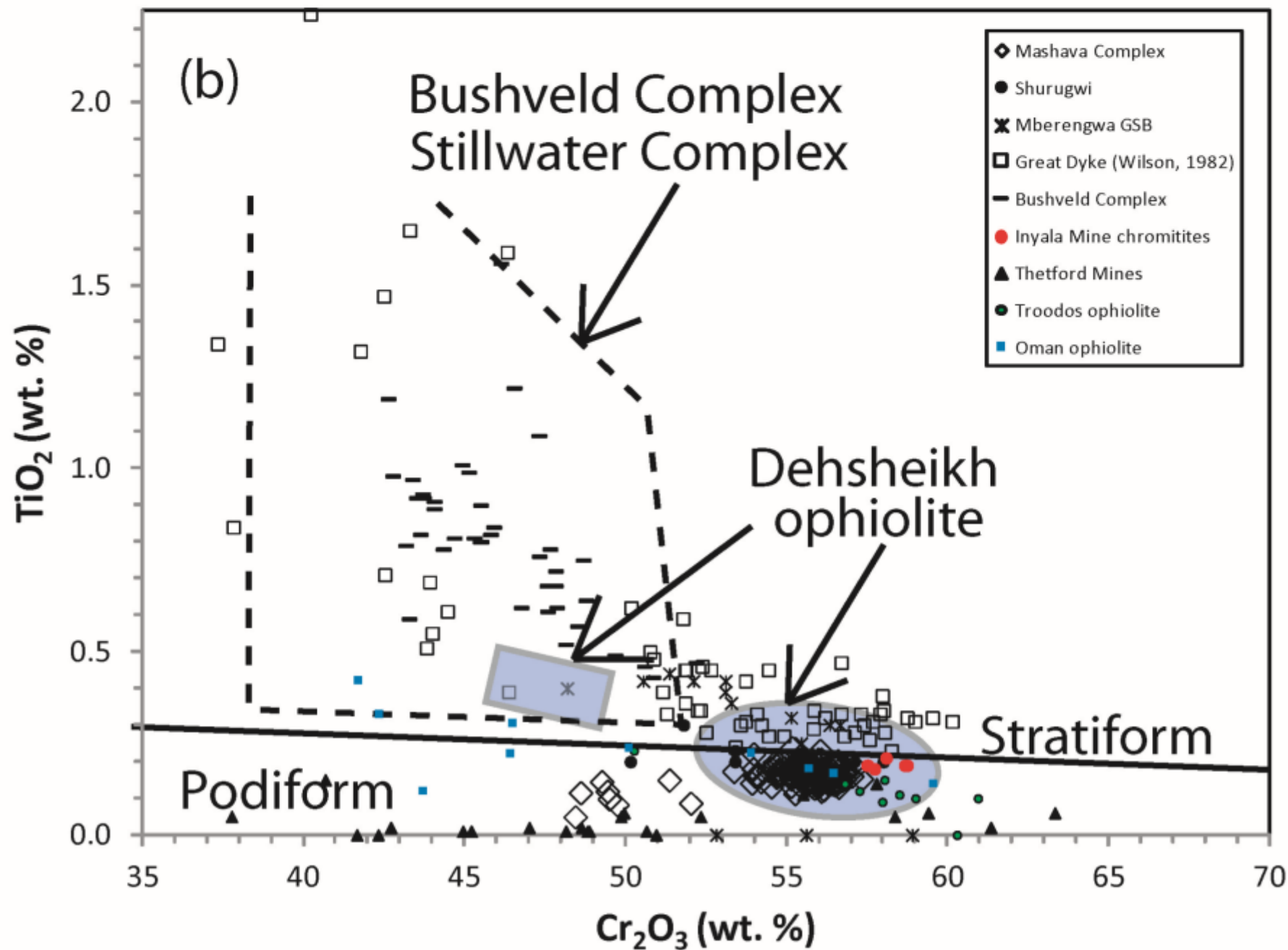


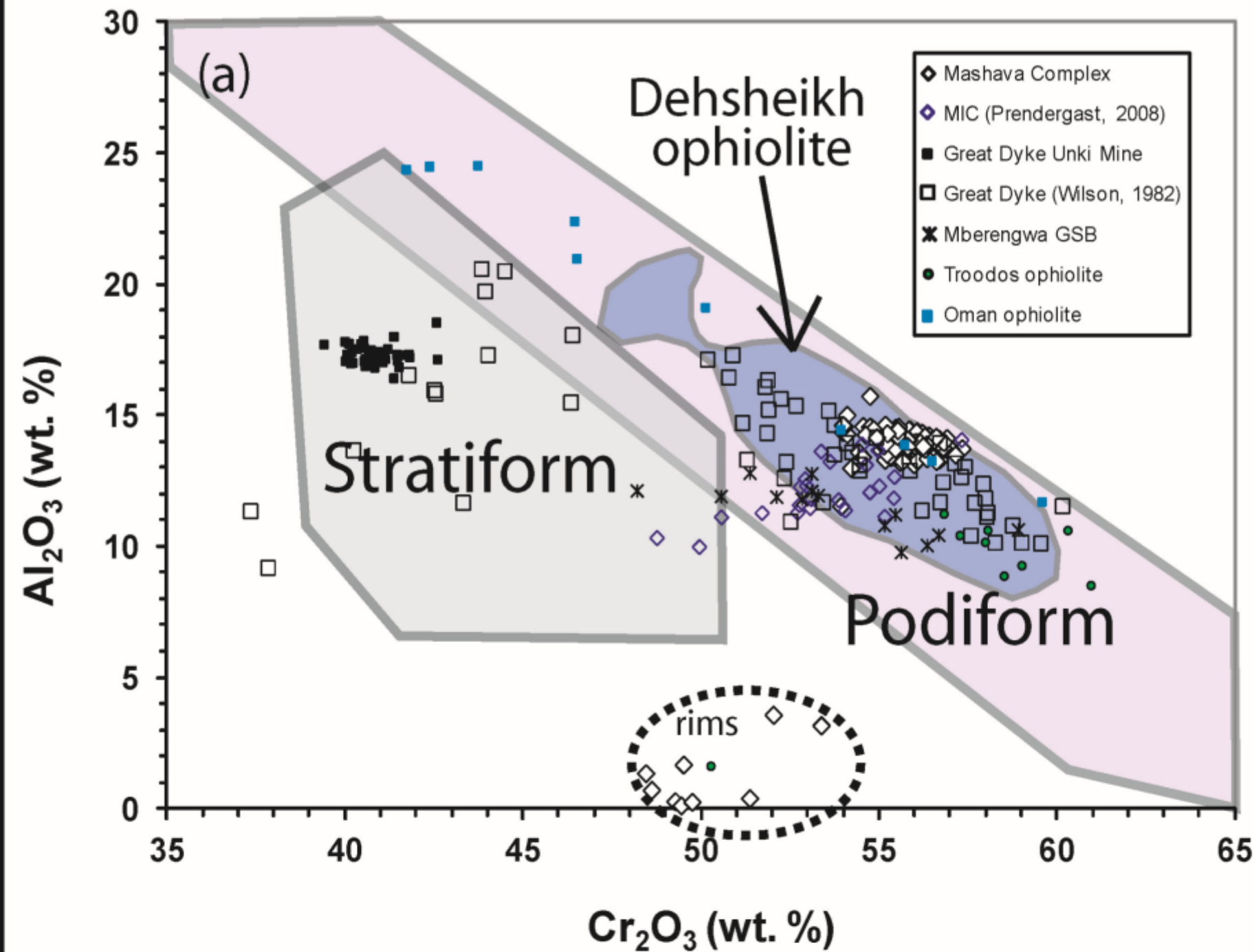


