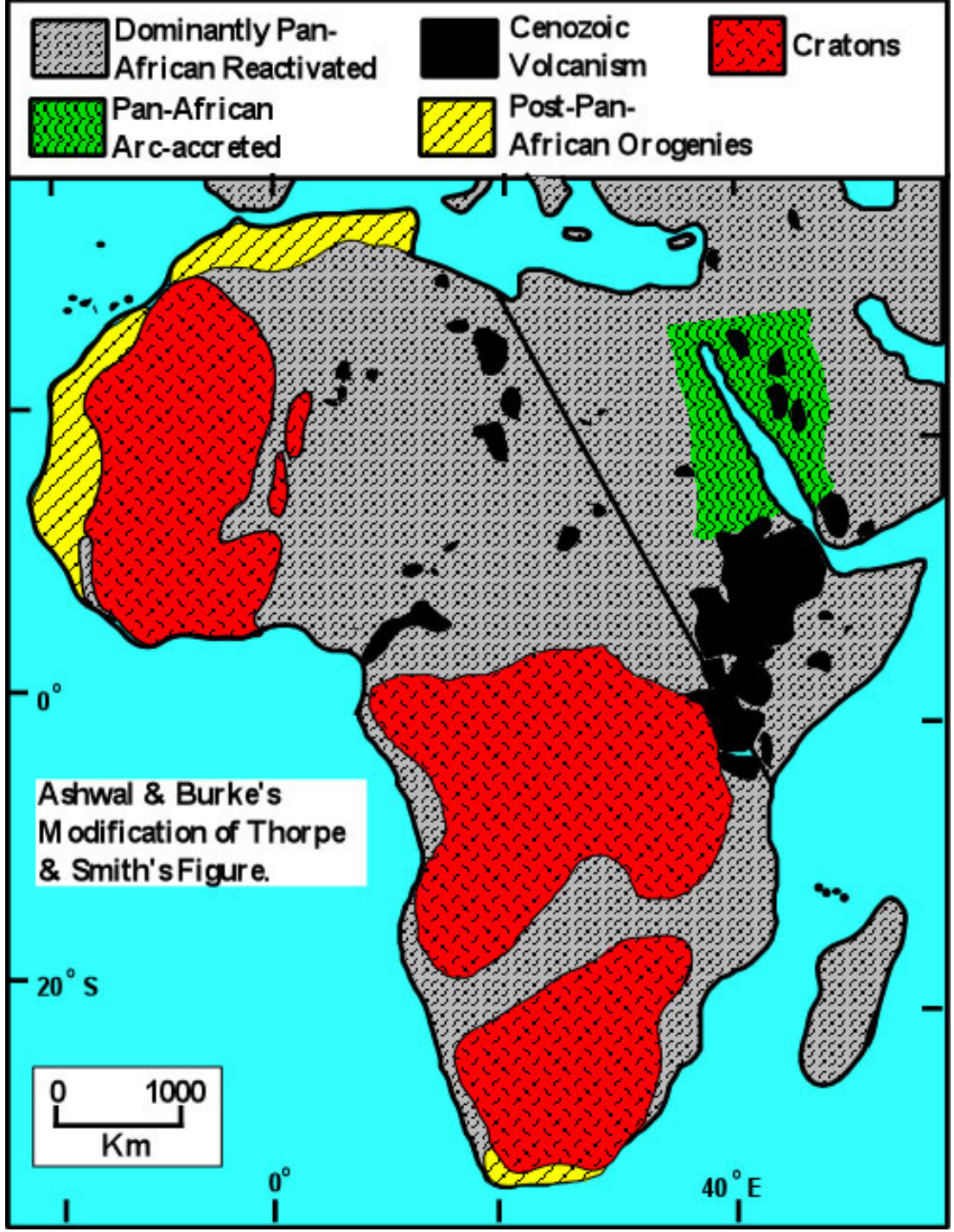
Volcanic rocks < 30 Ma in age are restricted to areas of reactivated Continental crust.

Cratonic lithosphere is thought too thick to cross the basalt solidus even where it has been elevated on swells. It is also highly depleted



Elevation of the African continent contrasts with that of other continents.

Suggested reasons are:

(1) Absence of mountain chains.

And

(2) Elevation of what until 30 Ma was a low-lying continent.

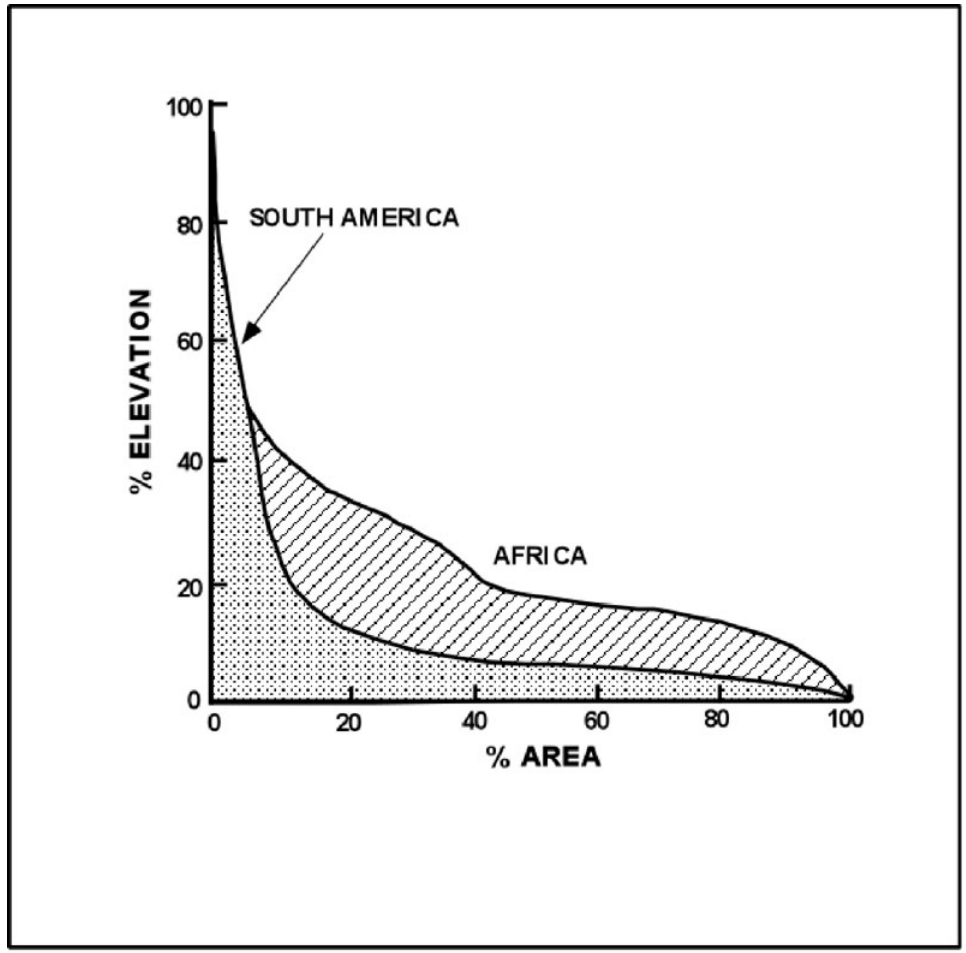
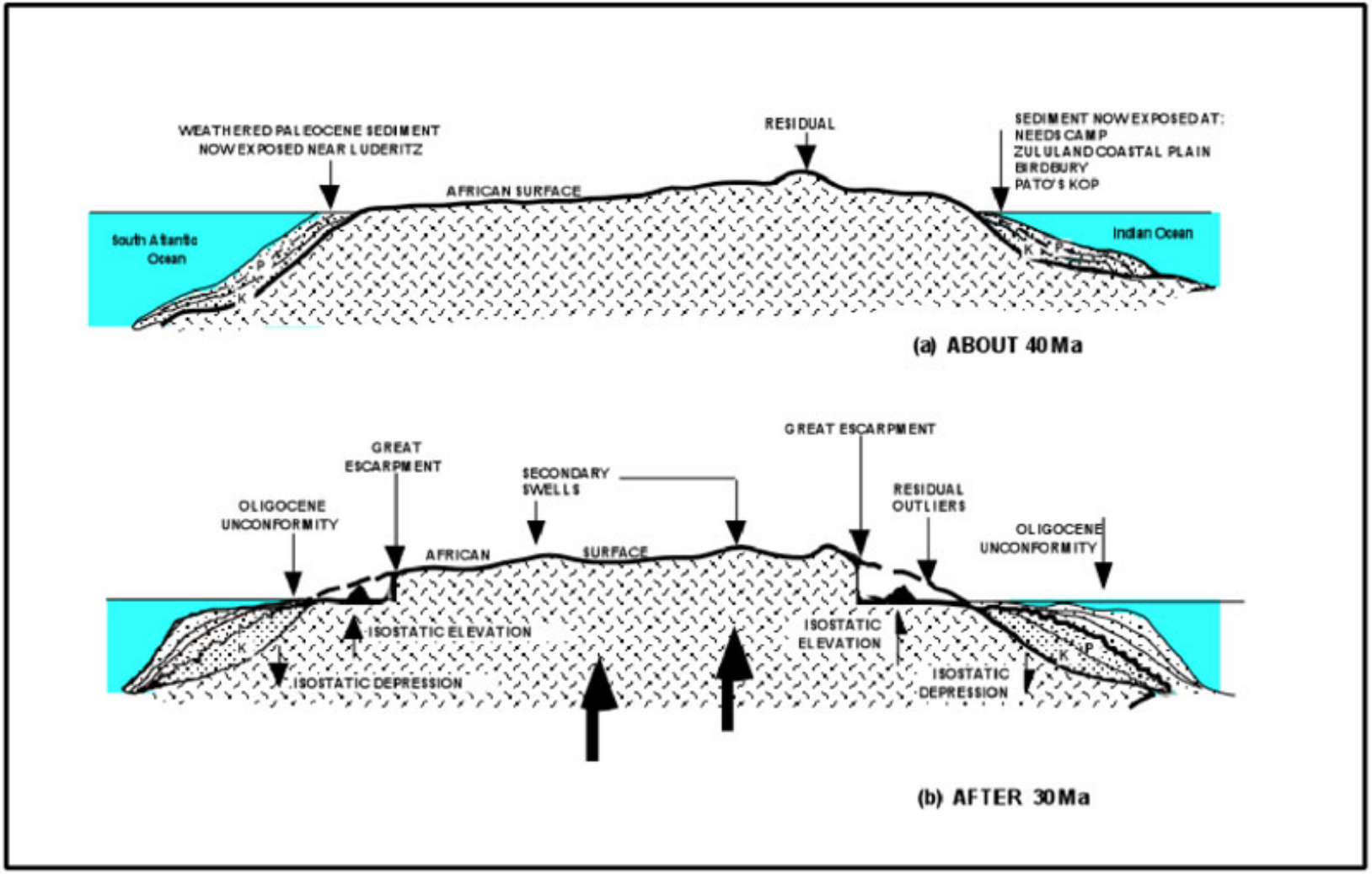


