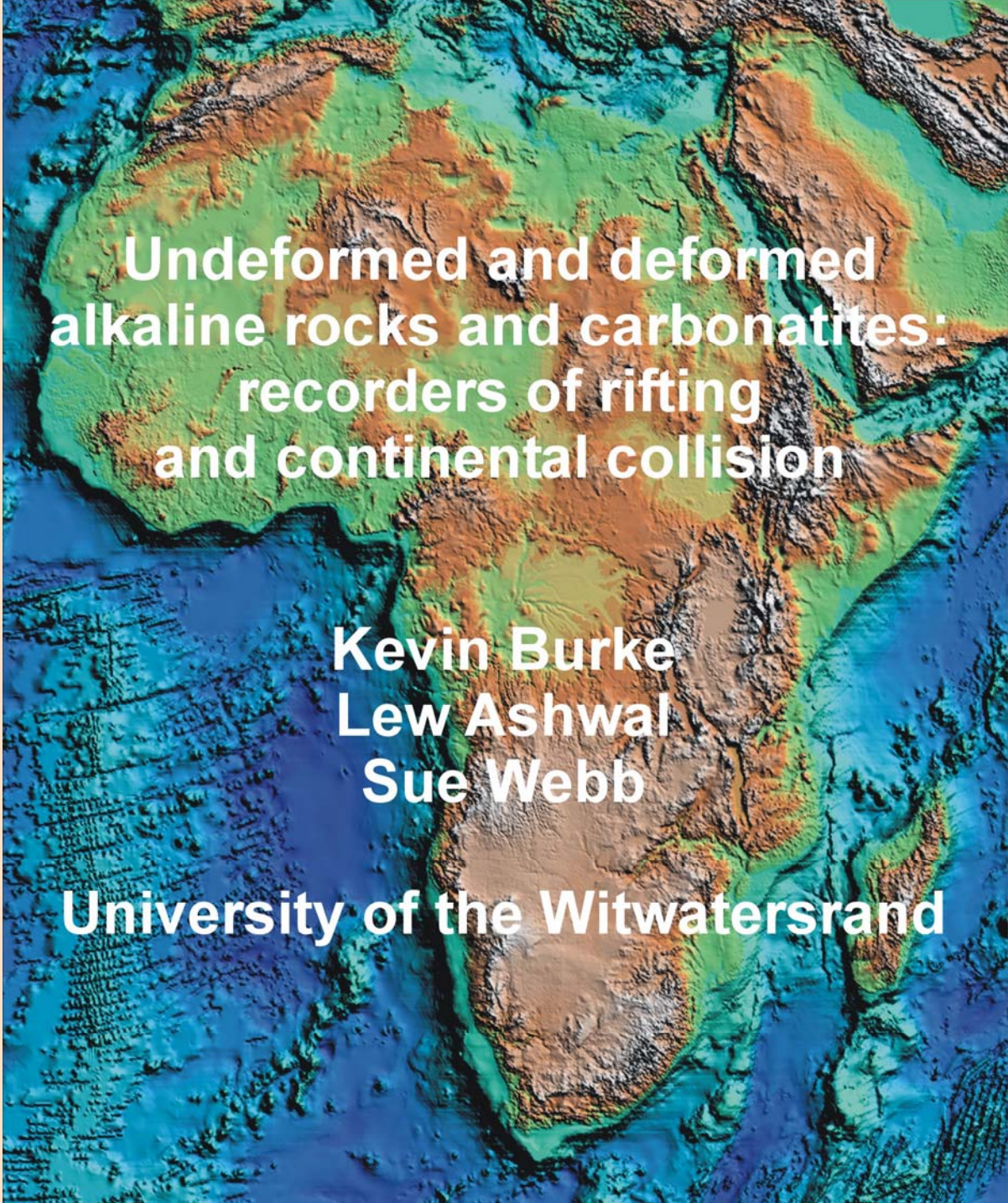


See:
“New way
to map
old
Sutures..”
by these
authors in:

Geology
2003,
Vol.31
p.391-394

A topographic map of the African continent, color-coded by elevation. The map shows the continent's outline and internal features like the Great Rift Valley and major mountain ranges. The colors range from blue (low elevation) to brown and red (high elevation).

