All the continents together formed pangaea

S.G. Lucas, Encyclopedia of Geology, 2005Pangaea (Figure 1) accumulated from different continental blocks than today's continents. The southern supercontinent of Gondwana (also called gondwanaland and GONDWANA) is a paleozoic combination of South America, Africa, Antarctica, Australia and the China-Pakistan peninsula, and a few small terranes. Laurussia (or Laurasia) consisted of most of the northern supercontinent North America and Europe.Figure 1. Paleocogical maps. (A,B) In Carboniferous, Pangaea accumulated with seams planted near the paleoector of Gondwana and Laurussia (A) Early Carboniferous (Mississippian) and (B) Near Late Carboniferous (Pennsylvania). Pangaea was exactly (C) Permyen and (D) Triassic.Asia throughout the day, however, did not exist as a single block. Today's Asian continental core is the Siberian bloc, but other blocks include Kazakhstan, Tarim and a blocky archida to be much of China and south-east Asia. Many of these eastern Asian blocks are derived from the splint of northern Gondwana and shifted to large Asian blocks during the late Trias-Jurassic.Pangaea period in the late Paleozoic and early Mesozoic period, surrounded by a universal ocean that means 'all sea' in Greek and is the ancestor of today's Pacific Ocean. The Atlantic Ocean was not even made of ancestors due to the fusion of North America to the Africa.An branch of Panthalassa in Europe and South America (Figure 1). This Tethys Sea was named oceanus sister and wife in Greek mythology. Tethys was the ancestor of today's Mediterranean. The successive ocean basins in it are called Paleotethys (Devoniyen-Permyen) and Neotetisol; The latter opened during the Late Permyen as a result of friction between Gondwana and small central and south Asian terranes. Don Hallett, Daniel Clark-Lowes, Libyan Petroleum Geology (Second Edition), 2016Pangaea is a term invented by Wegener in 1912 for the supercontinent formed after the Hersiyan orogen, which contains almost the entire continental crust of the earth. This term, which existed for 150 Ma from the late Carboniferous to the middle of Jura, was surrounded by a worldwide ocean as panthalassa, introduced by Suess in 1893. Other writers prefer the name mirovian ocean. A large ocean bay stretching from the east to the depths of Pangaea eventually became part of the Tethys Ocean. The bay was occupied by the ocean crust, with a seabed propagation center acting as a crossing plate, where Gondwana fragments pass through Proto-Tetis and move to the Eurasian side of the bay. During the early Permyen, the Rheic sukly line was marked with a large dextral key region with lateral a few hundred kilometers to north-west Africa. The last lands to travel along the Gulf were minmerian land, which separated from the northern border of the Arab and Indian plates in the Permyrian and reached the northern shores of the gulf in the Late Triyas, eventually forming the Black Sea, Anatolia, Iran and Afghanistan. South-east Asian land emerging from Gondwana in the early Devoniyen period is finally docking in southern China in the Late Triyas.15 Magmatic evidence in Libya is an indication of the instability of this period. Medium-late Permyen basalts encountered offshore and penetrated on waddan platform, with late Permyen granite, radiometric age of 256 Ma. Microsyenity thresholds in the Amal region are set at 245 Ma. There is no extensive metamorphism or orogenic event with these and subsequent attacks in this section, and these should probably be considered anorogenic events or 'resetting the clock' in previous magmatic events. This range corresponds to the time setting of the large dextral switch between Laurasia and Gondwana, a cancellation rift section in the central Mediterranean region and the disintegration of many small plates in the eastern Mediterranean region.16 During the Permian, pangaea Gondwanan components gradually moved north and passed the equator during the North African Trias. The disintegration of Pangaea began in the Triyas. Appalachia crack grabens are filled with late Triyas buckles and there is triyas rift evidence in Tunisia in north Africa, and maragh pit in Libya is filled withtriastic sediments. During this period, North Africa was characterized by extending continental margin and shell thinning. Track-apart also began the late