Image courtesy of The Geological Society of South Africa.



From ca.100 Ma after rift shoulders at the continental margin had been eroded southern Africa was low-lying with residual hills. The Great Escarpment began to develop as the Great Swell of southern Africa started to rise at 30 Ma. Since ca.34 Ma rainfall in the SE has been greatest and the Drakensberg has risen to nearly 4 km.

Image courtesy of The Geological Society of South Africa.

North-eastern Afro-Arabia just before the Afar plume erupted (A).

K-pippe rifts continued to receive sediment.

Volcanism in southern Ethiopia from 45 to 35 Ma migrated to the SW until Afro-Arabia stopped rotating.

The coasts of the low-lying continent were flooded and laterites continued to develop in the interior.

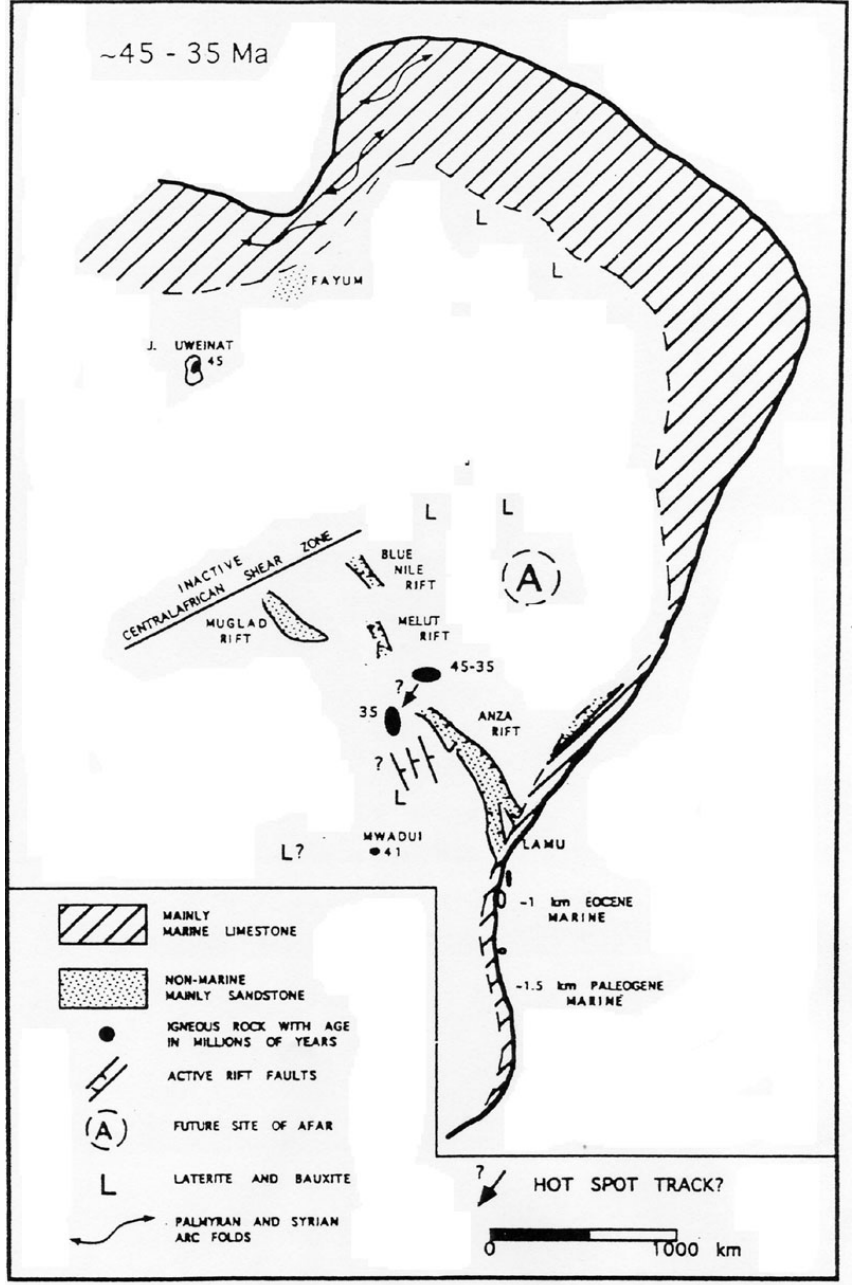


Image courtesy of The Geological Society of South Africa.

Gentle doming, Afar eruption,cracks formed dikes emplaced,rifts initiated all within temporal resolution.

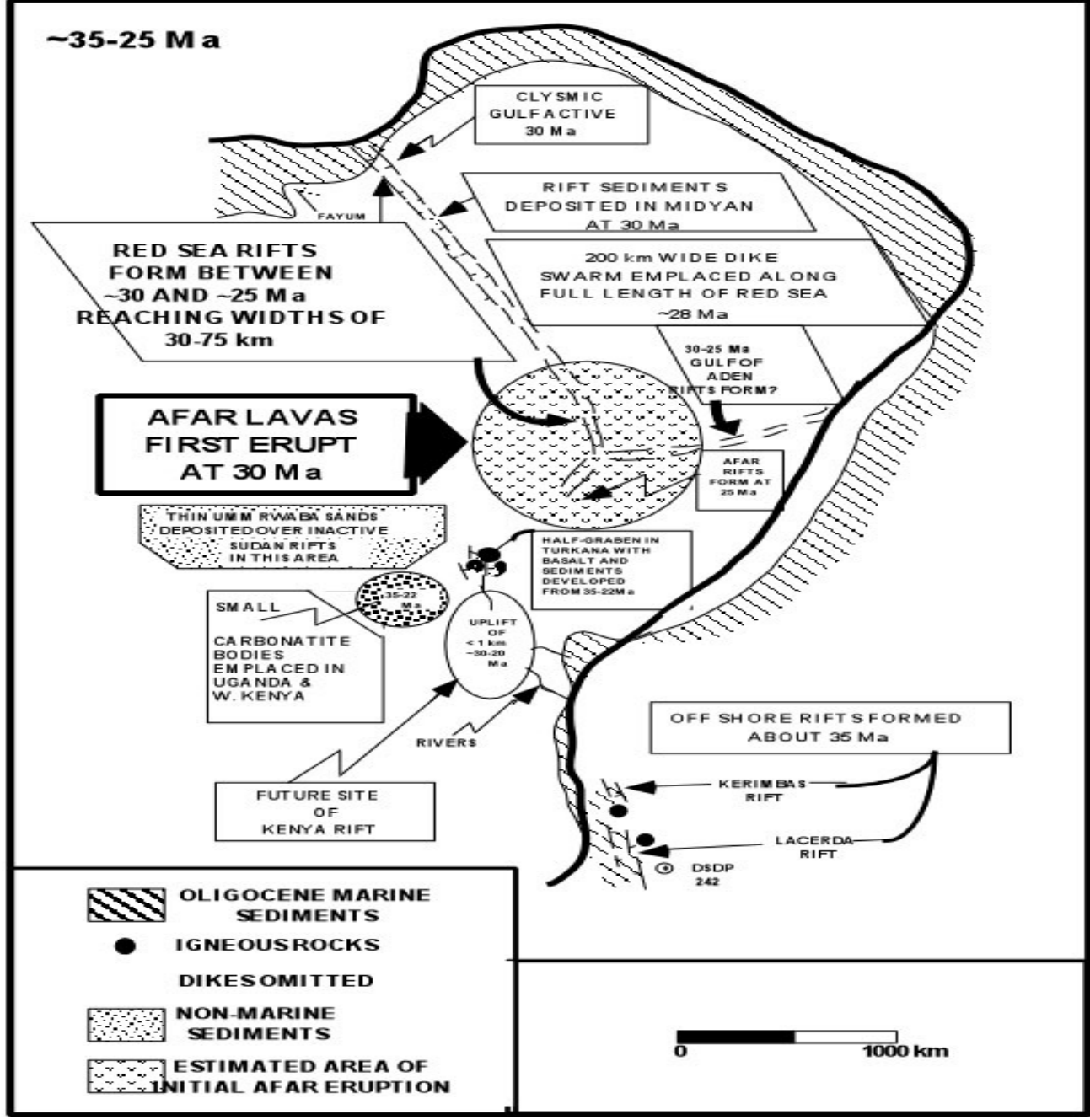


Image courtesy of The Geological Society of South Africa.