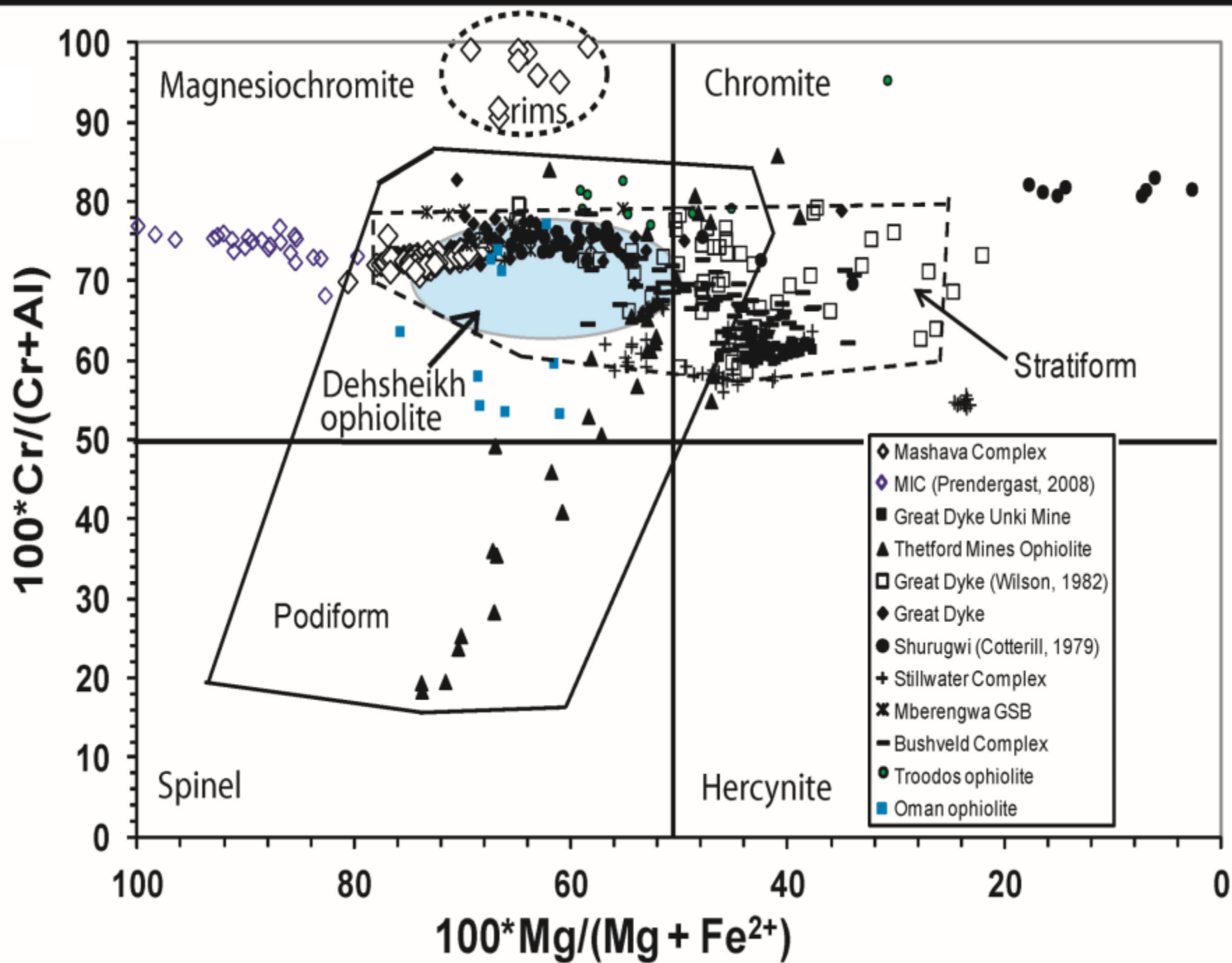


100 x Cr#

