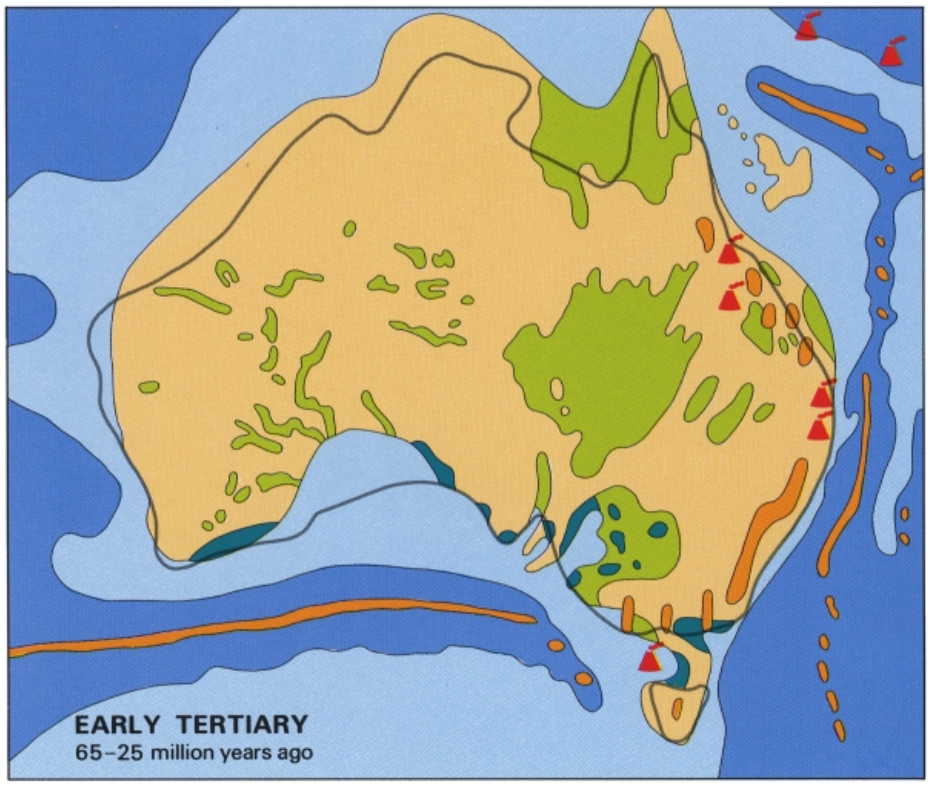
Cainozoic

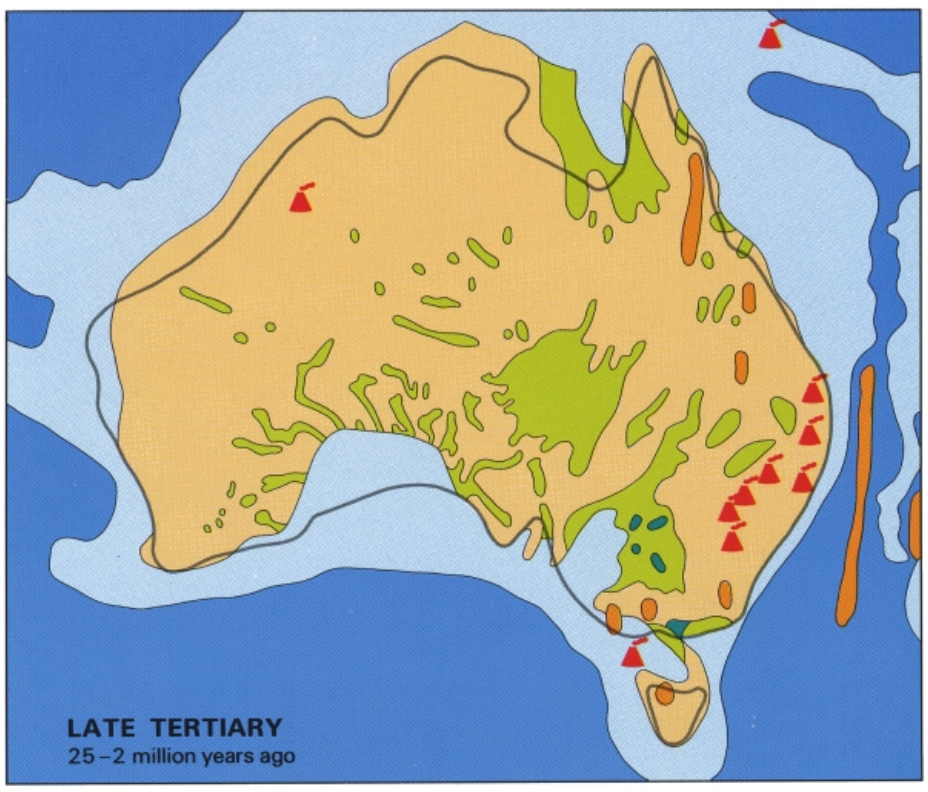
65 million years ago to the present

Tertiary

65 to 2 million years ago

Broad uplifting of eastern Australia led to the formation of the eastern highlands. As Australia and Antarctica separated, the limestone of the Nullarbor Plain built up in the shallow sea separating them. Enormous brown coal deposits were formed in extensive swampy areas of southern Victoria. These coal deposits are considered to be the source of the oil and gas now being recovered from the Bass Strait fields.





