

Continental Drift Theory

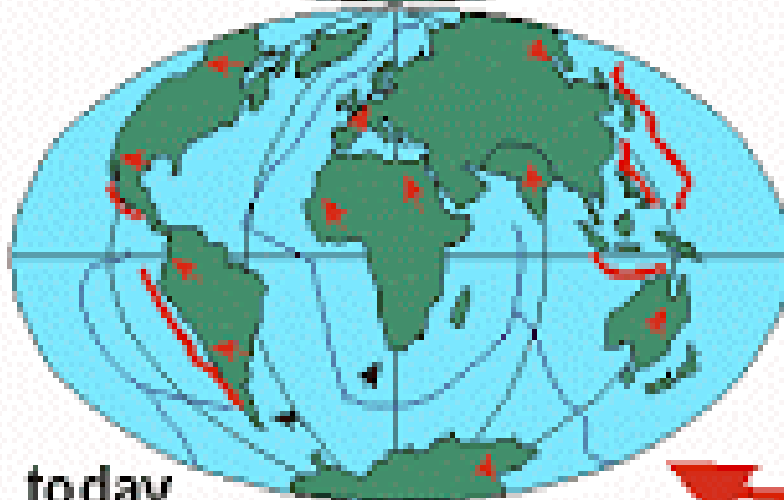
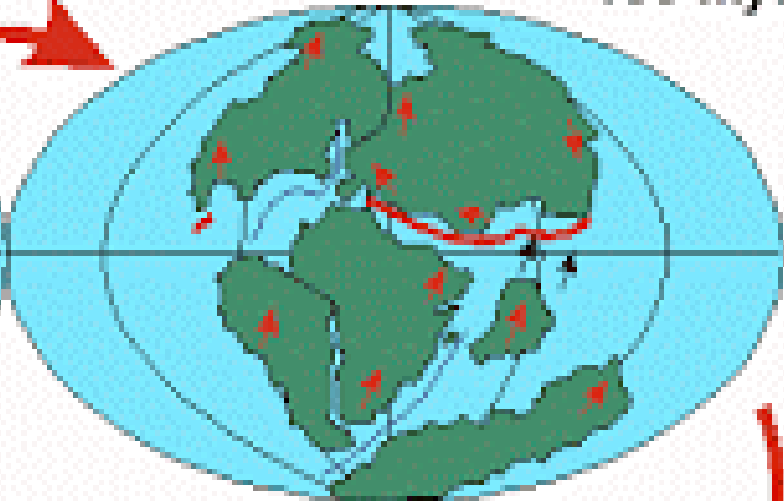
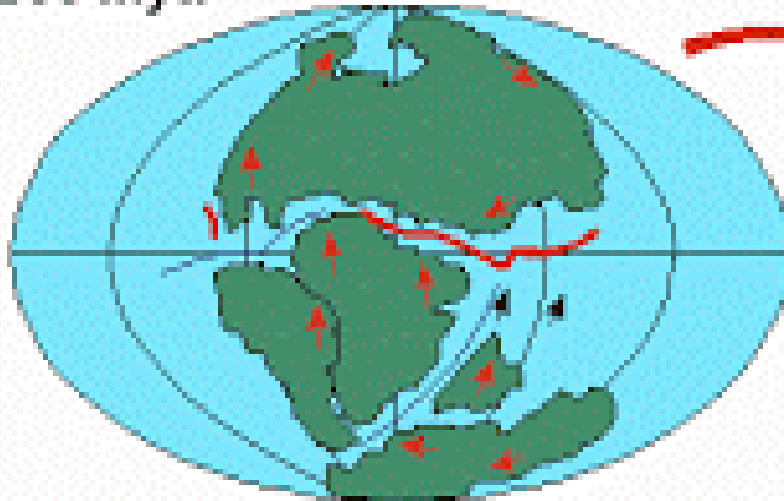
- Continental drift theory was proposed by Alfred Wegener in 1912.
- The theory deals with the distribution of the oceans and the continents.
- According to Wegener's Continental Drift theory,
- all the continents were one single continental mass (called a Super Continent) – Pangaea
- Mega Ocean surrounded this supercontinent is known as Panthalassa.