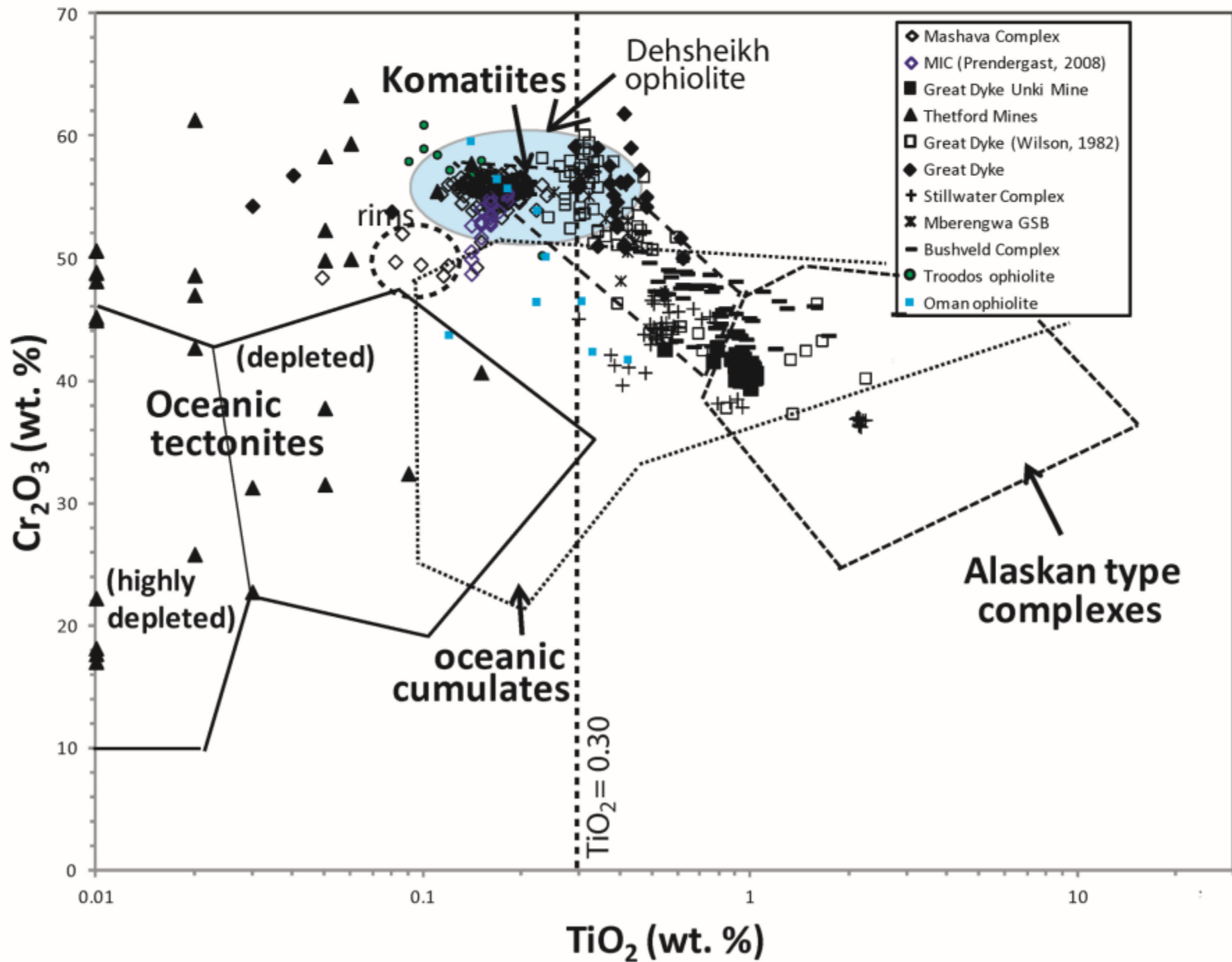


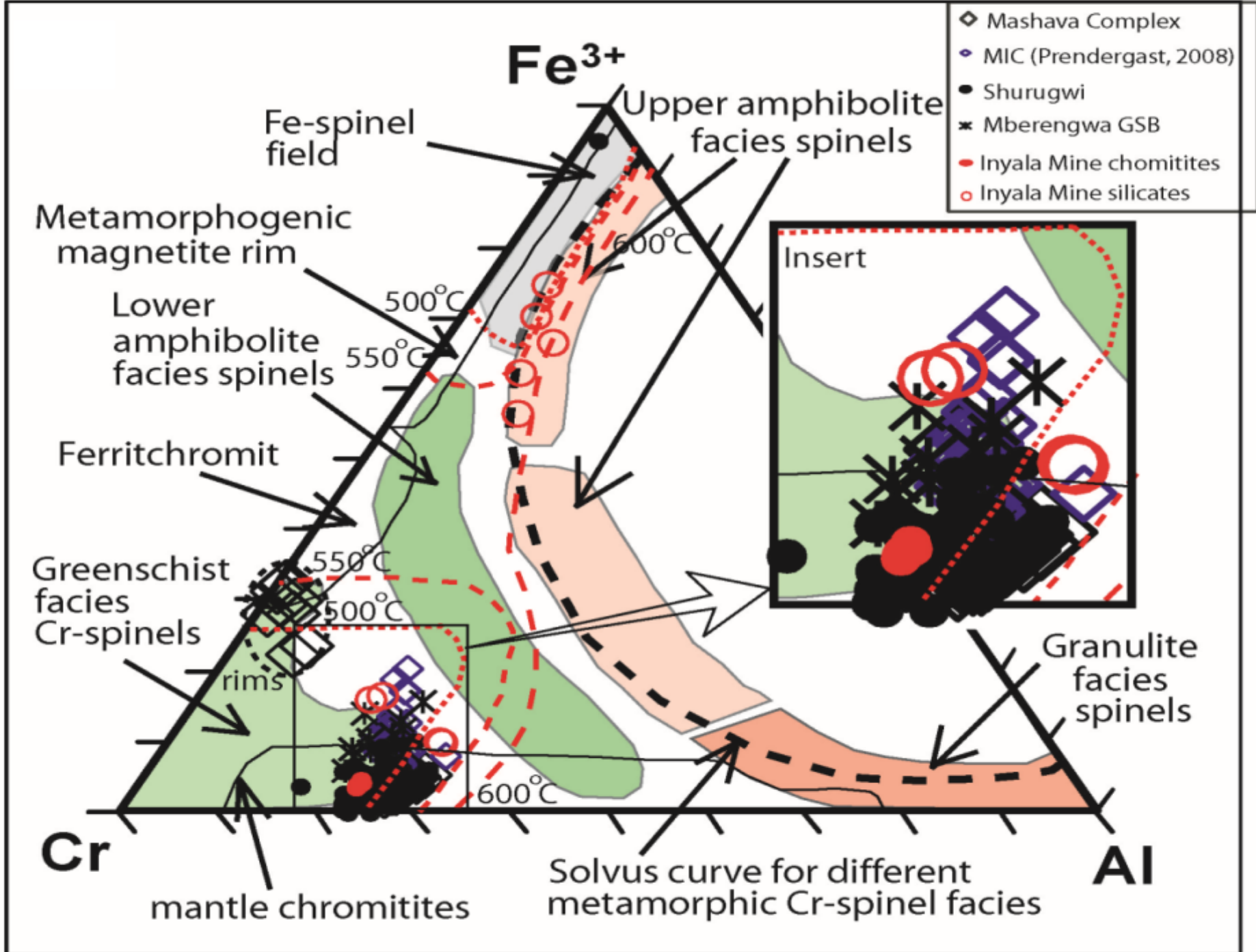