**Undeformed and deformed
alkaline rocks and carbonatites:
recorders of rifting
and continental collision**

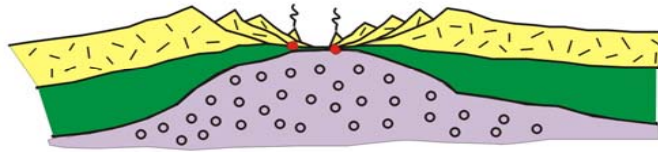
**Kevin Burke
Lew Ashwal
Sue Webb**

University of the Witwatersrand

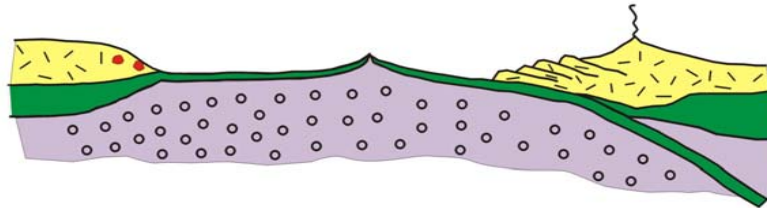
Model has now been tested in The Great Proterozoic Fold-belt of India, The British Columbian Cordillera The Kola Peninsula of Russia and linked Finnmark In Norway

Repeated alkaline intracontinental magmatism: A model based on examples from Malawi

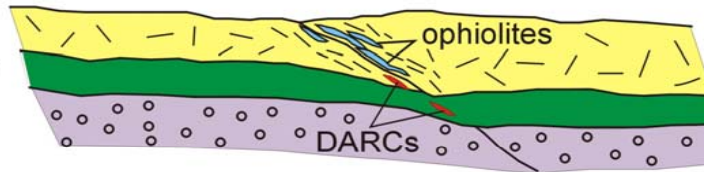
A. 1000? Ma
First alkaline rocks formed,
Continental rupture



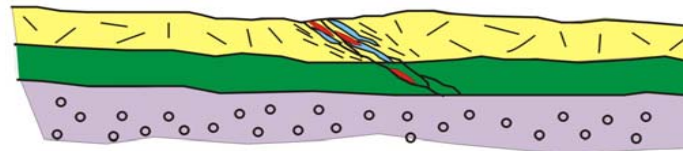
B. 700? Ma
Ocean open,
Alkaline rocks
not active



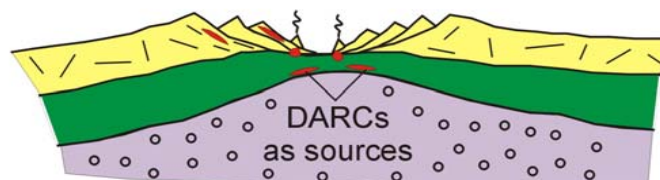
C. 550Ma
Pan-African collision,
Deformation of
alkaline rocks



D. 450 - 140 Ma
Lithospheric stability,
DARCs in crust
& mantle lithosphere



E. 140 Ma
Cretaceous rifting,
Renewed alkaline
igneous activity



AFRICAN ALKALINE IGNEOUS ROCKS

Data from Woolley (2001)