- According to this theory, the supercontinent, Pangaea, began to split some two hundred million years back.
- Pangaea first split into 2 big continental masses known as Gondwanaland and Laurasia forming the southern and northern modules respectively.
- Later, Gondwanaland and Laurasia continued to break into several smaller continents that exist today.

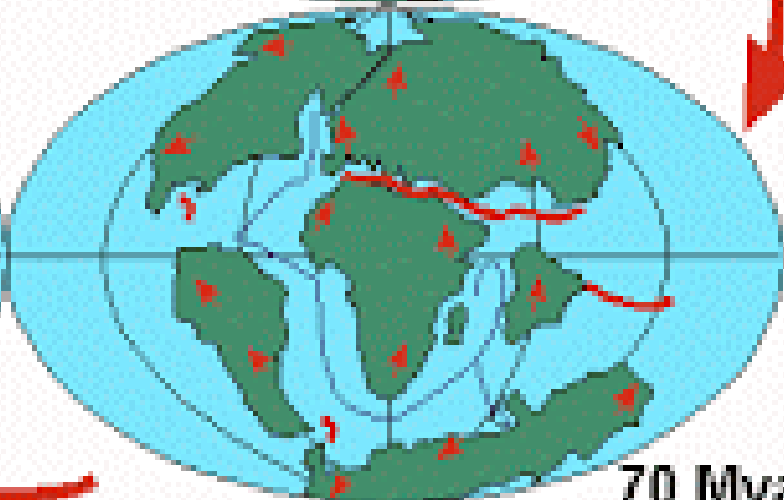
continental drift

200 Mya

130 Mya



today



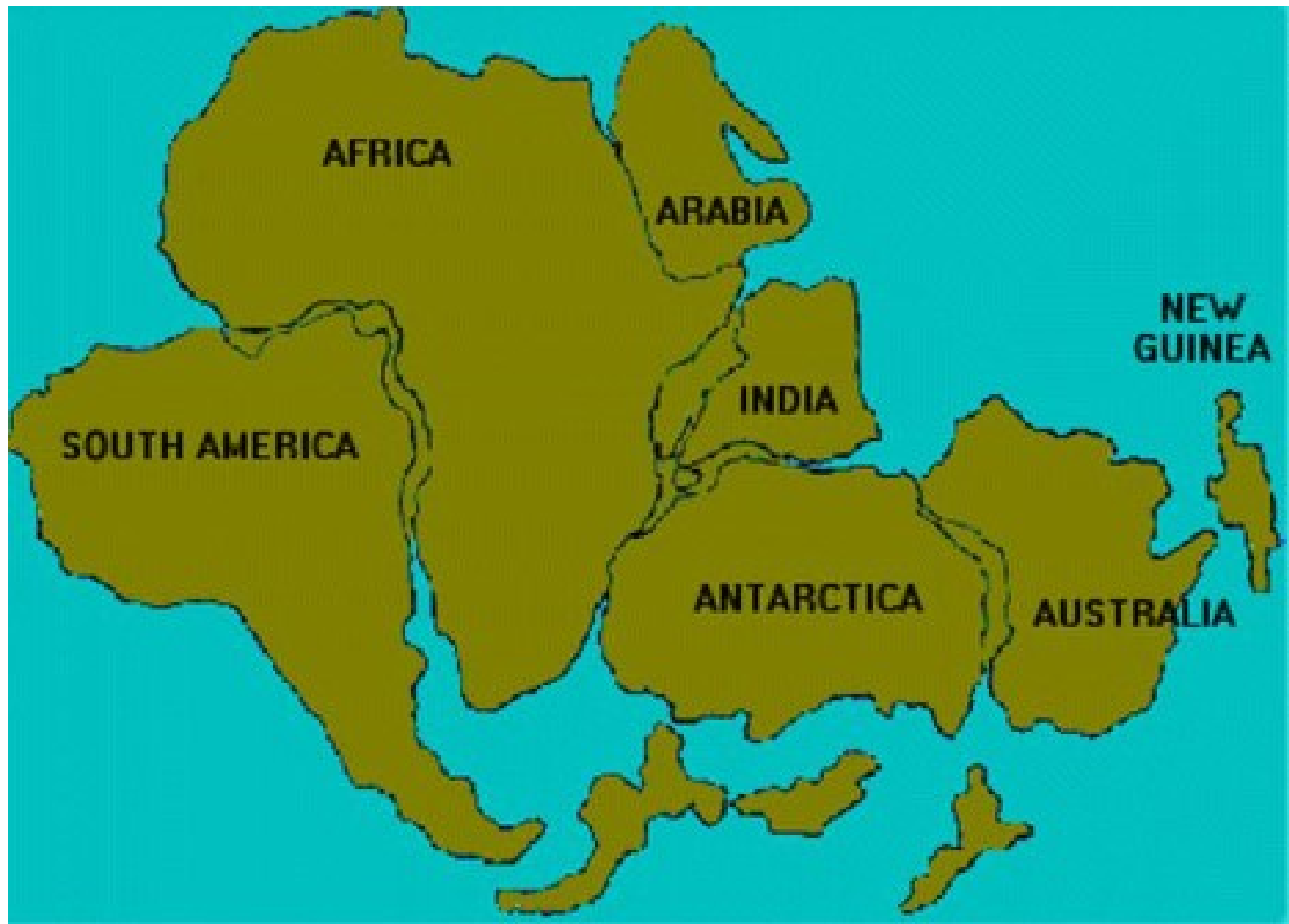
70 Mya

Force for Continental Drift

- equator wards due to the interaction of forces of gravity, pole-fleeing force and buoyancy
- westwards due to tidal currents because of the earth's motion.

Apparent Affinity of Physical Features

- South America and Africa seem to fit in with each other, especially, the bulge of Brazil fits into the Gulf of Guinea.
- Greenland seems to fit in well with Ellesmere and Baffin islands.
- The east coast of India, Madagascar and Africa seem to have been joined.
- North and South America on one side and Africa and Europe on the other fit along the mid-Atlantic ridge



- The Caledonian and Hercynian mountains of Europe and the Appalachians of USA seem to be one continuous series



North
America

Green-
land

Greenland-

Scandinavian

Caledo-
nides

Europe

Appalacians

Avalonia

Africa

Criticism

- Coastlines are a temporary feature and are liable to change.
- Several other combinations of fitting in of landforms could be attempted.
- Continental Drift Theory shifts India's position too much to the south, distorting its relation with the Mediterranean Sea and the Alps.
- The mountains do not always exhibit geological affinity.

- Causes of Drift
- Gravity of the earth, buoyancy of the seas and the tidal currents were given as the main factors causing the drift, by Wegener.
- Criticism
- This is illogical because for these factors to be able to cause a drift of such a magnitude, they will have to be millions of times stronger.