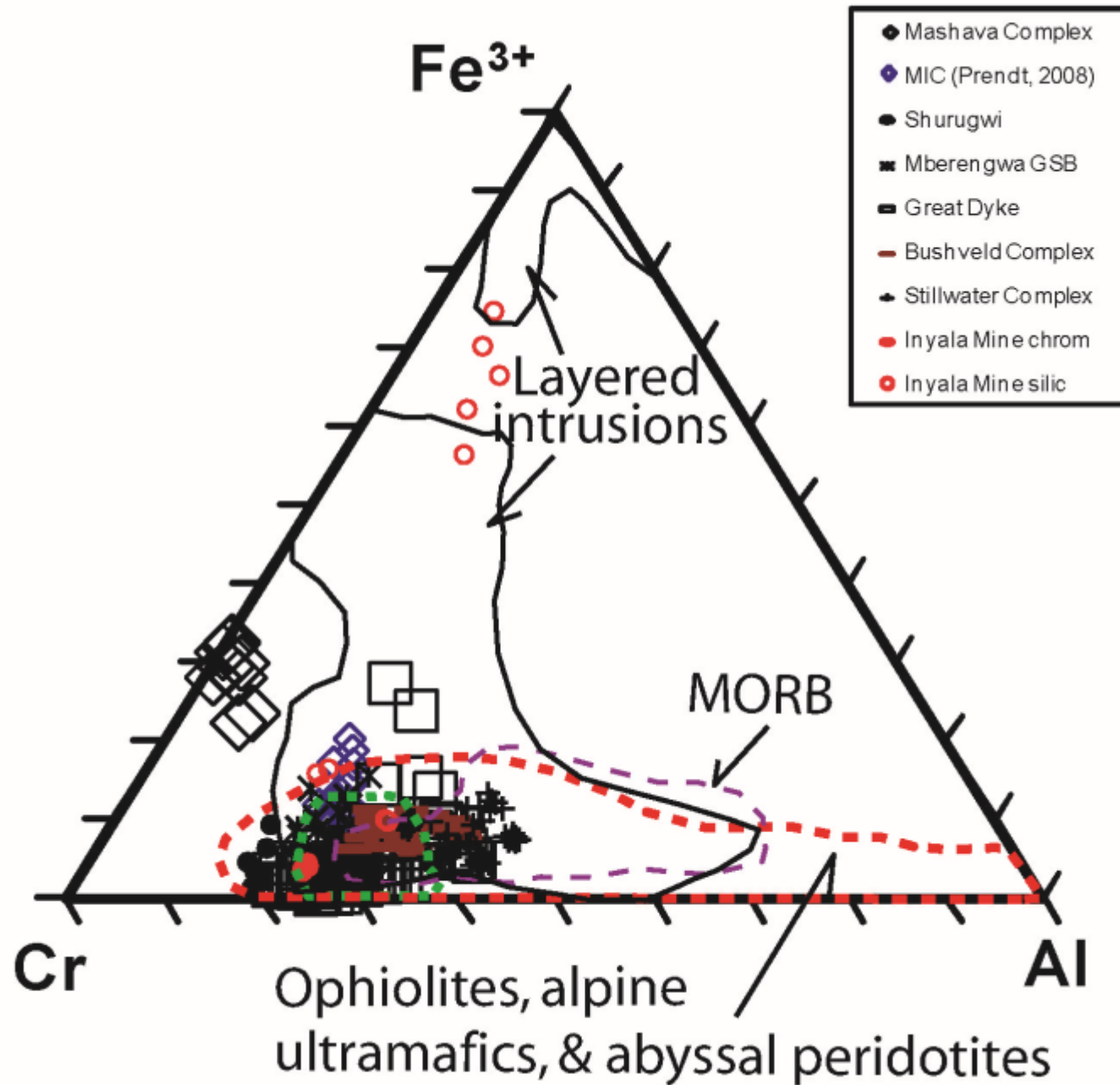


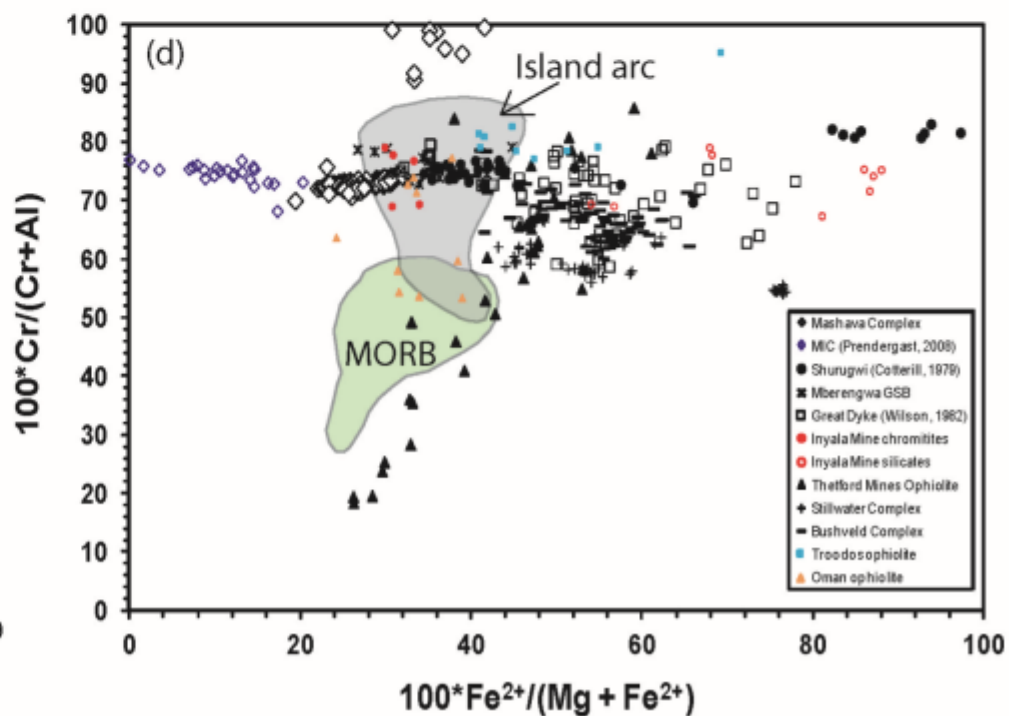