Triyas between the old components of East and West Gondwana, with the Arabian plate cracking along the eastern margin, and along the eastern margin of Africa. The disintegration of Pangaea led to the establishment of a seabed propagation axis along the Pangaean sumpo line between the terrains of north-west Africa and southwestErn Europe. Associated igneous activity in Libya waddan platform (granodiorite 230 Ma) and Amal oil field (granodiorite 207 Ma) have been reported. These events correspond to the first phase of the rift in the Mediterranean region. The tension errors of the Triatha age exist both offshore and on the coast in Libya, and there are various imperformity within the Triyas veraseti. Evidence from eastern Libya shows the presence of Triyas sedine, representing the first sedine in the first syn-rift grabens in the Eastern Sirt Basin.17C.R. Scotese, A. Schettino, European Permo-Triyas Salt Provinces, North Africa and Atlantic Margins, 2017Pangaea largely appeared during early Mesozoic (23% shallow sea against an average of 77% land). Wide epeiric seas covered During the Paleozoic period, the continents were gone (Scotese et al., 1979), and the remaining shallow seas retreated to the borders of Pangaea. Paleocogical maps (Figure 4-6) show the distribution of the deep ocean (ocean crust) — dark blue; middle ocean ridges—blue; shallow shelves and submerged sections of continents (epieric seas)—light shades of blue; coastal areas and continental areas near sea level—dark green; low interior areas—green; at the foot of the highlands and mountains; and mountainous regions—brown. These paleocogical maps were first published in paleomap paleoatlas magazine for ArcGIS (Scotese, 2008a, 2008b, 2008c, 2008d, 2008e, 2008f). Designed for use with GIS software (ArcMap, ESRI), this digital atlas features plate tectonics (Scotese, 2014b), paleolithological (Boucot et al., 2013), paleotographic (Scotese, 2014a; Scotese & Moore, 2014a, 2014e) and paleoclimatic reconstructions (Moore & Scotese, 2010; Scotese, Boucot, & Chen, 2014; Scotese & Moore, 2014b, 2014c, 2014d). The original paleocogical maps have been modified by Earthbyte for use with the program GPlates and can be downloaded from the (Scotese, 2016).M.R. Gibling, earthbyte website ... M.C. Rygel, United States and Canadian Sedine Basins (Second Edition), 2019Pangea was not stable for long. Rift basins developed along pre-existing faults such as the Minas Fault Zonu and filled with thick Triyas and Jura sedimanter and volcanic successors (see No age dates were exactly accompanied by regional exhumation that define the beginning of the Atlantic Canada.Rifting rift, as shown in the fission-piece evidence for triyas cooling (Gibling et al., 2002), and erosion of significant thicknesses of carboniferous for Permyen layers. A more common period of sediation during the Jurassic and Cretaceous period saw local sediation laid along carboniferous rocks on land and offshore as the rifts moved towards the spread of the sea floor (Res. 13). In parts of mainland Nova Scotia, the Cretacene rivers flowed through a karstic terrain that developed with prolonged weather conditions of Windsor-group carbonates and evaporits (Falcon-Lang et al., 2007). Founded in The Late Carboniferous (~300 Ma) with the closure of the Rheic Ocean between 2000Pangea, Gondwana and Laurussia in International Geophysics. At the time, the south pole lay in Antarctica (Res. 7.8), and most of Gondwana was covered with an ice sheet. Asia did not exist as a continent and was located in the econtinents of Siberia, Kazakhstan and North and South China. Due to the controversy surrounding pangea evolution during Permo-Carboniferous (§7.2.4), a discussion into global paleogerafya will be limited at this point late Permyen and young times. An overview of World history since 1000 Ma§ 7.4.3, which is paleocogical here in a cladistic-style diagram (see Figure 7.24).Figure 7.24. 