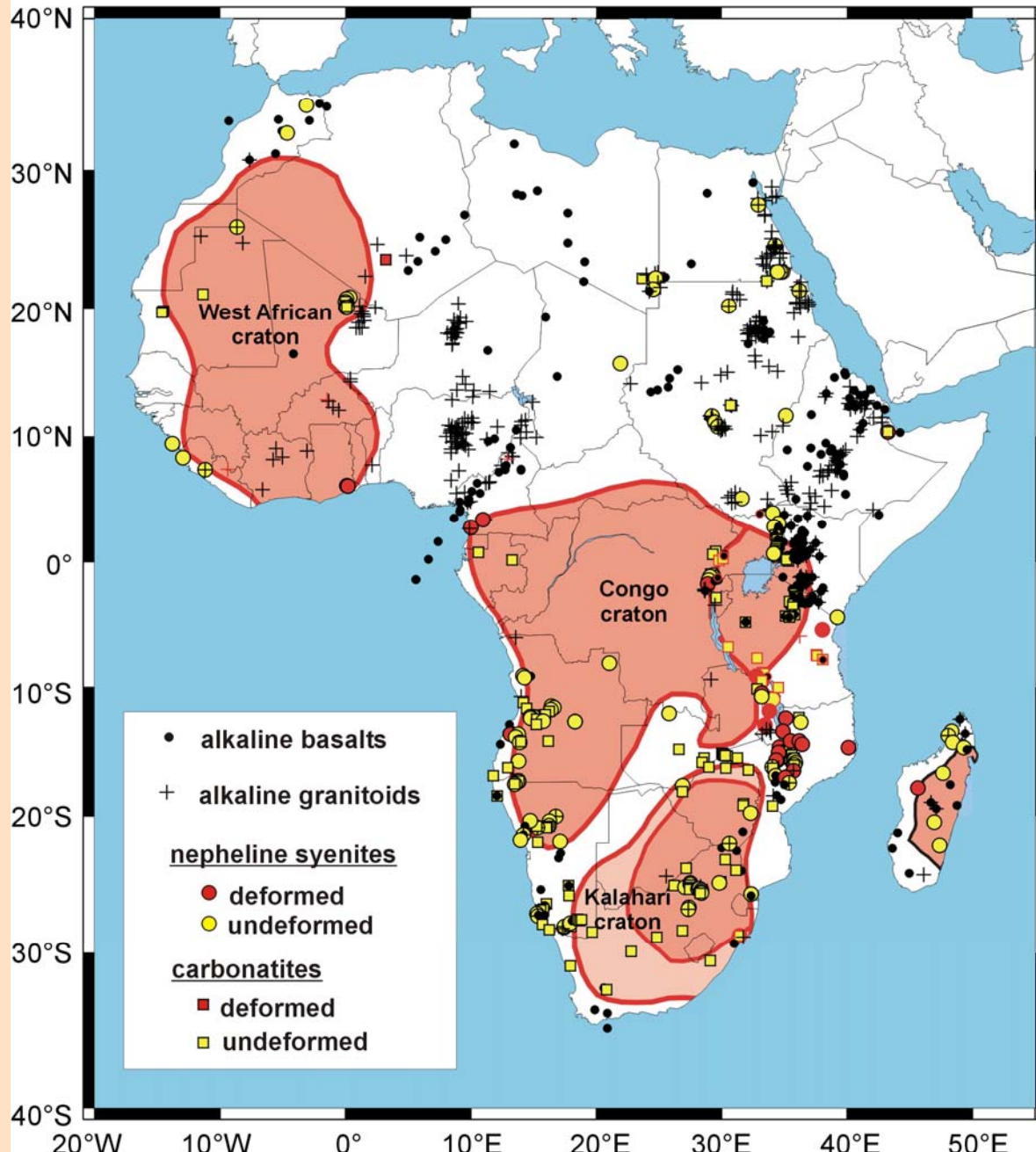


Image courtesy of The Geological Society of America.