The start of the Tertiary saw most continents nearing their present global positions. Though Africa and India had yet to collide with Eurasia and push up the Alps and the Himalayas, this recent major mountain-building event was fast approaching. Australia was probably still tenuously connected to Antarctica by an ever-widening and frequently flooded rift valley. However, quite early in the Tertiary, about 45 m.y. ago, the two continents finally separated. For the next 30 m.y. Australia's distinctive fauna and flora continued to evolve in relative isolation before Australia came into contact with the Eurasian Plate about 15 m.y. ago.

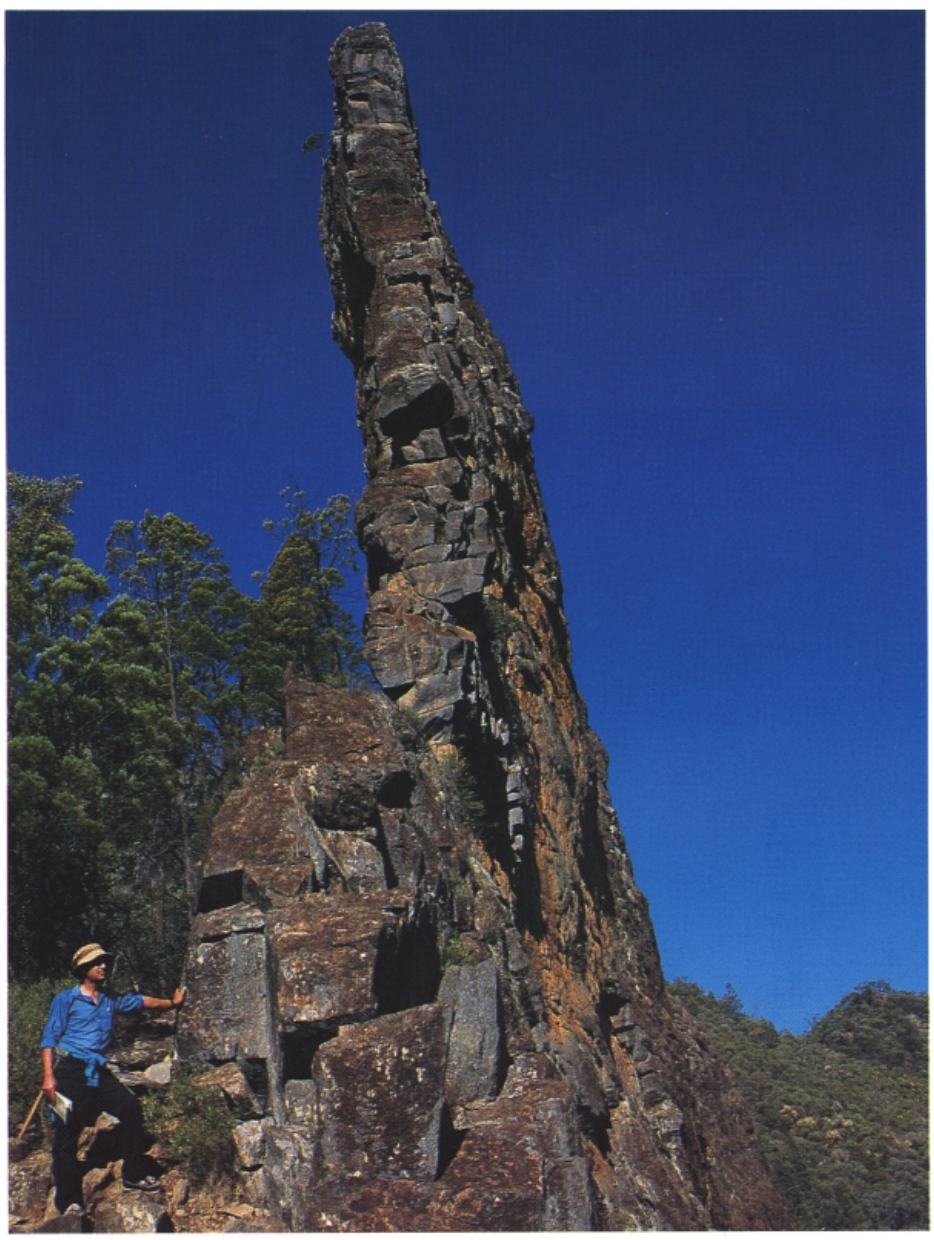
The thickest and most extensive Tertiary deposition occurred in the south, where the limestone of the Nullarbor Plain built up in a shallow but gradually deepening sea as Australia and Antarctica drifted apart.