Rifts developed as far south as off-shore Mozambique.

No rifts formed in southern Kenya until ca.10 Ma.

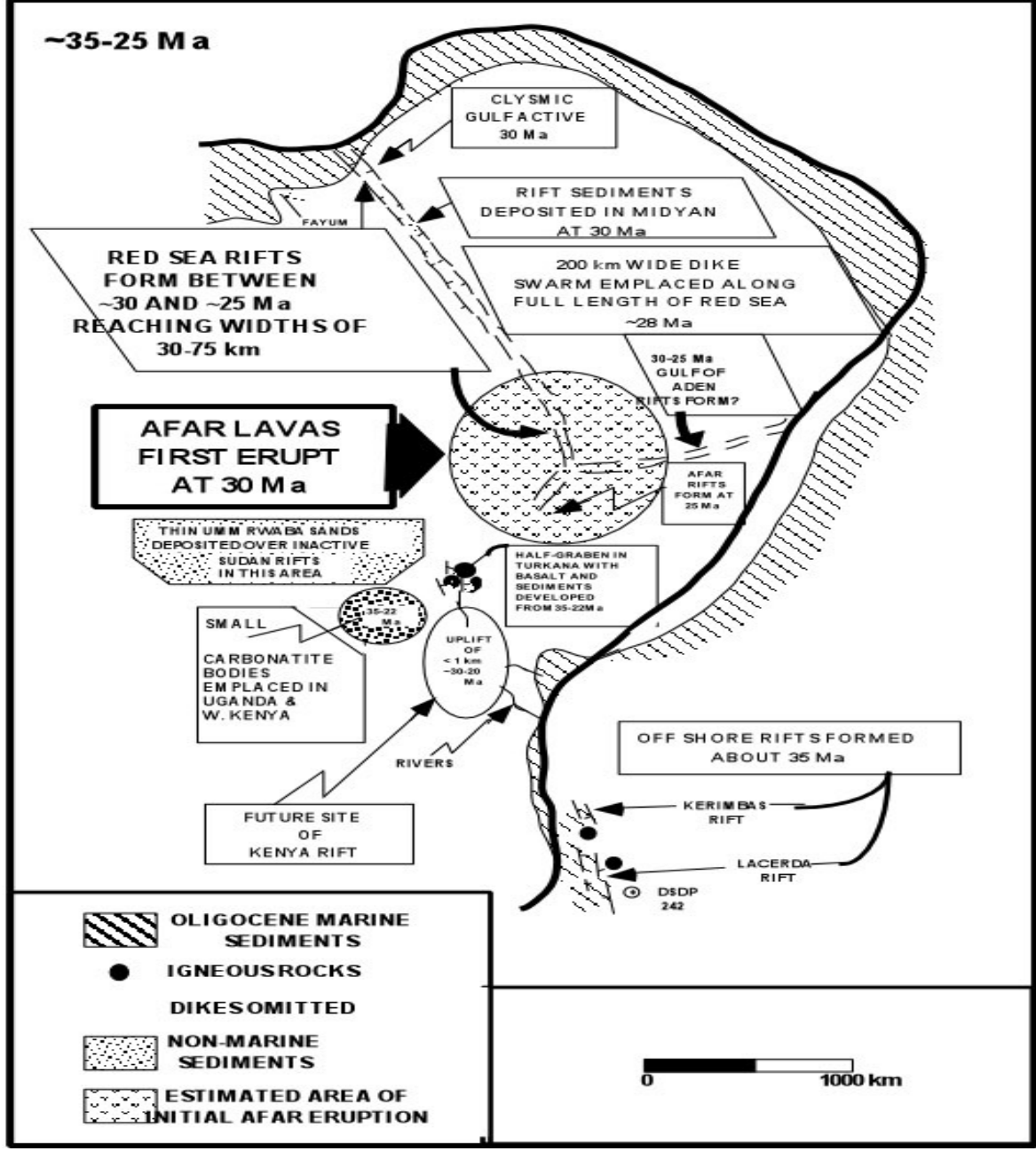


Image courtesy of The Geological Society of South Africa.

When the Afar dome arose stress modification was accommodated by crack propagation to places of existing abnormal stress concentration.

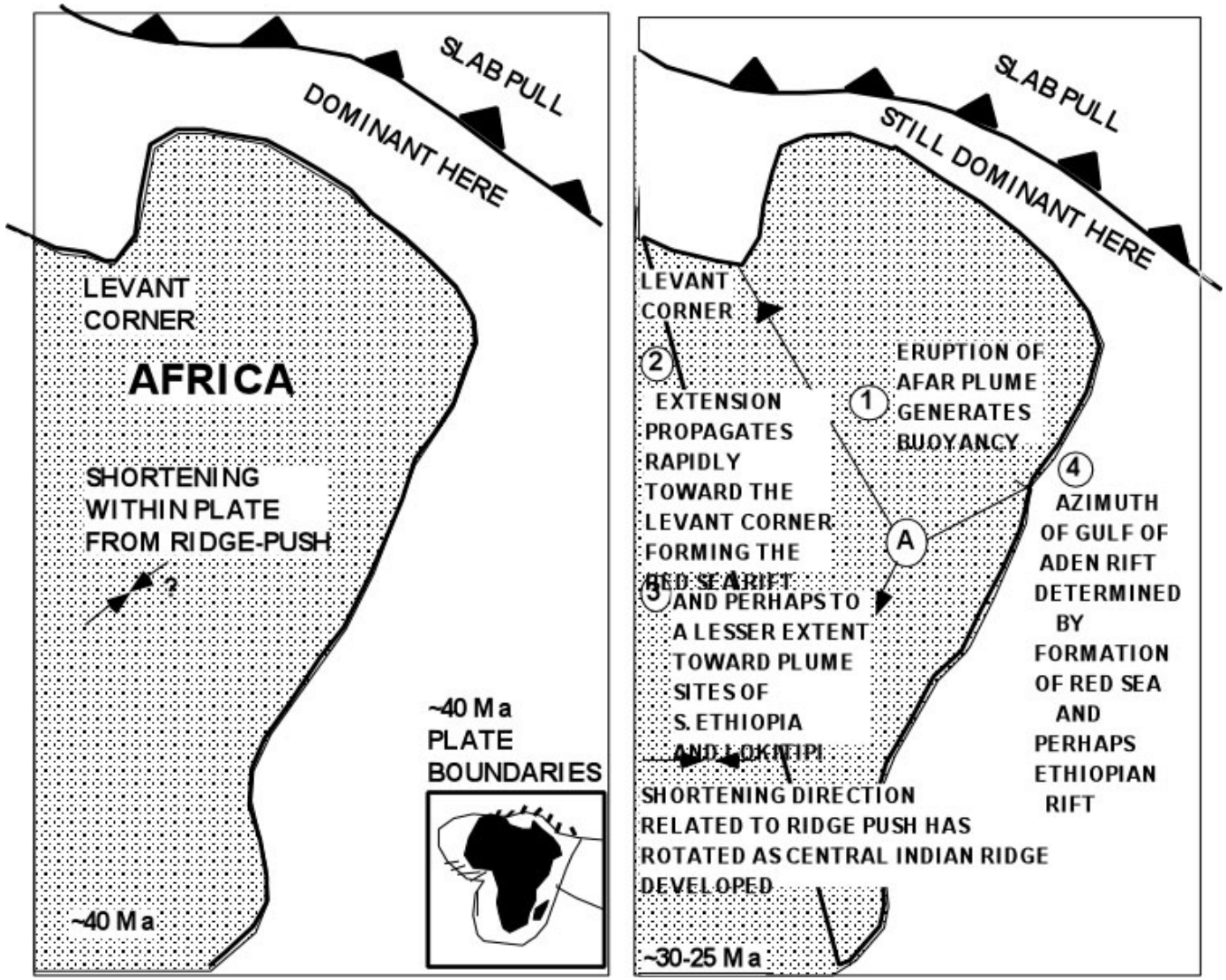


Image courtesy of The Geological Society of South Africa.