AFRICAN ALKALINE IGNEOUS ROCKS

Deformed nepheline syenites & carbonatites

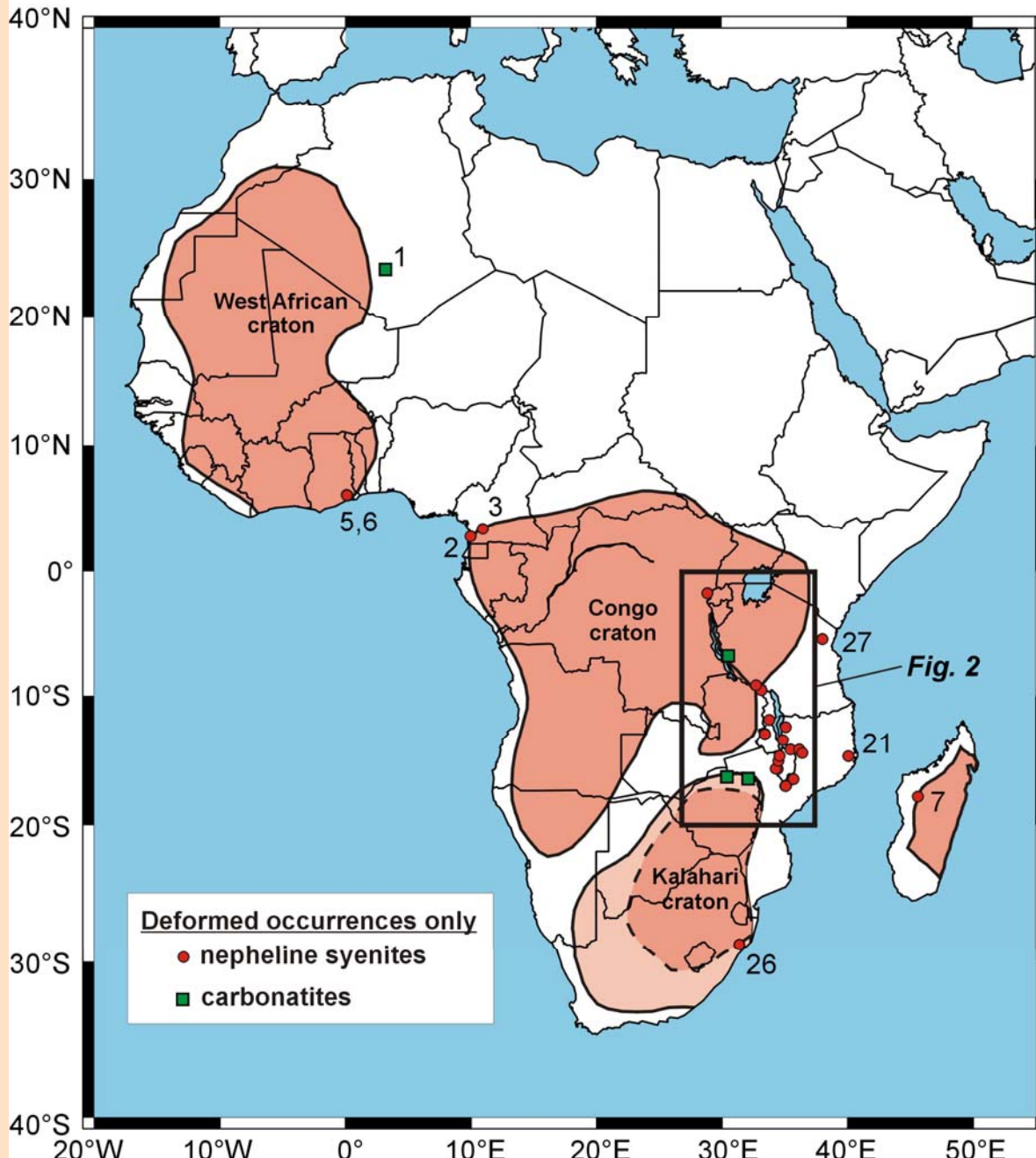


Image courtesy of The Geological Society of America.