Under the influence of an apparently wet and hot climate, erosion planed the land surface down to flat and low levels. These climatic conditions also led to the widespread development of weathered surfaces of laterite and silcrete. Vegetation growing in extensive swamps in southern Victoria led to the formation of enormous brown coal (lignite) deposits, now a major source of that state's energy supply.

Beginning about 40 m.y. ago major tectonic activity caused the general uplift of eastern Australia, forming the high but still gently sloping upper surfaces of the Snowy Mountains and the tablelands of New South Wales. Then, around 30 m.y. ago, eastern Australia began drifting over a 'hot spot' which caused a line of volcanic cones and basalt lava flows to progressively erupt over the next 25 m.y. The oldest are in the Atherton area of north Queensland; the youngest occur in south-central Victoria.

During the early Tertiary closed forests covered most of Australia. They consisted mainly of broadleaf and coniferous species of Gondwana origin and were host to a variety of possum-like animals. As the climate became drier the forests died out in all but a few more-humid areas, and open woodlands and grasslands began to dominate. Eucalypts, the trees so characteristic of Australia, did not evolve until about 35 m.y. ago, probably in response to the drier conditions and the now generally poor, leached soils.

Kangaroos, the most characteristic of Australia's mammals, are even more recent. They evolved into their present form only about 15 m.y. ago, taking advantage of the increasing expanse of open country as the closed forests of the early Tertiary gradually disappeared.



Sentinel-like volcanic plugs and dykes of the Warrumbungle Range (N.S.W.)
The Warrumbungle Range (right) is a deeply dissected remnant of intense volcanic activity during the Tertiary. Prominent dykes, plugs and domes of solidified lava that has resisted erosion rise abruptly from the surrounding terrain. The 'Breadknife' (far right) is a striking example of one such preserved dyke.

The Cainozoic, or era of 'new life', commenced with the demise of the dinosaurs and covers the evolution of most of the world's present-day flora and fauna. Australia and Antarctica finally separated quite early in the era thus enabling Australia's unique plant and animal species to evolve during a subsequent 30 million year period of effective global isolation.

Quaternary

the last 2 million years

As the Australian crustal platform drifted to its present global position tectonic and volcanic activity, which had begun in the Tertiary, slowly abated. Down-warping and faulting near the centre caused the development of a large inland lake system, now much contracted to Lake Eyre and other salt lakes in central and northern South Australia.

Volcanic activity became more localised, with basalt lava flows extruding in northern Queensland and volcanoes erupting in the Mount Gambier area of south-eastern South Australia. The southern volcanoes were still erupting until about 5000 years ago and activity continued until as recently as 1500 years ago.

As Australia drifted towards the equator into the zone of desert-producing high pressure systems the climate became increasingly drier. However, this gradual climatic change was overridden by more rapid and extreme variations during a sequence of world-wide glacial periods beginning around 500 000 years ago—the *Pleistocene Ice Age*. At the peak of this ice age permanent snow covered the highlands of the south-eastern mainland and Tasmania, where glaciers sculptured the higher valleys into the smooth forms that can be seen today.

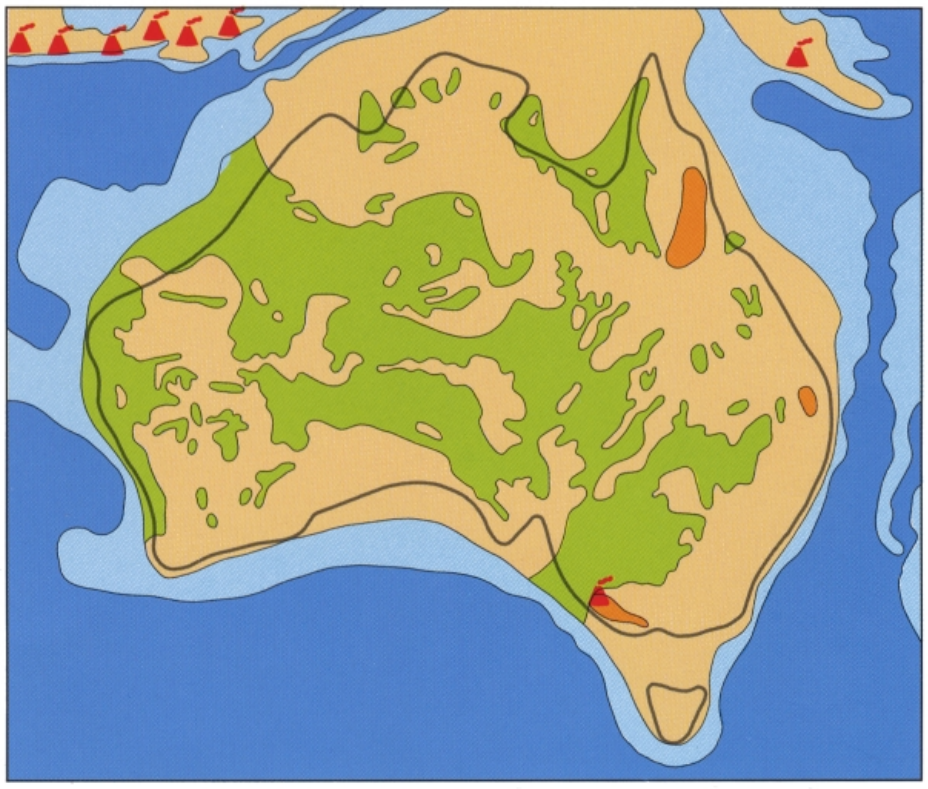
With so much water trapped globally in extensive ice sheets at the height of glaciation the sea level dropped some 200 m below its present-day level. As a consequence dry land was created between the Australian mainland and New Guinea and Tasmania. The shelf on which the Great Barrier Reef later developed was also land at this time.