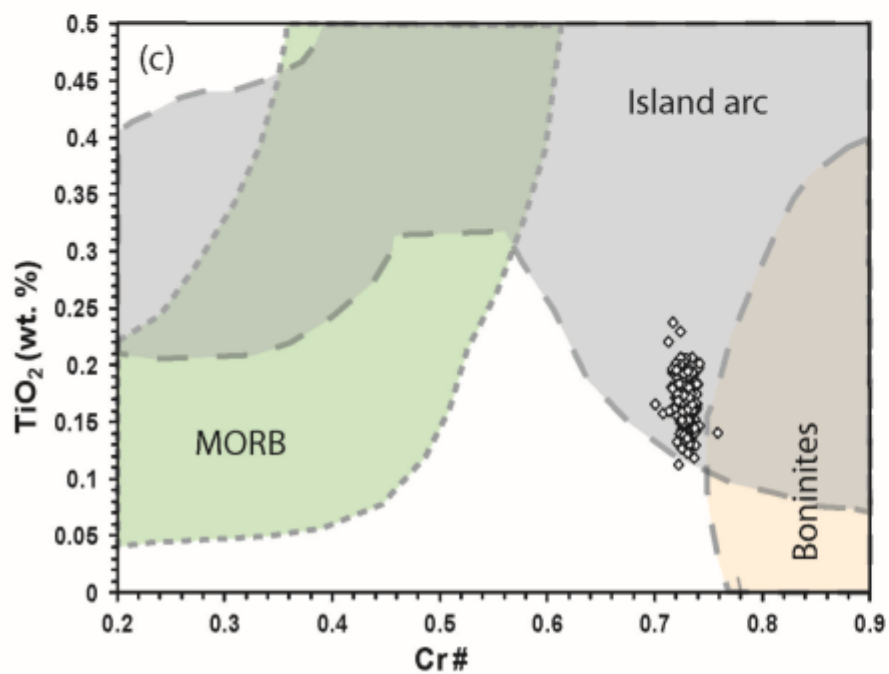