1,000 million years of earth's history. From the supercontinent of Rodinia, with the formation and disintegration of pannotia, Gondwana, Laurussia and Pangea. The timescale at the base is approximate and not one-on-one. Paleomagnetic data for the main blocks on the Earth's surface can be combined with information from marine magnetic anomalies outlined in §5.3.1 to produce paleocogical maps over time (see Figure 5.19). Such a set of maps was compiled by Scotese (1997) and has been shown in fig. 7.11 since the Late Permyen (255 Ma). Maps contain topographic and sea level information and are set to the correct paleolatitude according to paleomanetic data. Paleoic maps for paleozoic paleozoic can be found in Scotese and McKerrow (1990) based on combined paleomanetic and geological information and updated by Scotese (1997). The maps presented here can be seen on the website of a much more complete series. 7.11. (a–c). (a) Global paleocogical maps for The Late Permyen (255 Ma), (b) Central Trias (237 Ma) and (c) Early Jura (195 Ma). Ocean trenches are shown in red. From Scotese (1997), see also. (d–f). (d) Global paleocogical maps for the Middle Cretacele (94 Ma), (e) The Last Cretacete (94 Ma) and (f) the Eocen (50 Ma). Ocean trenches are shown in red. Posted by Scotese (1997) (see also). Copyrighted © 1997 in the Late Permyren (255 Ma), Pangea dominates global paleogegy (See 7.11a). Gondwana was located at high inlems, while North and South Indodel were at low inerms. The territory of Turkey, Iran and Tibet were components of the Cimmerian continent, which was highlighted by Sengör et al. (1984). As a protocrate in Gondwana, Cimmeria was located just north of India and Arabia, while the Paleotethys Ocean was located in the north. In 255, Ma Cimmeria had just left Gondwana, resulting in the first opening of the tethys ocean. Siberia and Kazakhstan are located in high-backs, but the Central Triyas (237 Ma) is located close to Europe.By of Siberia and Kazakhstan, and has teamed up with Europe to form the Ural Mountains (Res. 7.11b). The Tethys Ocean is well developed and the map shows Cimmeria occupying a position between Gondwana and Eurasia. However, it should be remembered that the latest paleomanetic data from Iran (Besse et al., 1998) shows that Iran had already united with Eurasia at the time (see §7.3.5, Res. 7.16). Southern China and Indoirdi lay in the evatorenens, and north China had by then moved to the mid-north tlows. During the early Jurassic period (195 Ma), the Tethys Ocean was fully developed (Res. 7.11c). North and South China have not yet put it together, but it was close to the southern border of Eurasia. The Amurian Sea separated northern China from Siberia. 7.16. Reconstruction of positions (Ar), East Avalon (EA) and West Avalon (WA) Terranes for the Early Ordovician regarding Gondwana (490 Ma) Torsvik et al. (1996), elsevier Science.Pangea with permission about 175 Ma began to leave North America. The disintegration of Gondwana began at about 160 Ma when Antarctica (along with Greater India) left Africa (see Table 5.2). About 130 Ma left North America, Iberya and South America to leave Africa. Remember that Eastern Gondwana (Greater India, Madagascar, Antarctica and Australia) drifted south after leaving Africa. Then About 130 Ma Antarctica of Greater India and Madagascar were separated and drifted north. The middle Cretacene time (94 Ma) and the large blocks that make up present-day Eurasia (excluding India) came together and the narrow North and South Atlantic Oceans developed (Res. 7.11d). With the latest Cretacene (69 Ma), Greater India is separated from Madagascar and quickly drifting north in the central Indian Ocean (Res. 7.11e). The Tethys Ocean was almost gone by then. Although the distinction between Australia and Antarctica began at about 95 Ma (see Table 5.2), they would still lie close to each other at 69 Ma because the separation rate was initially very slow. The Labrador Sea between Greenland and North America opened to about 85 Ma and was still only a narrow sea route of 69 Ma. The opening of the South Atlantic continued, and South America and Africa left well during this period (Res. 7.11e). The North Atlantic between Europe and Greenland did not open until about 60 Ma (see Table 5.2). Great India by Eocene (50 Ma) was about to collide with Asia, which resulted in the formation of the Himalayas and the push of the Indian plate. The distinction between Antarctica and Australia began a lot (Res. 7.11f) and the Indian Ocean was well developed. The North Atlantic Ocean between Europe and Greenland was opening up. Meanwhile, the opening of the Labrador Sea continued. Qiang Fang, Huaichun Wu, Earth Systems and Environmental Sciences Reference Module, 2019Superkıta Pangaea assembly resulted in a