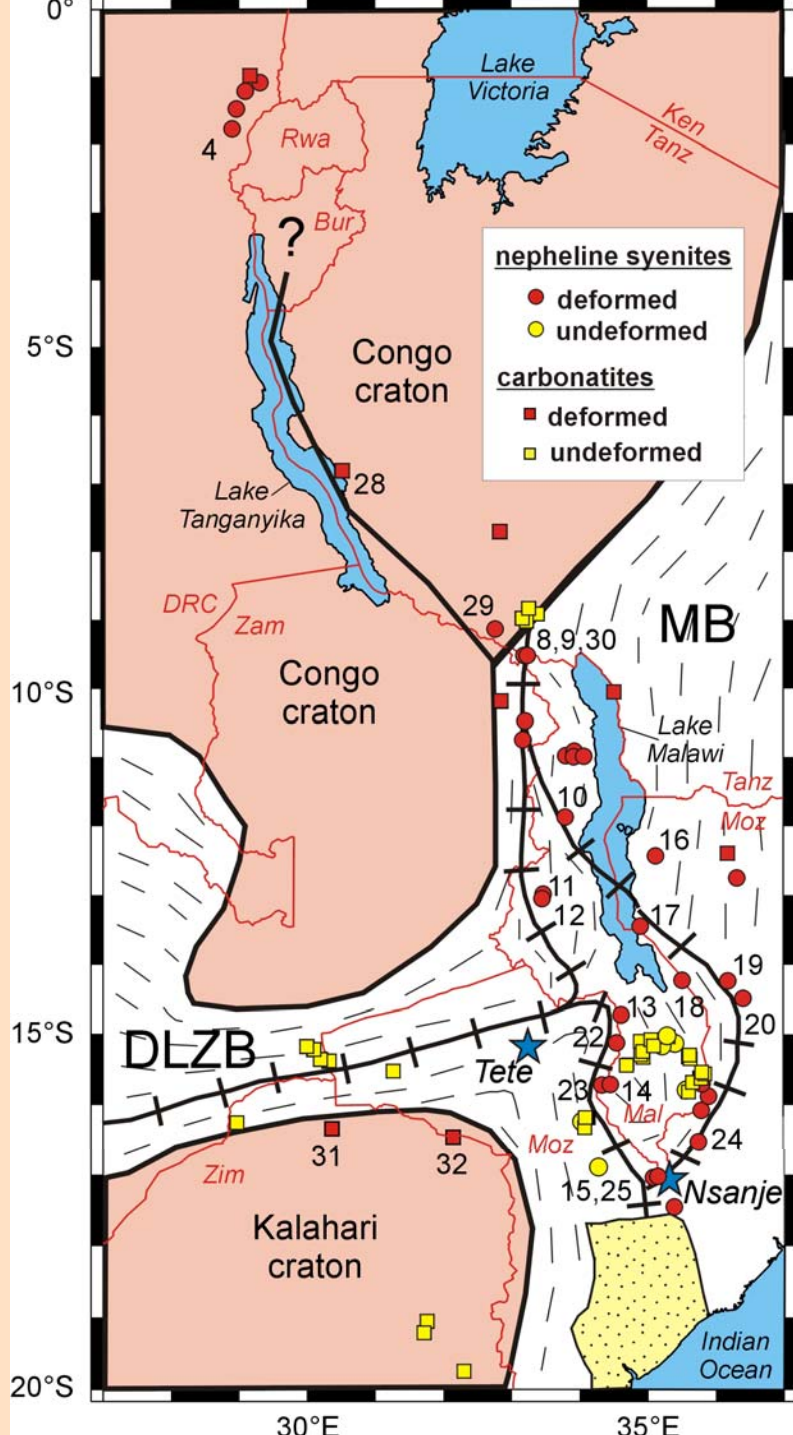


Image courtesy of The Geological Society of America.