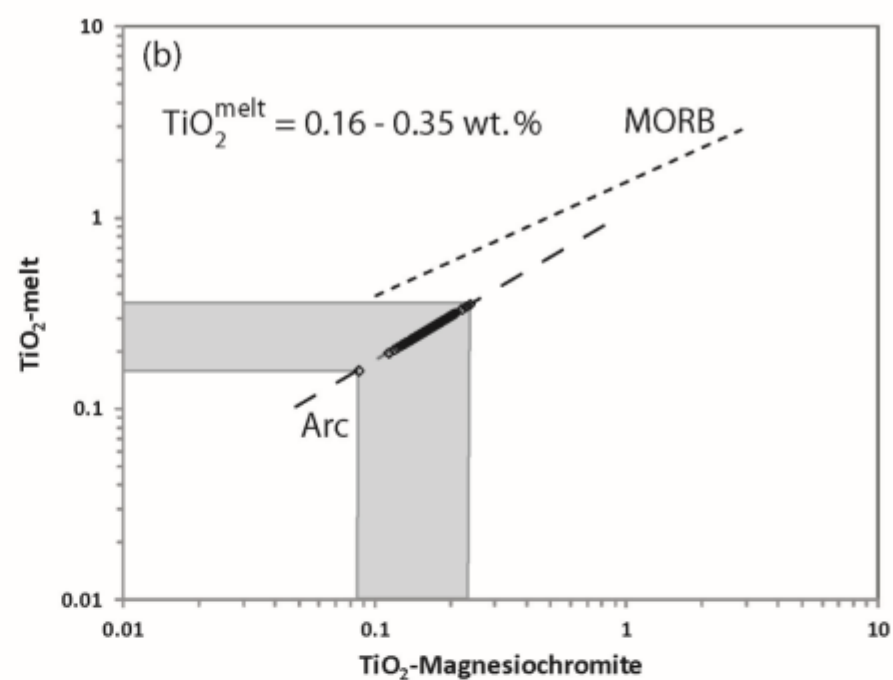
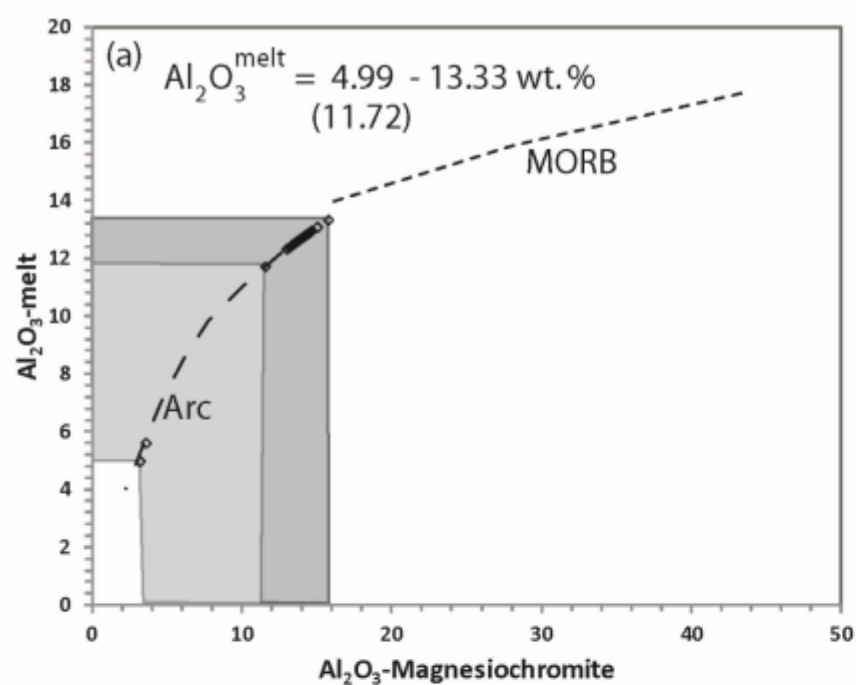