wide and long east-west focused equatorial Mount Pangaean (CPM) chain, which may have reorganized atmospheric circulation into a so-called megamonsoon system. The highlands may have intensified the Monsoon canonation as well as the presence of the Tibetan Plateau intensified the South Asian monsoons. Monsoon circulation from the Permynen to the Late Triathlete had a significant climatic impact on low-to-mid-sleathing regions, especially in the inner Pangaea. The climate model for Pangaea predicts an almost complete failure of intense monsoon circulation and throal atmospheric circulation due to extreme continentality. Long-term drought across western equatorial Pangaea during the early Permian period The northern hemisphere is attributed to the onset and inconsement of the monsoon. Pangaean monsoon intensity continental drift .B.W. Sellwood, P.J. Valdes, Encyclopedia of Geology, 2005 Pangaea 2005 can be different on shorter time scales modeled to receive very little precipitation of about 40°N and 40°S between large roads. Most of the precipitation is over the oceans and is characteristically convective, and the main precipitation belt migrates north and south through the movement of the Intertropical convergence zone (ITCZ) throughout the year. The equatorial lands surrounding the eastern and southern Tethys are modeled to receive relatively little precipitation in December-April. North-east Gondwana is modeled to have a monsoon climate (winter wet). Northern and eastern Siberia have some precipitation throughout the year, with the wet period usually being the drest (also equivalent to a winter wet biome) in June and July and August summer. South-west Gondwana is also modeled as winter wet; The eastern parts of Gondwana are noisyer than the western parts. However, the major roads of pangaea, especially tropical but stretching up to about 50°N and 50°S, have a huge excess of evaporation over a large period of the year, there is no large part of western Tethys. Southgondwana is also wet in winter, including the south polar area during the dark month. Figure 3. Model simulated (A) average seasonal precipitation for Norian for December-February and (B) for June-August. The units are at −1 mm days and the stroke range is not regular. JJA, June, July, August; DJF, December, January, February.In Triyas (Figure 4), the following climatic zones have not yet been recognized from geological data: ice; polar; cold-schooled; and cold-school a dry (steppe/desert). Tillites was not reported. The absence of both glaciers and some of these biomes can be expected from model simulations, but some caveats are also expected while biomes are modeled by reference to modern equivalents (e.g. cold-school). Figure 4. Walter biome regions model for trias based on predicted temperature and precipitation. The highest in the Triyas contains a lycopod with a worldwide distribution, reflecting a global climate largely devoid of frost. From geological proxy data, pangaea's interior was hot and dry, with warmly warm climates extending to the poles. In Siberia, flora displays deciduous and well-defined annual growth bands; The climate is interpreted as coolly warm, with cool winters and hot summers and a growing season of four to eight months. In order for this biome to reach up to 75° in both hemispheres, the poles must be much warmer than they are now. This is consistent with modeled output. The distribution of large crete along the European and western Tethian margin is in harmony with the modeled climate: warm and predominantly a dry but short Season. The relatively low-variety communities of conifers were limited to lower llems and are usually found near evaporites (usually located between about 10° and 40° llem in both hemispheres). Thus, they represent a subtropical dry environment and their distribution is in line with model estimates in terms of the ratio between precipitation and evaporation. Based on facies and paleobotanic data, hot-warm climates were between 5° and the equator, with high variety flora of ferns, cycads and seed ferns, as well as conifers and ginkgoes. The coolly warm region and Central Siberian Volcanic Traps extending all the way to Central Siberia.During the Central Triyas, abundant evaporites and calcretes accumulated in Europe, while in northern and southern China there were warm and cool warm