The off-shore Mozambique rift developed on one of the fracture zones that formed as Madagascar departed from Africa. The igneous rocks are as yet undated. DSDP 242 provides stratigraphic control.

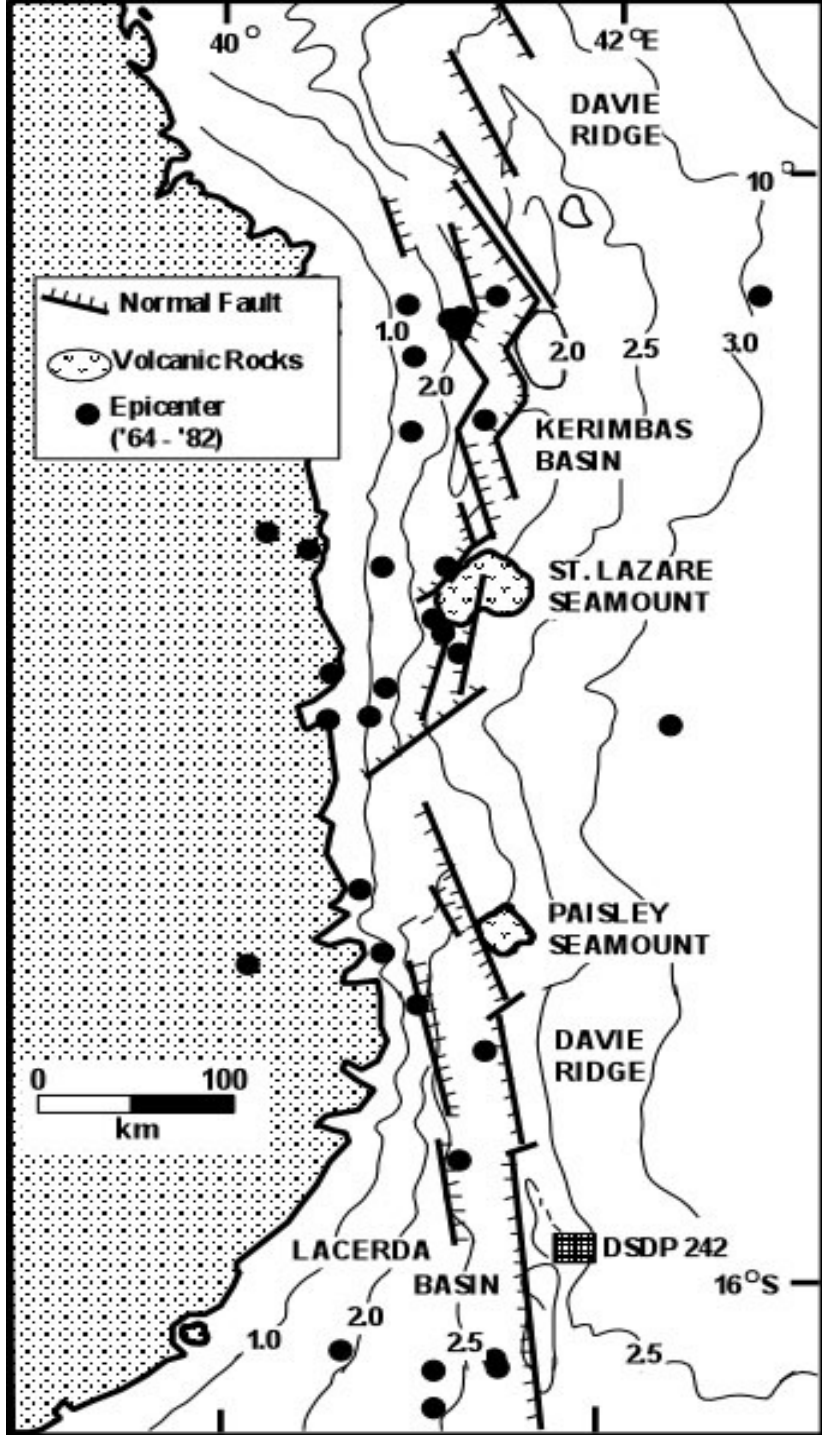


Image courtesy of The Geological Society of South Africa.

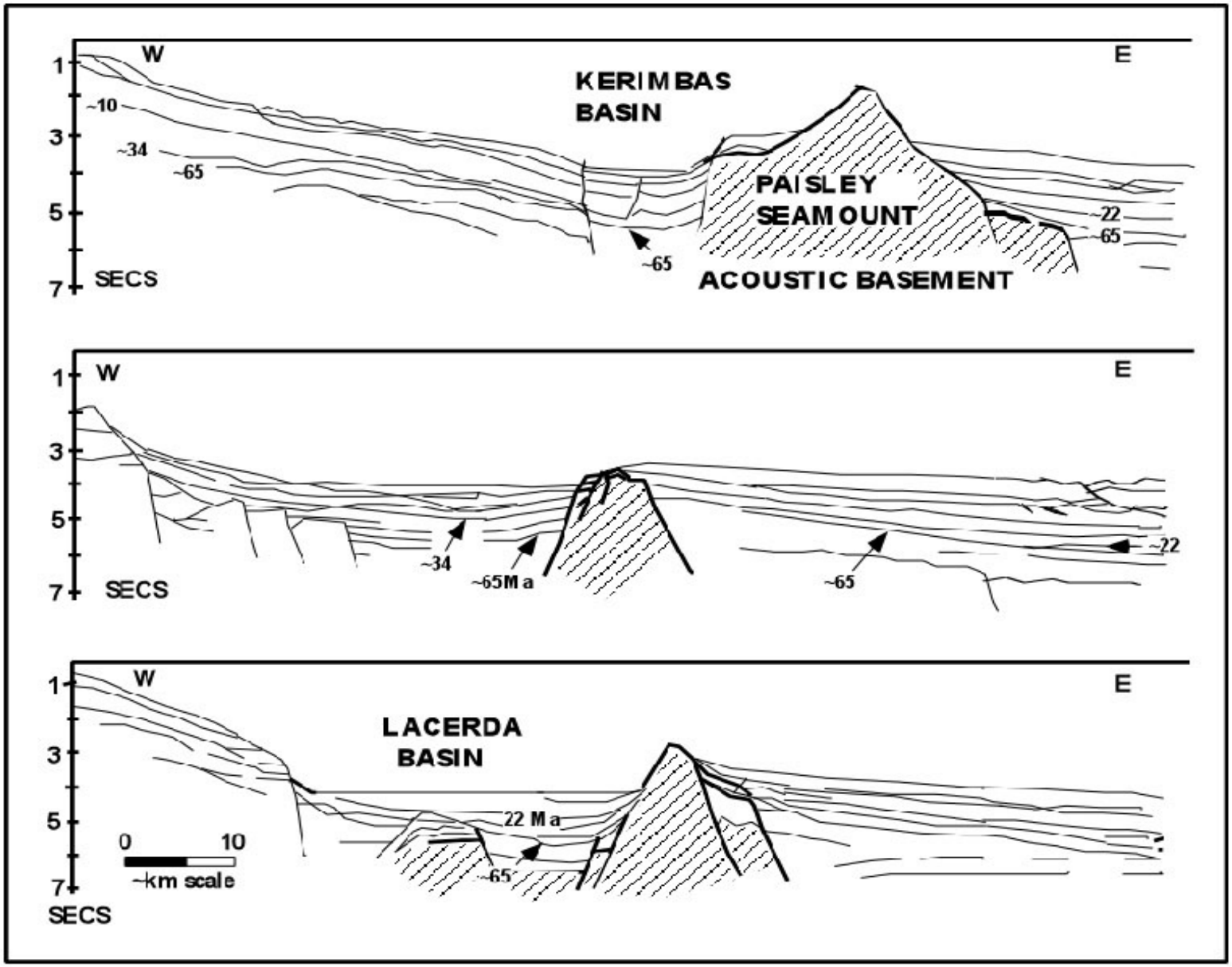


Image courtesy of The Geological Society of South Africa.

Red Sea, Gulf of Aden Ethiopian,northern Kenya and offshore Mozambique rifts continued to evolve.

Turkana rifts migrated to the east to join Ethiopian Rifts.