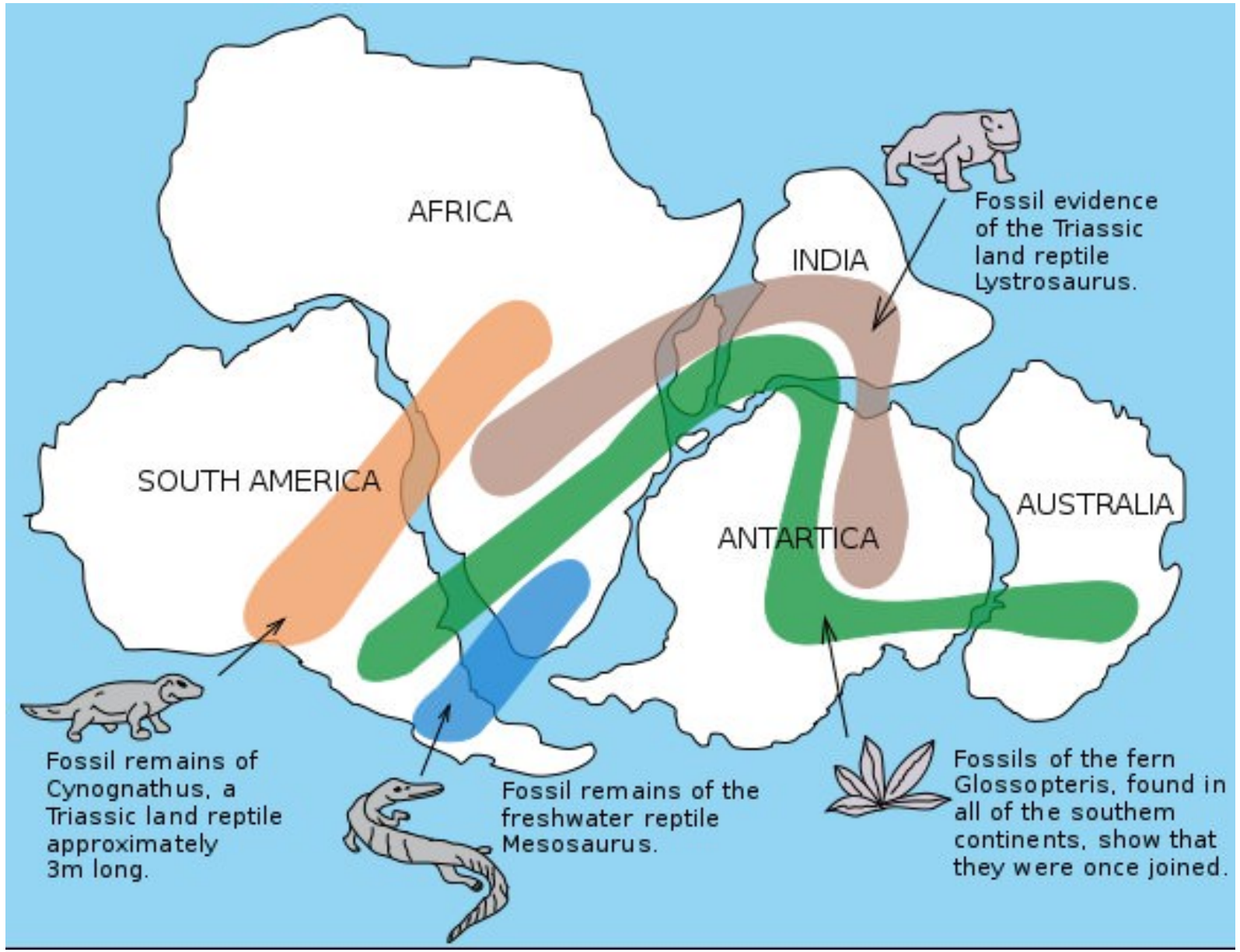
Distribution of Fossils

- The observations that Lemurs occur in India, Madagascar and Africa led some to consider a contiguous landmass “Lemuria” linking these three landmasses.
- Mesosaurus was a small reptile adapted to shallow brackish water. The skeletons of these are found only in South Africa and Brazil.
- The two localities presently are 4,800 km apart with an ocean in between them.

- Botanical Evidence
- Presence of glossopteris vegetation in carboniferous rocks of India, Australia, South Africa, Falkland Islands (Overseas territory of UK), Antarctica, etc. can be explained on the basis of the fact that parts were linked in the past.

- Criticism
- Such vegetation is also found in the northern parts like Afghanistan, Iran and Siberia.
- Similar vegetation found in unrelated parts of the world.