floras. These observations fully agree with the model output. Warm warm flora has expanded to about 70°N in north-east Siberia and appears in this area of the first north-hemisphere coal marshes since the last Permian. Southern hemisphere-in-law marshes are found in South America and Antarctica, again in line with regions where precipitation has exceeded evaporation for most of the year. Biomes and facies suggest that the equatorial alisi is a predominantly a dry generation, again borrowing support for the validity of the model. Elegantly preserved fossil wood from antarctica's Central Triyas (70-75°S in the Triyas) shows forests with growth rates that are one to two sizes larger than those seen at these tlems today. In the late Triathian, hot-warm biomes dominated between 30° and 50° in both hemispheres. The model usually supports this scenario, but the lack of precipitation loses many regions between these inerms, especially away from coastal areas. Thus, model output correlations well with data obtained globally, especially for terrestrial plant biomes, terrigenous proxy facies and the distribution of reefs. Terrestrial reptile distributions are difficult to establish a direct relationship with paleoclima, but can be interpreted as wide in line with model output. This shows the kind of model-proxy correlation that is currently possible.O.G. Sorokhtin, ... Developments in N.O. Sorokhtin, Ground and Environmental Science, 2011The division ofPangaea's component continents in mesozoic and Cenozoic to their present location, and the history of the centrifuge shift that followed are known in detail (Zonenshein et al., 1976; Zonenshein and Gorodnitsky, 1977; Smith and Briden, 1977). Therefore, it will provide a single reconstruction for only one intermediate period (about 60 MMY earlier). Presented in Figure 9.11. For comparison, the locations of today's continents are given in the Lambert projection (Res. 9.12). Figure 9.11. Pangaea disintegration (about 60 MMY ago). After their and Brieden (1977). Figure 9.12. Continental and oceanic locations on today's Earth; Lambert projection. After Smith and Brieden (1977). Figure 9.10-9.12 shows the gradual closure of the Tetis Ocean, where the Atlantic Ocean gradually opens and a majestic Alpine-Himalayan mountain belt emerges at the end of Cenozoic. Figures show that Africa and Arabia are drifting north, gradually closing the western part of tethys. Only the small ruins of this ancient and large ocean remain the southern depression of the Eastern Mediterranean, the Black Sea and the Caspian Sea. The emergence of the Alps and caucasus was significantly related to the clash of afro-Arabic Plate with island arcs framing the south of Western European and Russian platforms. Another and apparently most representative example of the formation of the planet's highest mountain systems is given to the northern hemisphere by the rush to drift india from the south. India separated Antarctica before about 100 MMY and collided with the southern edge of the Asian continent before 30 MMY. Thus, it lasted 6600 km at a rate of over 9 cm/year over 70 MMY. India's collision with the Asian continent and its now ongoing northerly movement resulted in the formation of the Hindu Bird, Pamir and Himalayan mountain belts, as well as the high-altitude Tibetan Plateau. Figure 9.10 shows an intermediate stage in the middle of the Indian peninsula in the formation of the Indian Ocean, Madagascar is already separated but Australia is still connected to Antarctica (slightly separated later, about 50-40 MMY ago). By summarizeing the destruction and destruction of the supercontinent, you can align the formations until the time belongs (see Figure 9.13). A: Monogaea (2.5-2.3 BY ago); B: Stille's Megagaea (1.8-1.7 BY before; C: Mesogea-Rodinia (1.0-0.9 by BY); E: Wegener's Pangaea (230-100 MMY ago). The same figure shows the result of Mesogea splitting into two small supercontinents, the last 900 MMY of Earth's geological evolution, which played an important role in Northern Laurasia and Southern Gondwana. For comparison, today's continental positions are shown. Still, there were only four initial accumulations, A, B, C and D, real supercontinents. Figure 9.13. Paleo-reconstruction of continental and ocean locations, Lambert projection: (A) Monogaea, before 2.6 BY (shadowless areas of continents are