Flood basalts erupted on the site of the future Gregory rifts. Total volume was ca.150,000 cubic km over ca.10 My. much less than in a LIP of deep-seated origin

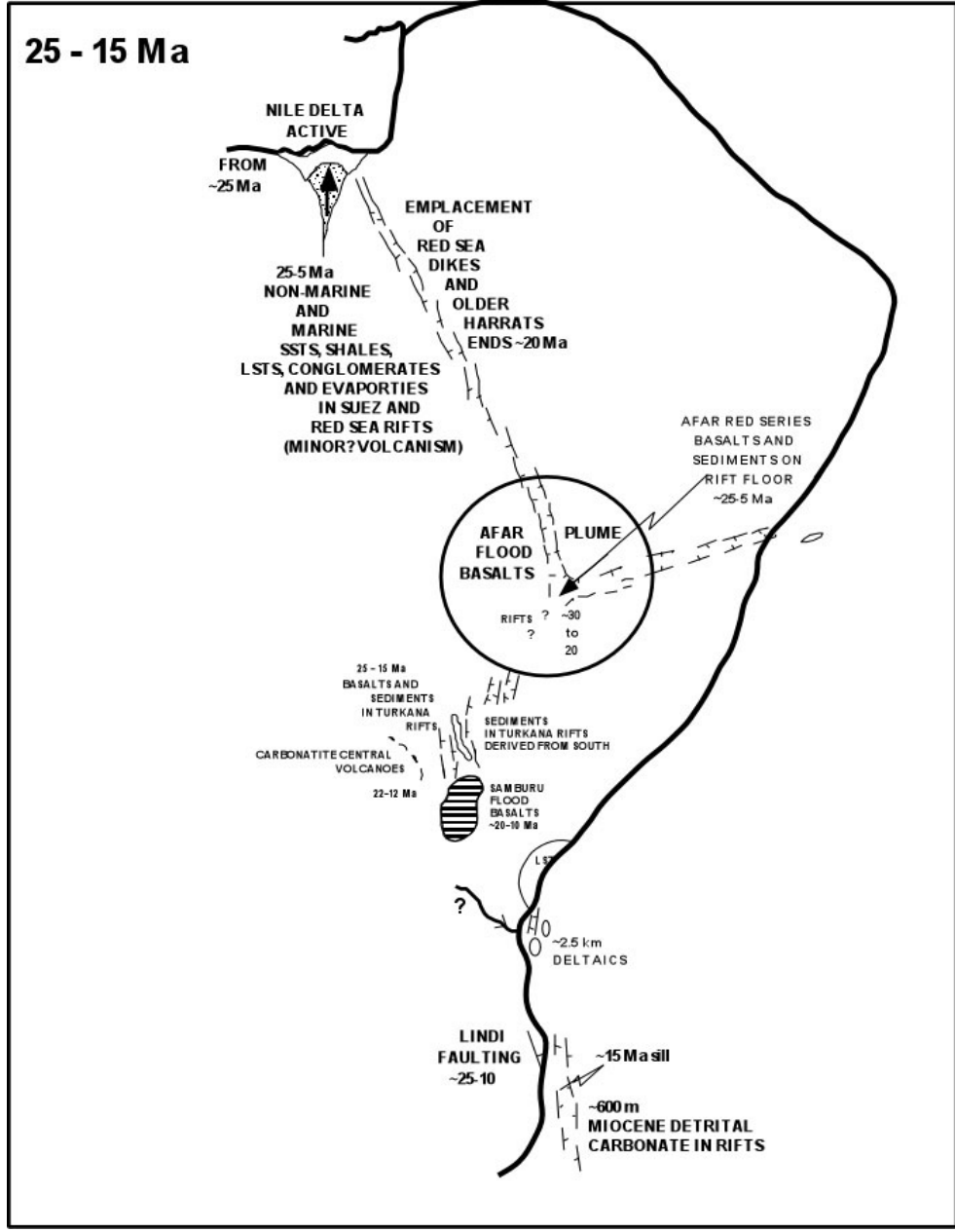


Image courtesy of The Geological Society of South Africa.

Bitlis collision induced great changes. New Harrats and western rifts initiated.

Ocean floor began to develop in the Gulf of Aden.

Whether the collision had effects farther afield in Africa is as yet unclear.
Indian ocean monsoon may have developed at this time.

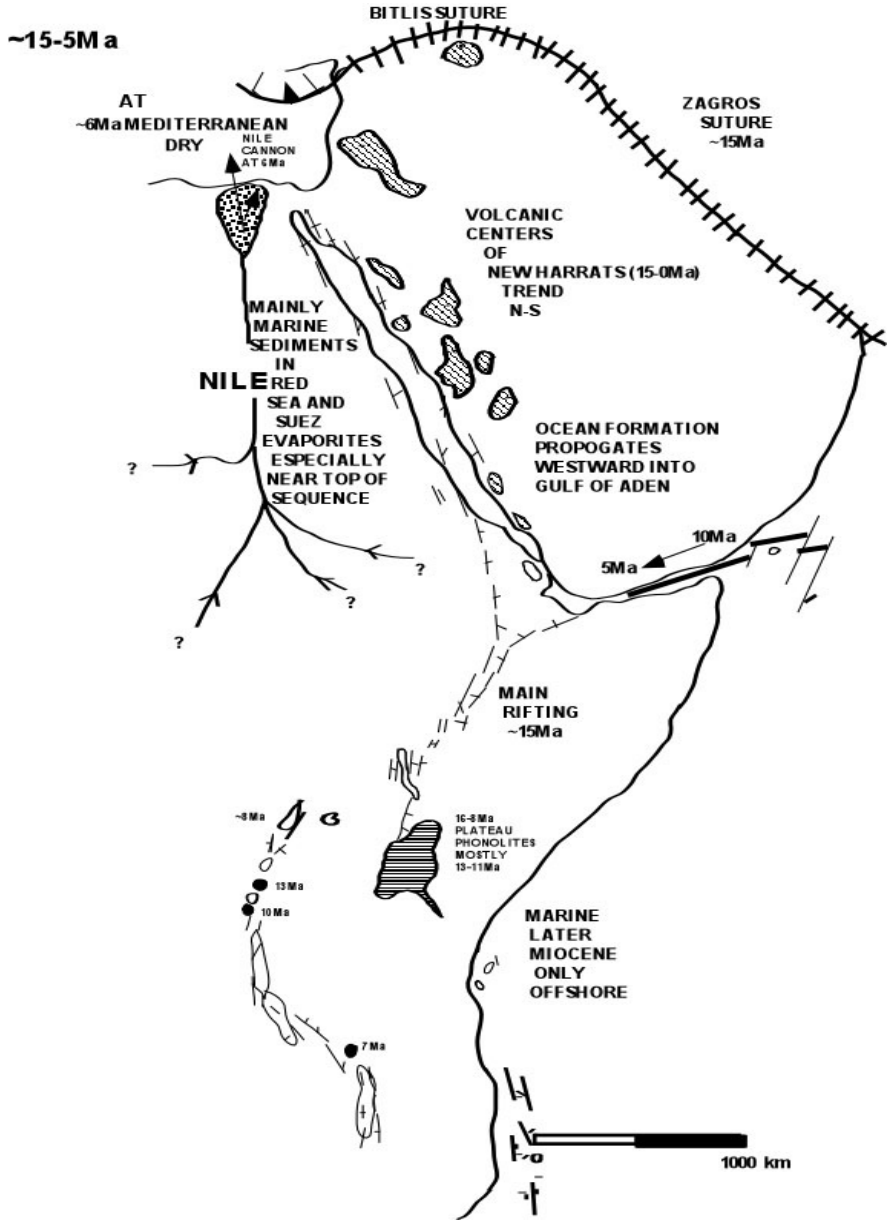


Image courtesy of The Geological Society of South Africa.