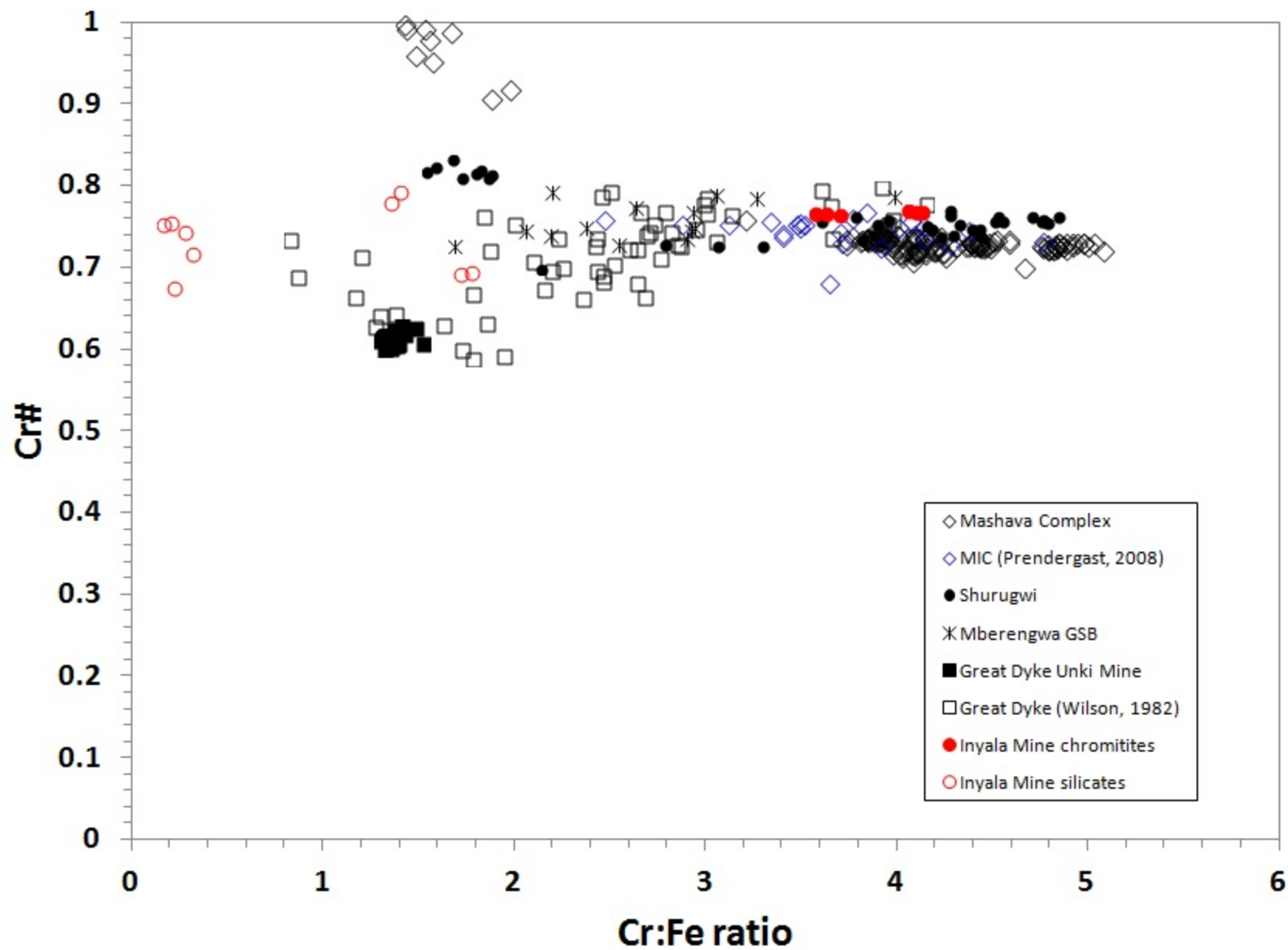
(b)