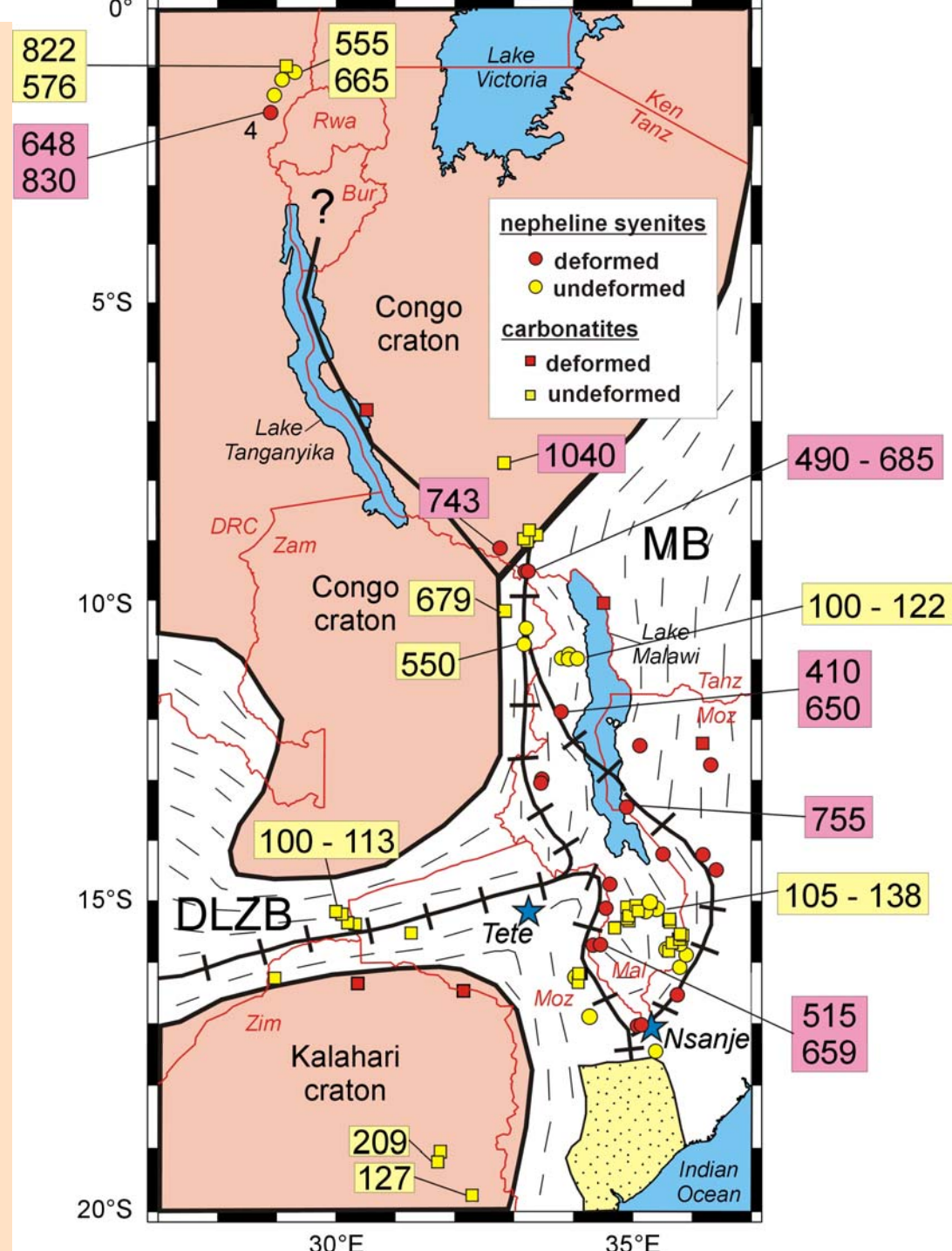


Image courtesy of The Geological Society of America.