The great ca.30 Ma unconformity off Morocco

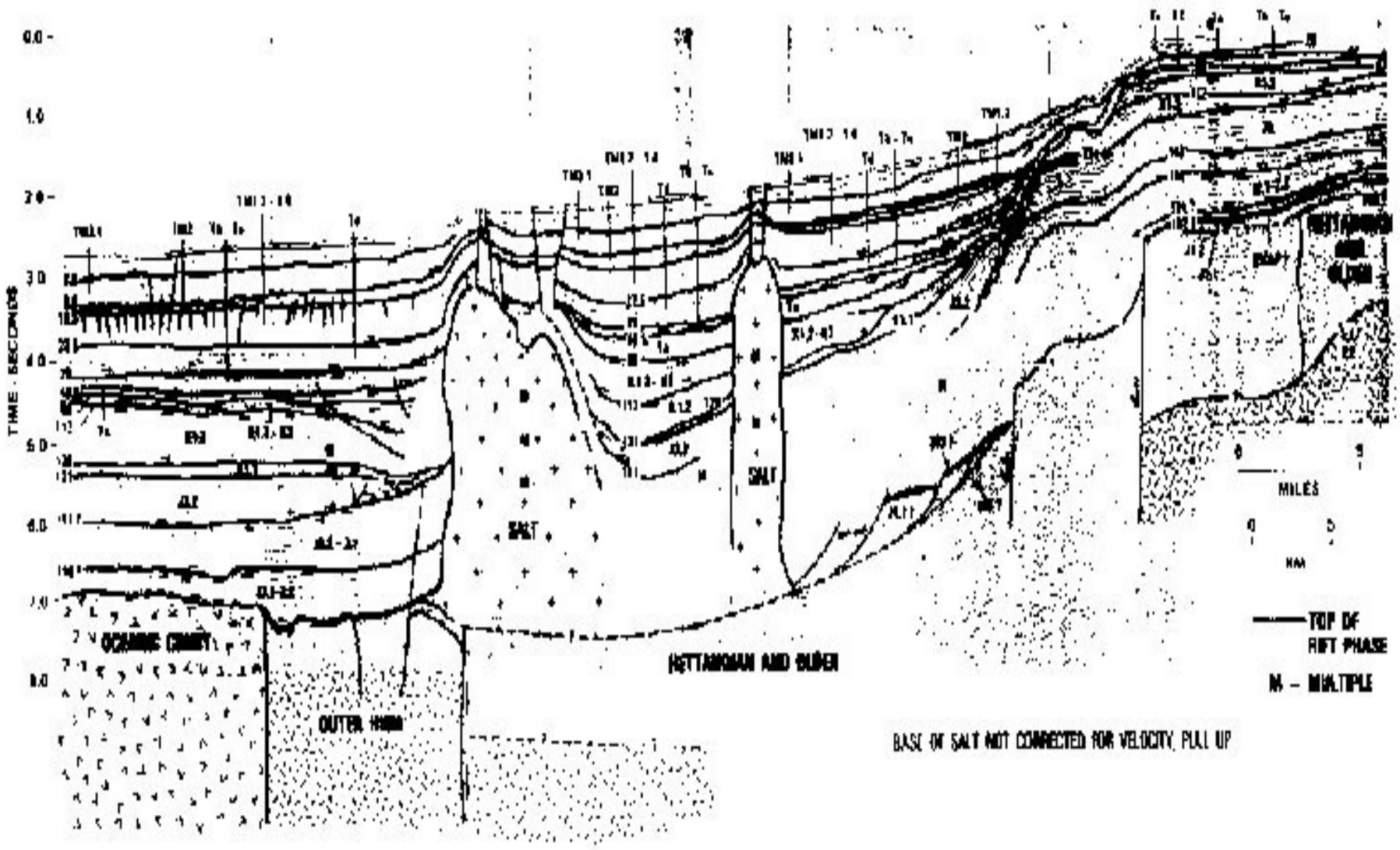
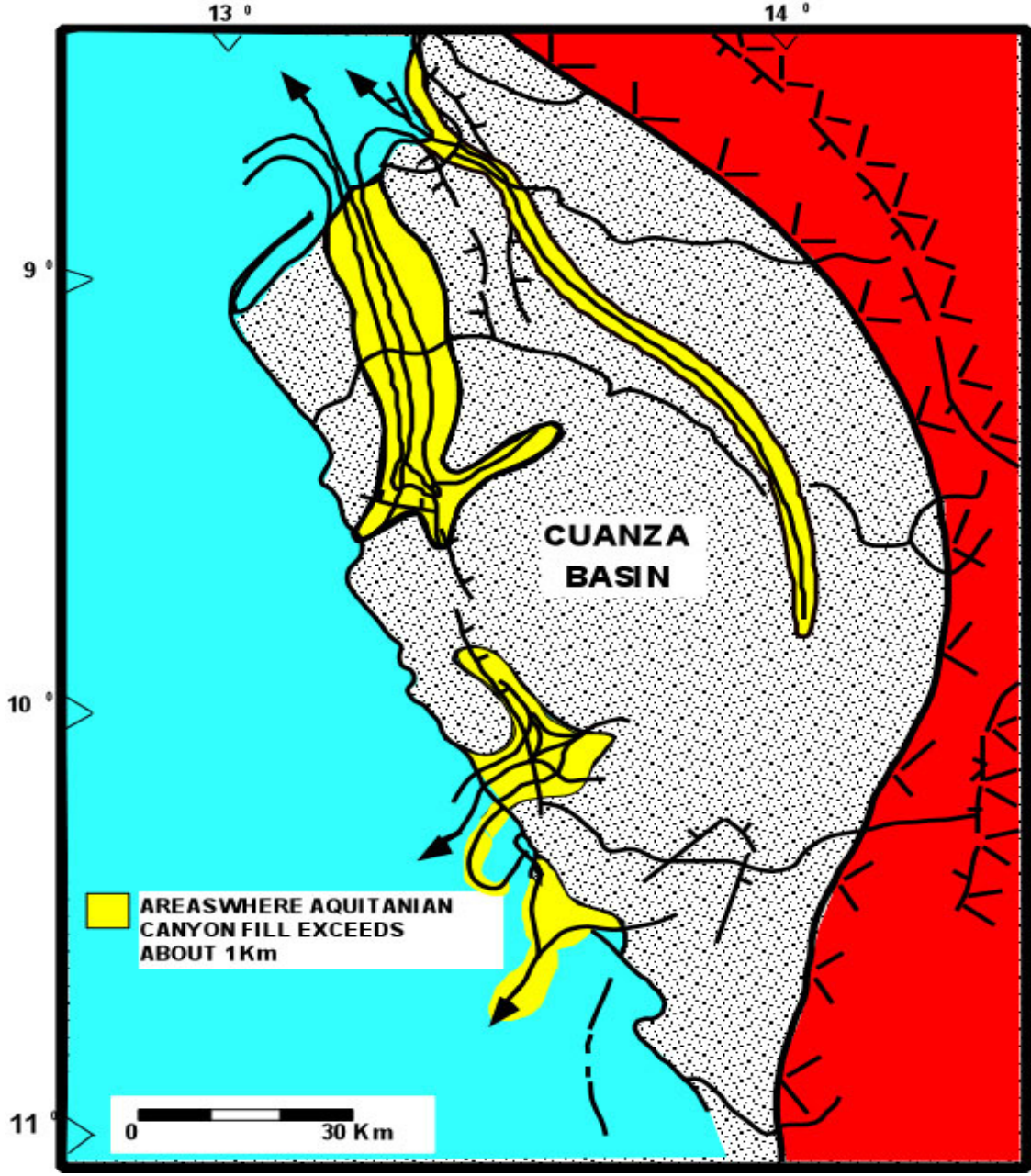


Image courtesy of The Geological Society of South Africa.

Submarine canyons of the onshore Kwanza basin cut at ca.30 Ma and filled by ca.20 Ma.

Erosion of these canyons and their offshore continuations triggered a major “raft tectonics” episode in which huge bodies of salt moved.

In most cases the shape of the
original canyons has been obscured as a result of salt movement.