ice sheets; crosses are tillites and tilloids after Chumakov (1978); (B) Stille's Megagaea, before 1.8 BY (wavy shading folded arches; black spots are red bed arrays after Anatolyeva (1978); (C) Mesogea, before 1.0 BY; (D) Mesogea Laurasia and Gondwana, divided before 750 MMY (shadowless areas of continents are ice sheets; triangles tillites and Tilloids Chumakov after (1978); (E) Wegener's Pangaea, 200 MMY ago (reconstruction by Smith and Briden, 1977); (F) current continental and ocean locations. When single-cell convection structure appears, all continental massives dwindling flow and form on a single supercontinent, such as monogaea, Megagaea or Pangaea. It was always accompanied by an explosion in Earth's tectonic activity during the formation of supercquita (see Res. 6.8). After the formation of such a supercontinent, naturally from all sides, the only ocean in the surrounding area appears as if surrounded by plunge zones, where the ocean layers of Pantalassa sink into the coat. At a regular plunge rate of about 5-10 cm/year, in a few tens of millions of years these plates will fall to the core level. There, iron-oxide differentiation will be completely destroyed (fragmented) due to the action of the barodif fusion mechanism (see Section 4.4). The effect of differentiation of the thruct material barodif fusion differential is time-reliant on its sojourn under high pressure (over 0.9 Mbar). The desering substance itself is always slightly colder, so it is more dense than the surrounding coat. Therefore, it is natural for the thrust under the subduction regions to de-core and form the similarity of the declining flow roots (See 9.14). Figure 9.14. The mechanism of superkita destruction is due to the emergence of a new flow of rising coats instead of the previous decreasing flow. Therefore, after differentiation these roots need to flow from them, in the form of a fragmented coat substance, a liquid magmatic meper (that is, rise) on both sides of the areas sinking into the nucleus of old lithospheric plates. Therefore, large differentiated masses, hence light, coat matter begin to accumulate under the center of the newly formed supercontinent. As a result, a strong rising flow emerges under the supercontinent instead of flowing, which occurs in turn for several tens of millions of years. This flow rises and the holiday with the covering lithospheric shell. As a result, the supercontinent is divided and its parts-continents are dragged from its former center as centrifuges. That's probably why supercontinents formed in past geological ages were unstable and existed as unified continents only for short periods of time (no more than 100 MMY). This pattern (in fact, a law) can only be explained by a sphering bone-density convection mechanism. The reconstruction of continental locations can be evaluated towards the future based on today's drift pattern. In the early 1970s, Dietz and Holden (1972) underted a reconstruction such as 50 MMY (Res. 9.15). This 50 MMY shows that both the Atlantic and Indian Oceans will be much wider. The Pacific Ocean will shrink in parallel. North and South America will shift west, Africa to the northeast, Europe, Asia and India to the east, and Australia to the north. They'll all reach the equat. Antarctica will remain virtually unchanged compared to the South Pole.Figure 9.15. Continental positions estimated at 50 MMY Dietz and Holden (1972) then now: oblique shading current continental positions, black shading positions 50 MMY now; large dotted shading create new ocean crust; Small dotted shading racks.A.B. Roy, Ritesh Purohit, Indian Shield, 2018Prekambrian-Cambrian Border along the Indian Shield Phanerozoic reconstitution resulting in geomorphectonic transformation of the Precambrian shell block. Precambrian climax Vindhyan and Indian Shield were also witnessed by the inverter (upliftment) of the associated 'Purana basins' on the mainland. Globally, precambriarian end Pangea marked a gradual change over this Rodinia configuration. Pangea's exact timing and the process of growth and evolution are still under debate. However, pangean configuration precambrian.The emerging Supercontinent Pangea may not be so unreasonable to assume that it is finally in the process of appearing, including two different continental associations, Laurasia in the north and Gondwanaland in the