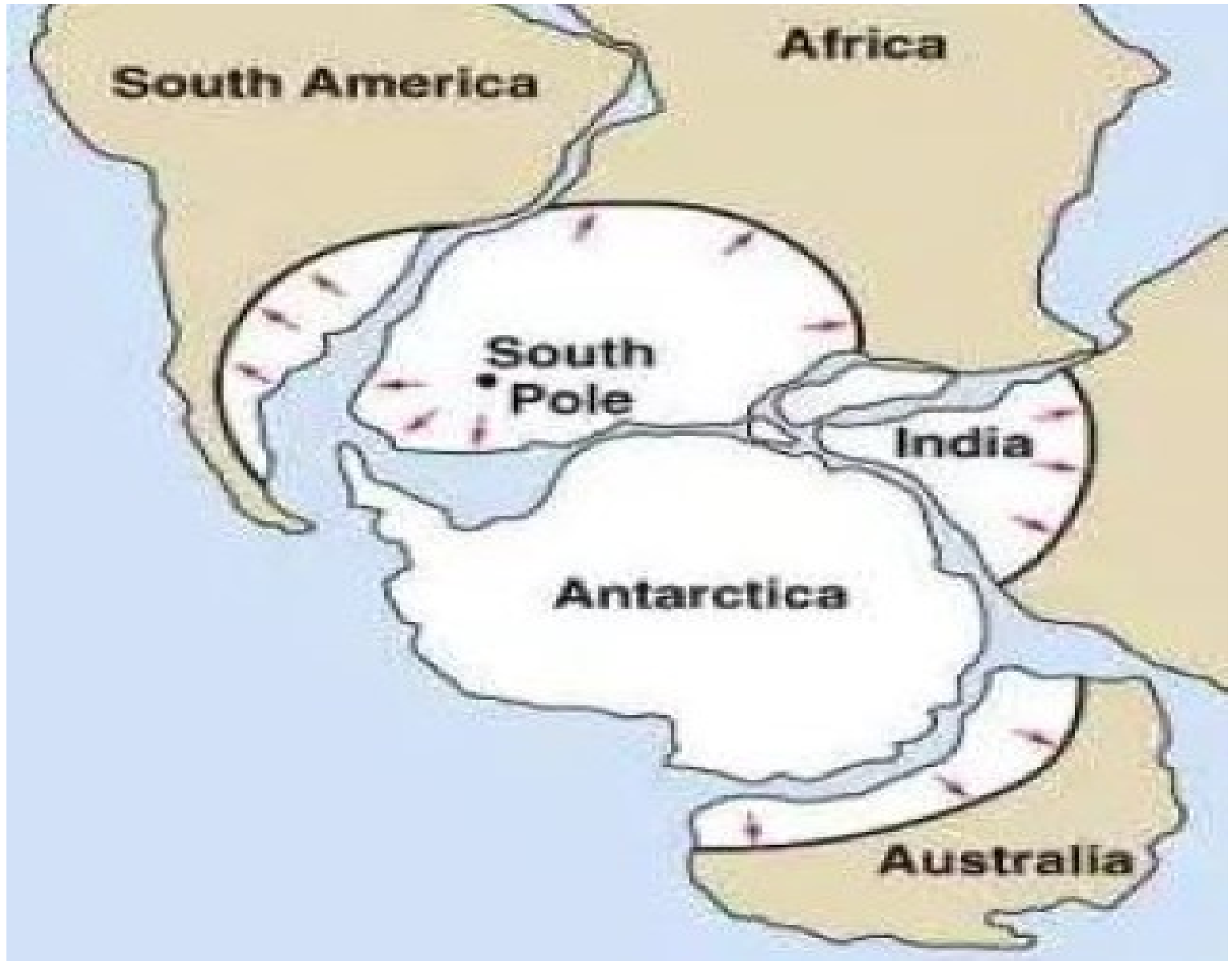
- Rocks of Same Age Across the Oceans
- The belt of ancient rocks of 2,000 million years from Brazil coast matches with those from western Africa.
- Criticism
- Rocks of same age and similar characteristics are found in other parts of the world too.



Tillite deposits

- It is the sedimentary rock formed out of deposits of glaciers.
- The Gondwana system of sediments from India is known to have its counter parts in six different landmasses of the Southern Hemisphere.
- At the base the system has thick Tillite indicating extensive and prolonged glaciation.
- Counter parts of this succession are found in Africa, Falkland Island, Madagascar, Antarctica and Australia besides India

- Overall resemblance of the Gondwana type sediments clearly demonstrates that these landmasses had remarkably similar histories



Placer Deposits

- Rich placer deposits of gold are found on the Ghana coast (West Africa) but the source (gold bearing veins) are in Brazil and it is obvious that the gold deposits of the Ghana are derived from the Brazil plateau when the two continents lay side by side.

Drawbacks of Continental Drift Theory

- Wegener failed to explain why the drift began only in Mesozoic era and not before.
- The theory doesn't take oceans into consideration.
- Proofs heavily depend on assumptions and are very general in nature.
- Forces like buoyancy, tidal currents and gravity are too weak to be able to move continents.