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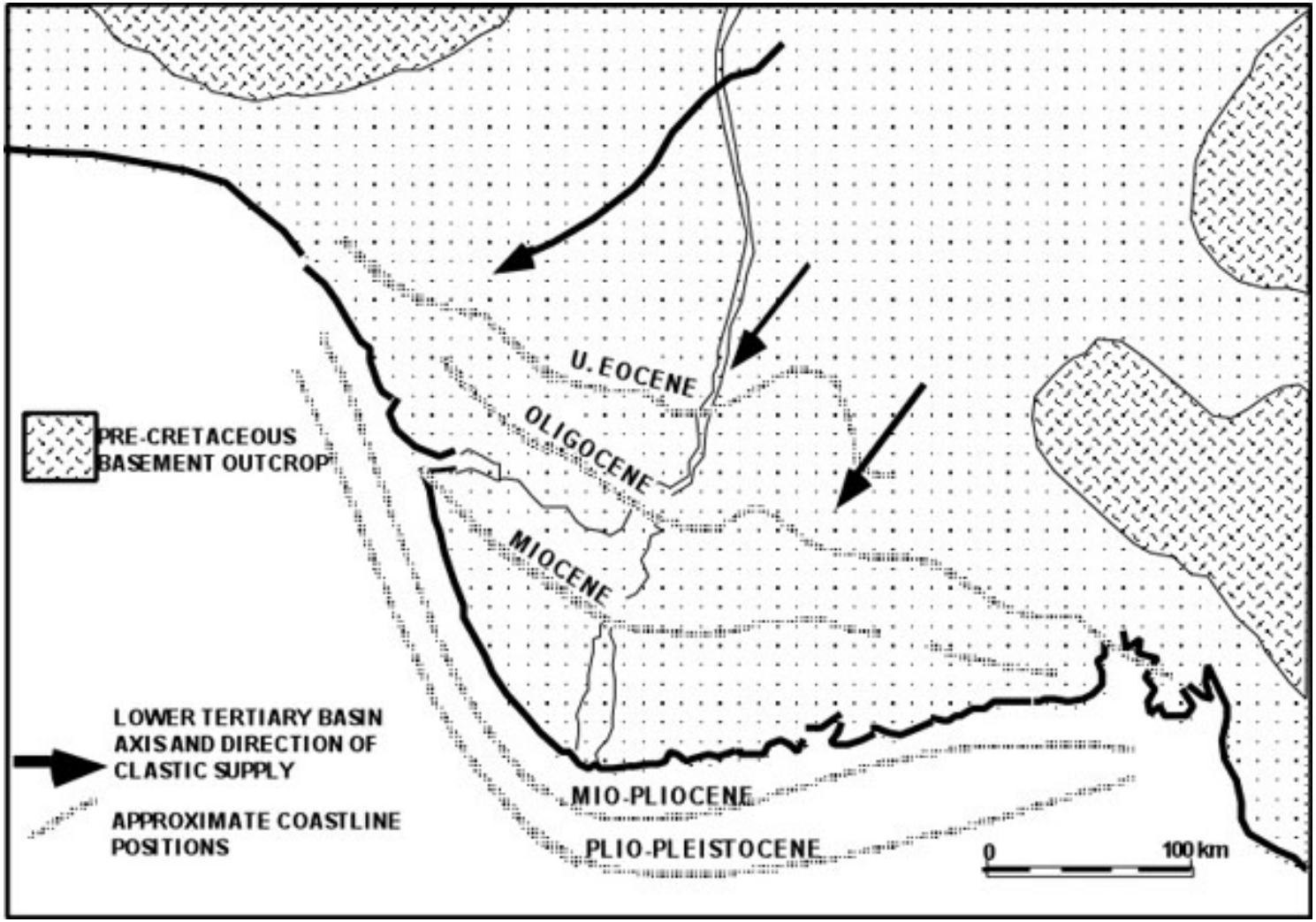
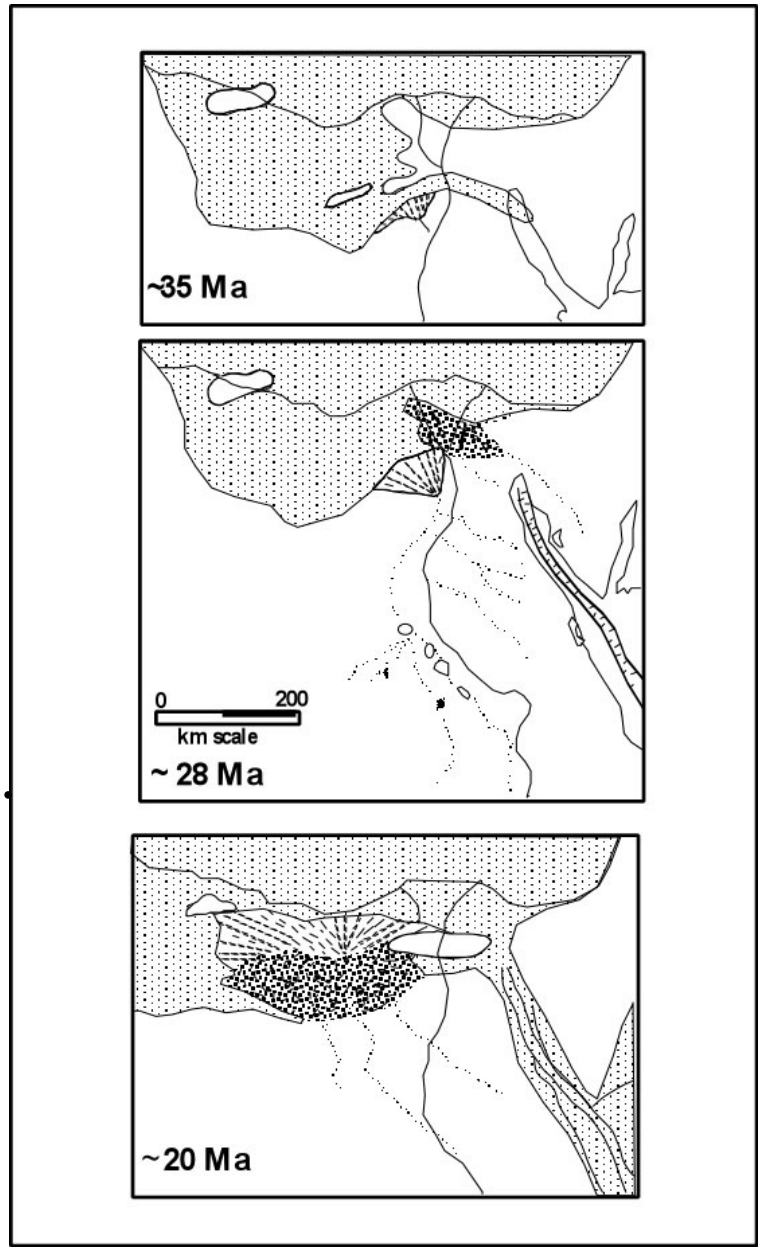


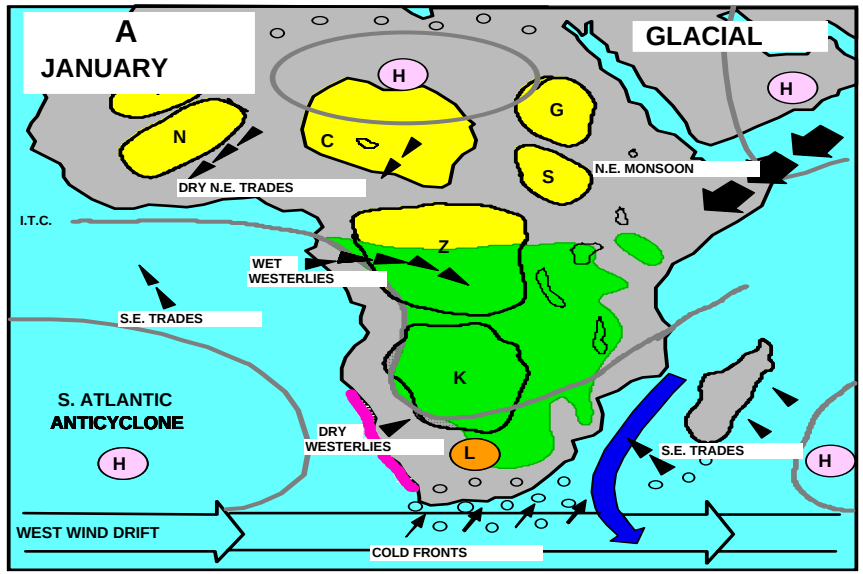
Progradation of the Niger delta since 34 Ma as a result of increased erosion of the African continent since that time. From Short and Stauble (1972)

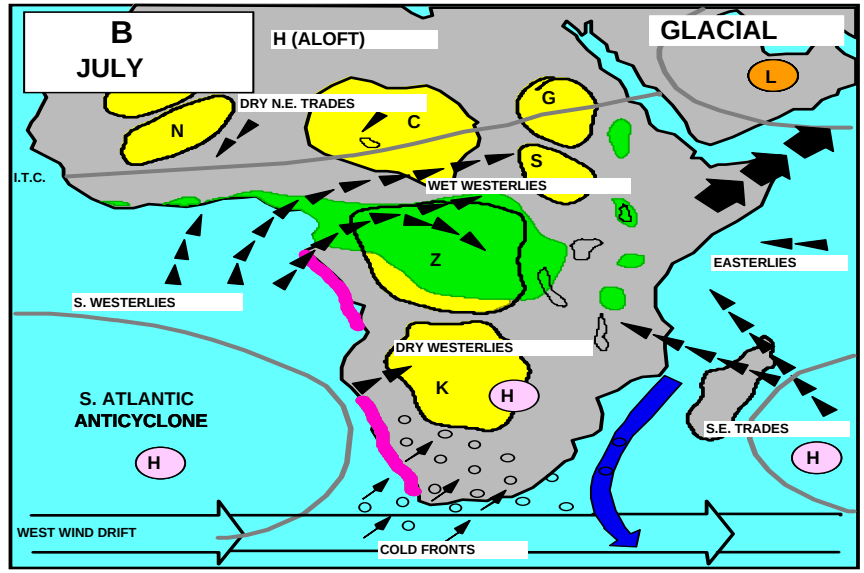
There was no Nile delta at 35 Ma although the shoreline at Fayum, famous for its vertebrate fauna, was developed.

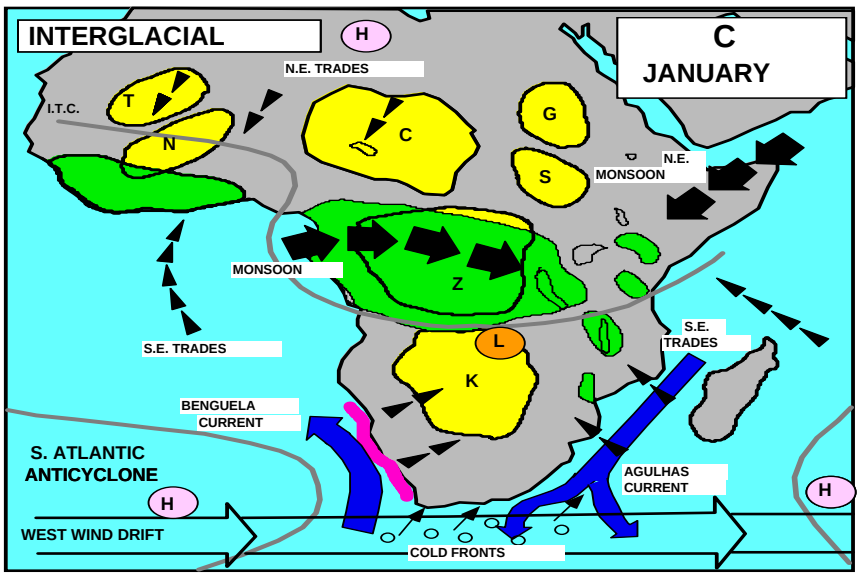
By 28 Ma a substantial delta, largely eroded from the Afar dome and the Red Sea shoulders, had begun to grow.