south, which were connected due to the proximal connection of large land masses. This alignment is well interpreted in various studies, and logical settlements of the interconnected borders of continents have been discussed on the basis of rock, mineral and fossil adconsity. The Indian shell block (now known as the Indian Peninsula) was located northeast of the old Gondwanaland (Fig. 15.1).Fig. 15.1. The framework of the Pangean Supercontinent, which consists of Laurasia to the north and Gondwanaland to the south. IND means the continental bloc that forms the Indian Subcontinent at a later stage. The dark-brown part of the supercontinental frame represents the southern polar glaciation zone. Box 15.1Gondwanaland has a prevailing confusion about the timing of growth and the formation of the Gondwana basins. Both features could not have evolved at the same time. The growth of the Gondwana basins was around the Late Carbonaceous or Early Permyen when it was considered traditional. The appearance of basin formations previously or at the same time kept in general at Gondwanaland.The generally held appearance of the land mass could not be located with the growth of pangea supercontinent about 550 Ma, that is, it is called pannotia, which was exactly opened to several small pieces of precambrierian-Cambriane border. The large part, which includes parts of China, India, Africa, South America and Antarctica, Gondwanaland.Lee Hannah, Climate Change Biology (Second Edition), 2015Fleas movement is the most important concept in modern geology. Continents ride large crusty plates that change position over millions of years of timescale. The plates are constantly formed on volcanically active central ocean ridges and are constantly destroyed by plunge as head edges. they are driven back into the shell, where they encounter another plate. More than 200 million years ago, the continents were all connected to a supercontinent called Pangaea (Figure 6.1). Currently north South America and Africa and southern North America and Europe were currently equatorial. After the continents widely disintegrated, they came together to form Pangaea. Figure 6.1. Pangaea (a), Laurasia and Gondwanaland (b). Source: (a) Courtesy of Canadian Geographic. (b) Wikimedia began leaving the Commons about 190 million years ago for Pangaea, Gondwanaland and Laurasia. North Africa and South America remained on the equator, while North America and Europe moved poleward. All southern continents (South America, Africa, Antarctica and Australia) and India were interconnected in Gondwanaland during this period. This explains the distribution of families of plants and animals that are relevant but are currently found in widely seged areas such as ratite birds in South America, Africa, Australia and New Zealand. Source: Retallack, G.J., 2001. 300 million years of atmospheric carbon dioxide recorded from fossil plant ice. Nature 411, 287-290.Use stomata for co2 exchange with plants atmosphere. When more CO2 is available, plants need less stomata to get the job done. This simple fact has been used for 300 million years to get a proxy for atmospheric CO2 (Retallack, 2001). Fossil leaves were examined under a microscope to count their stomata. Less stomata means low atmospheric CO2 concentrations. The resulting CO2 concentration estimates agree with other ad closenesses. They point to the close corration of high CO2 with global warm periods. Gondwanaland left about 150 million years ago. First, India slid into Asia, eventually crashing into the plate there, causing the Himalayas to rise. A little later, Africa and South America left. Most recently, Australia left Antarctica 50-60 million years ago, allowing the polar current to be established around Antarctica about 47 million years ago. Since the fall of Gondwanaland, major mountain construction and the closure of the Panamanian clamp have had global and regional climatic consequences. The start of the Himalayas about 40 million years ago resulted in global cooling associated with its effects on the carbon cycle (see The closure of the land bridge in Panama separated the Atlantic and Pacific oceans, and changes in ocean circulation affected precipitation and temperature patterns in many regions. The impact of And Es' rise has had major impacts on the South American climate and biotechnology. biotechnology.