Chinduzi porphyritic foyaite
Chilwa Province, Malawi
~116 Ma



**Chinduzi nepheline syenite
Chilwa Province, Malawi
~116 Ma**

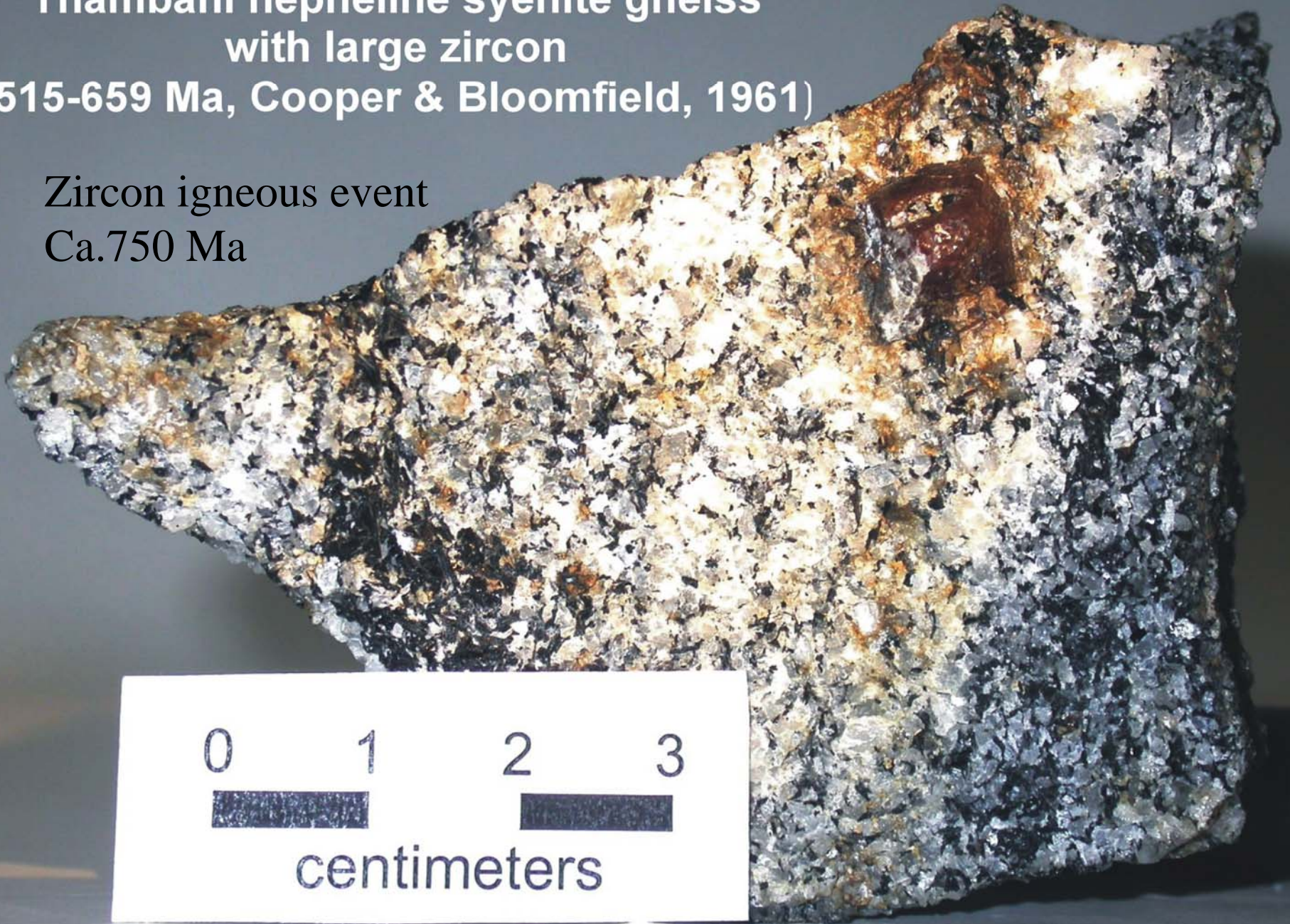


Nepheline syenite gneiss
Thambani, southern Malawi
>659 Ma



**Thambani nepheline syenite gneiss
with large zircon
(515-659 Ma, Cooper & Bloomfield, 1961)**

Zircon igneous event
Ca.750 Ma



One of these crystals has yielded ca. 750 Ma ages in F. Corfu's lab
And comparable SHRIMP ages in Canberra. Attempts to extract
An age related to collision continue on some material in the crystals



Conclusions

- ~90% of DARCs (28 of 32 localities) occur in known or inferred suture zones, mostly of Proterozoic age. The remaining 4 are on a probable suture
 - We attribute this to:
 - Emplacement of nepheline syenite & carbonatite in intracontinental rifts
 - Later deformation of those rocks during continental collisions
- Subduction of DARCs into the mantle lithosphere as a result of collision provides a reservoir of source rocks for alkaline magmatism in a younger rift, as in southern Malawi