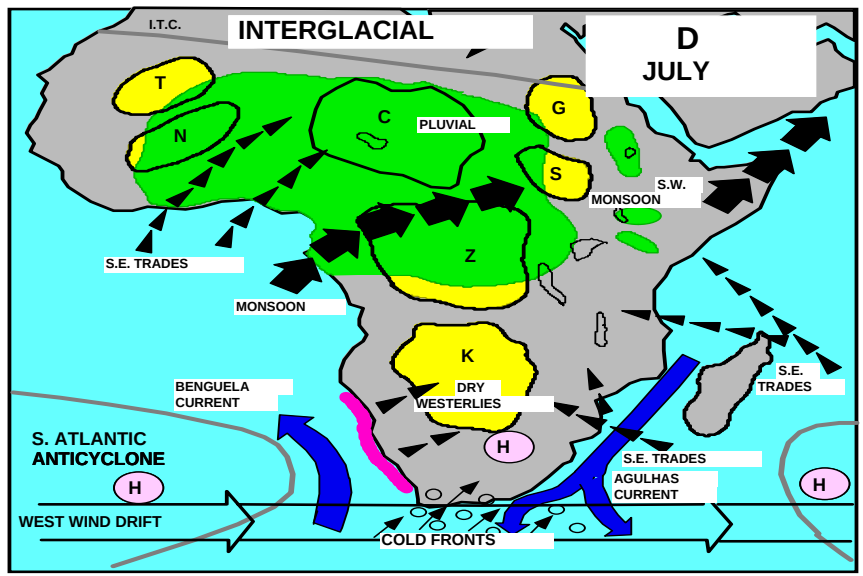
By 20 Ma the Nile delta was mature. It occupied an area somewhat to the south-west of its present location.
From Rushdi el Said



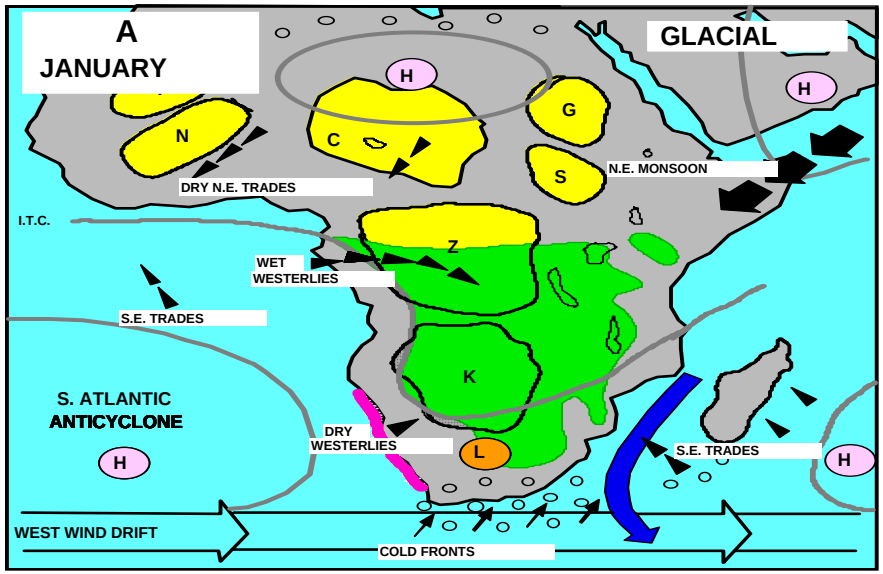


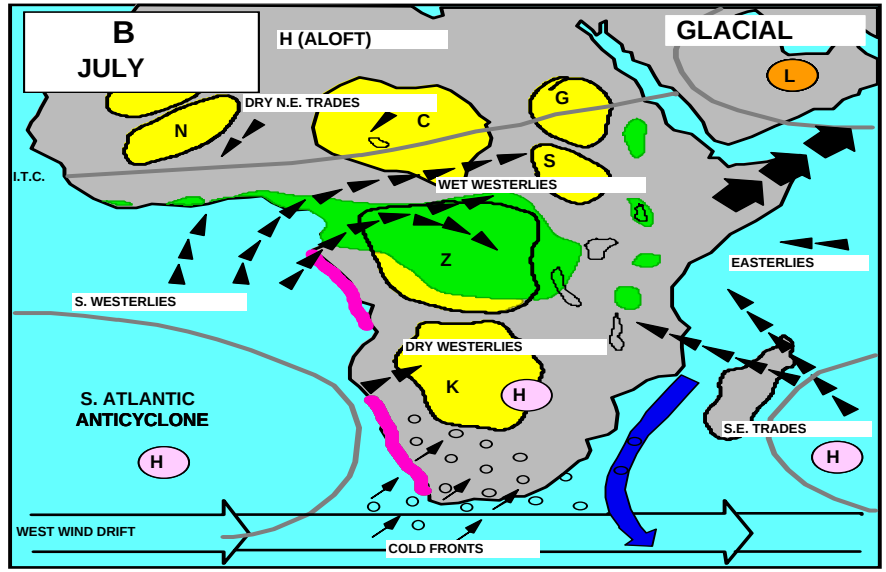


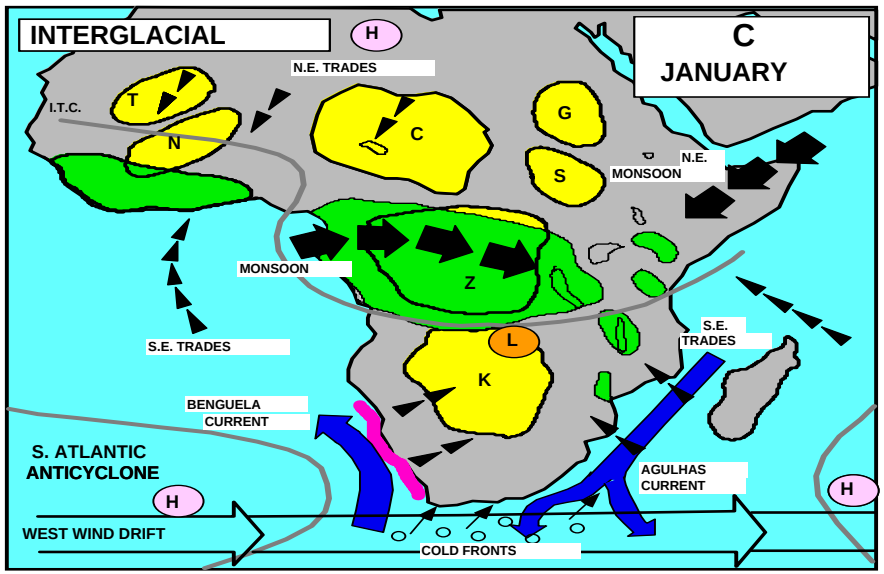


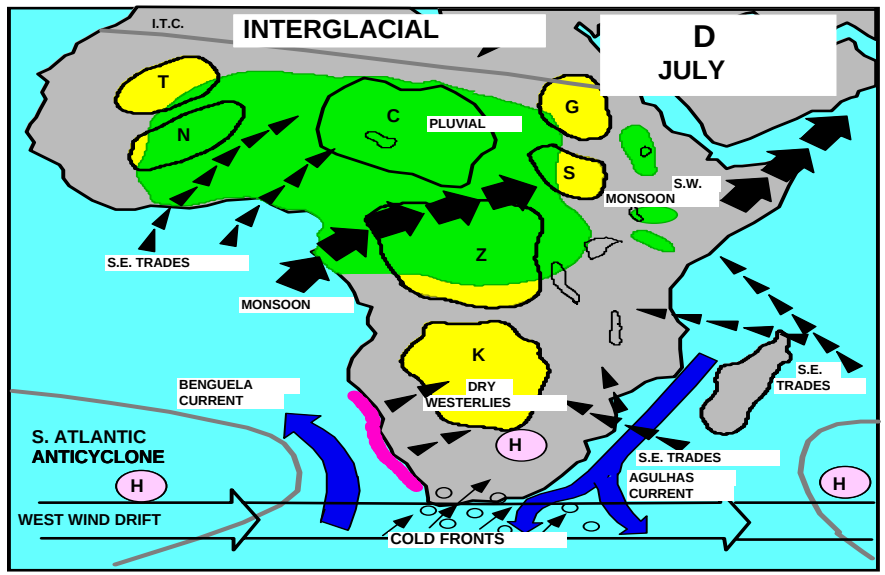


H High pressure
L Low pressure
Winds
Ocean currents
Cold fronts
I.T.C. Inter-Tropical Convergence
Cyclonic rains
Upwelling water
Monsoon
Pluvial conditions
C Chad Basin
G Gezira Basin
K Kalahari Basin
N Niger Basin
S Sudd Basin
T Taoudeni Basin
Z Zaire Basin









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Africa's geological development illustrates interactions among parts of the Earth system including: the lower mantle,the upper mantle,the crust,the hydrosphere, the atmosphere and the biosphere.

The establishment in Africa of a benign environment for much of the evolution of the human family represents a recent example of interactions among these various parts of the Earth system.

During the past 150 years industrial ecosystems in agriculture, mining and petroleum development have contributed to rapid change in Africa. Health has improved with water supplies,vaccinations and better crops. An appalling prospect looms from HIV/AIDS.