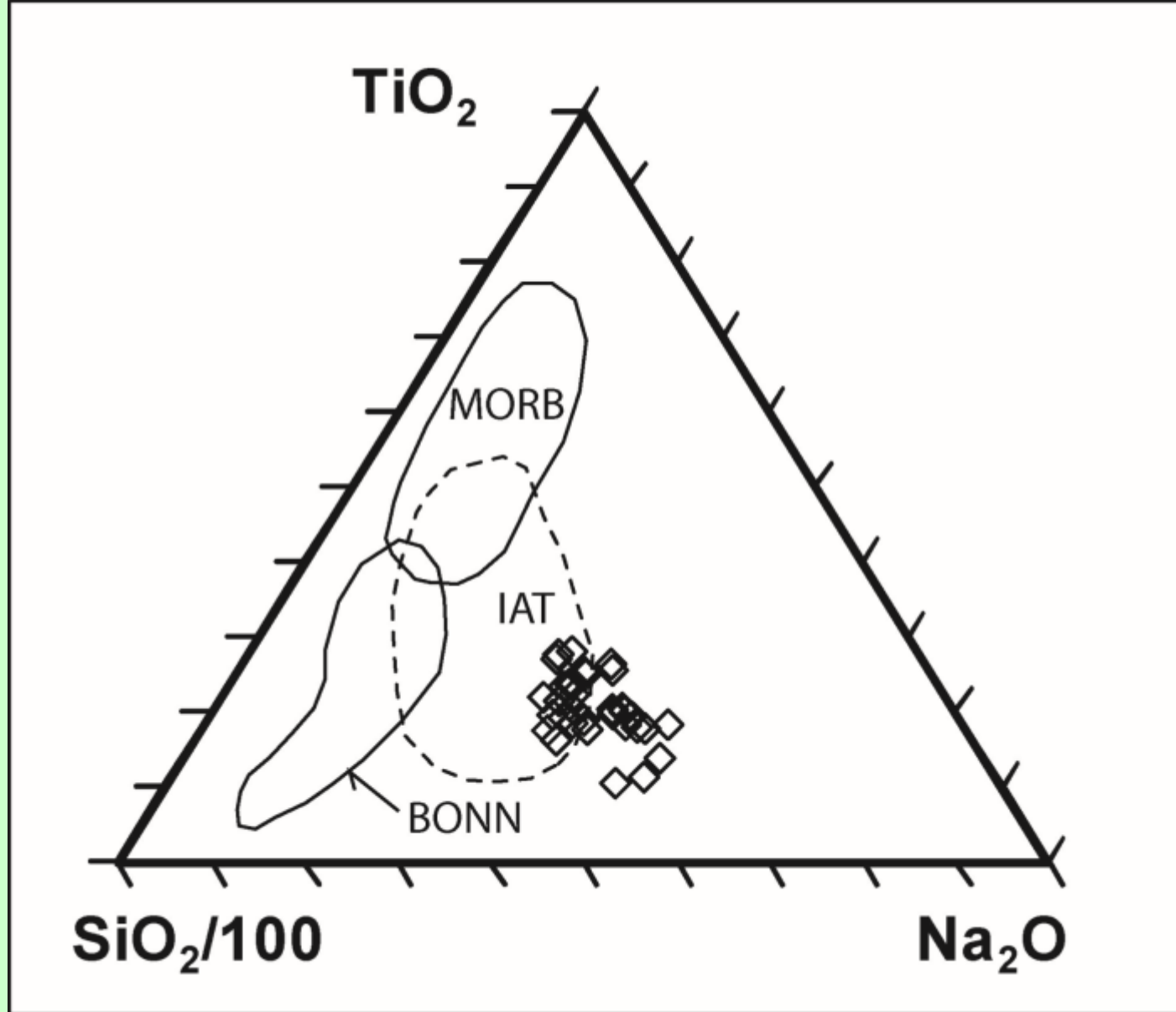




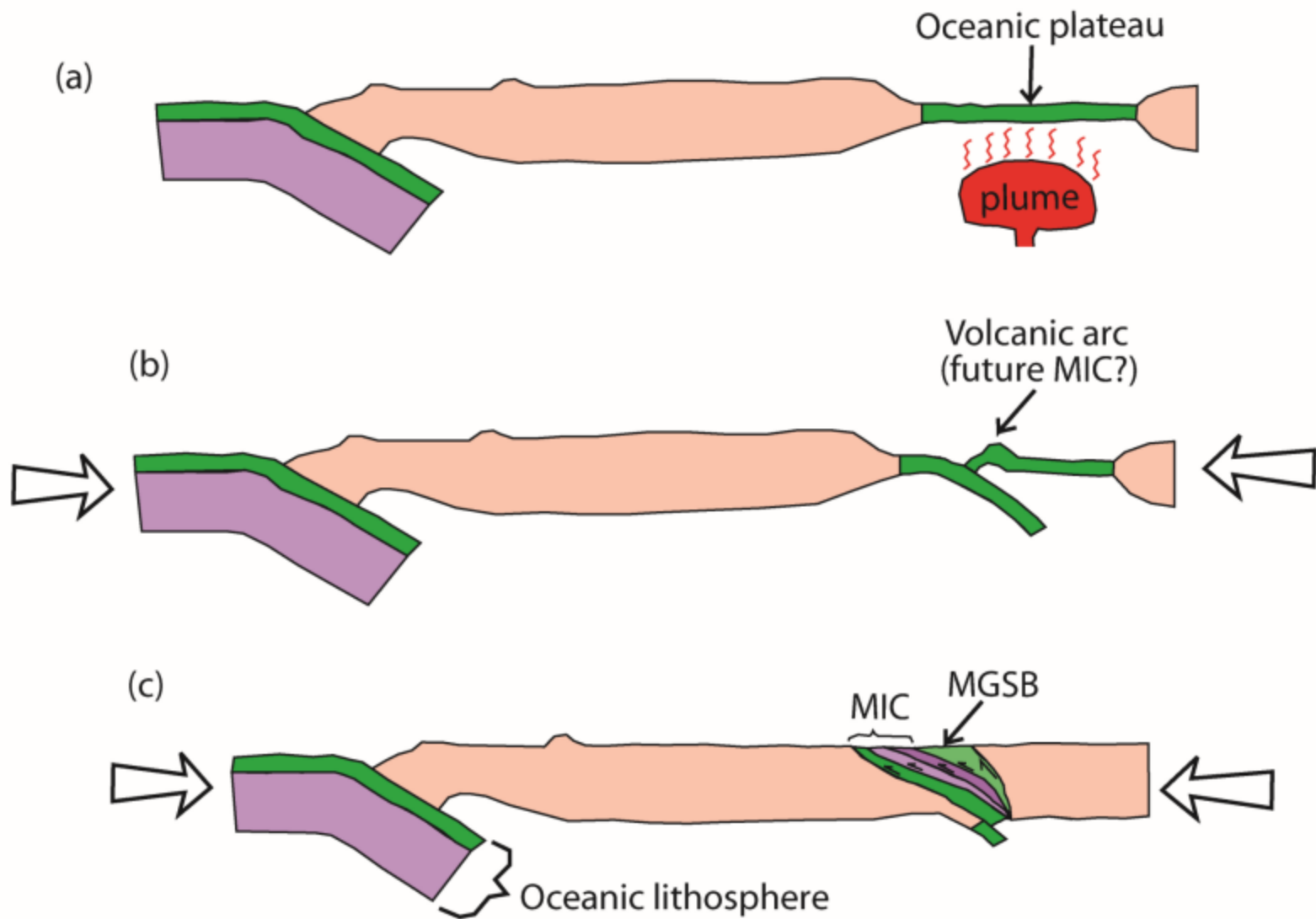








Cpx composition is related to host magma type.



EXPLANATION

Continents

Compression

MIC work currently under way

- i. Sulfide chemistry
- ii. Chlorite thermometry
- iii. Pyroxene thermometry
- iv. Amphibole thermometry
- v. MELTS modeling

Summary

- Although for long interpreted as a 'layered mafic intrusion', results here suggest that the MIC likely originated at a convergent margin boundary
- Chromite chemistry lend support to an 'ophiolitic' origin for the MIC
- MIC contains high-grade chrome, even higher than other chromite deposits in Zimbabwe

Not really the end –
there is a lot to be done!

Questions?