The much enlarged continental landmass almost linked up with south-eastern Asia, making the migration into Australia of its first human inhabitants—today's Aboriginals—relatively easy. The climate was generally cool and arid and strong winds lifted and deposited loose sand to form the vast dune system which still exists today over much of the interior.

As the world climate warmed in recent times the sea gradually rose to its present level, separating Tasmania and New Guinea from the Australian mainland and enabling the Great Barrier Reef to form into what is now the world's largest bio-geomorphic structure.

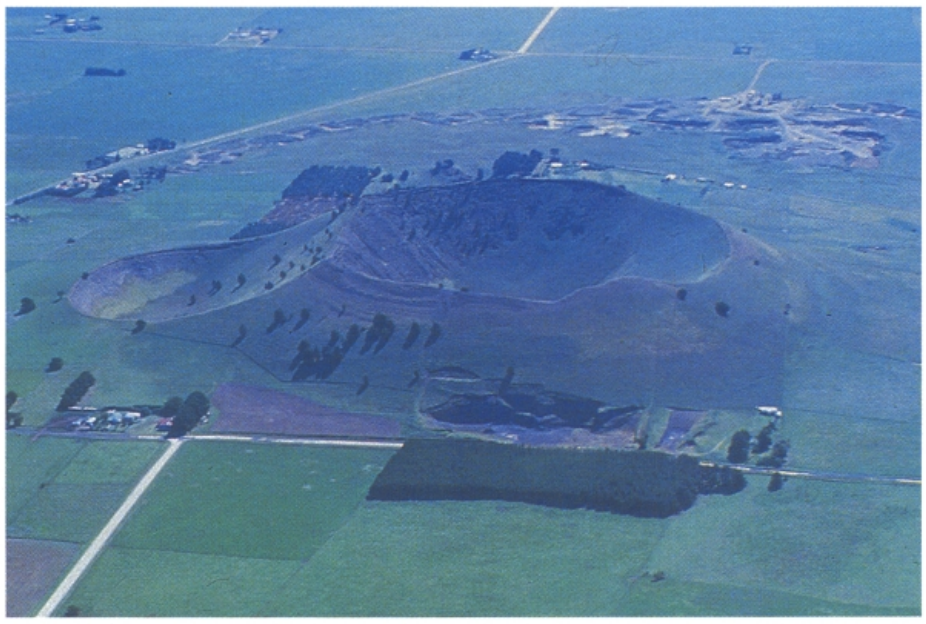
Evolution continued in Australia with the appearance of species that exist today. In addition some giant marsupials, wingless birds and reptiles evolved but they all became extinct between 10 000 and 20 000 years ago. This was probably due to a contraction of suitable habitats as aridity increased and to man's impact on the environment through fire and hunting.

Australia's mineral resources were by now largely in place. The most significant recent event was the concentration of heavy minerals—rutile, ilmenite and zircon—in beach sands at a number of locations along the newly formed coastline.



Australia's most recent geological history saw the eventual evolution into their present-day form of many plant and animal species. The continent was first inhabited by man following global lowering of the sea level during the Pleistocene Ice Age.

As the sea level rose after the last glacial retreat New Guinea and Tasmania were separated from mainland Australia. Drowned river valleys such as Sydney Harbour were formed along the new coastline. The Great Barrier Reef developed on the submerging coastal plain off the eastern coast of Queensland.



Mount Schank, a volcanic cone near Mount Gambier (S.A.)
Displaying a virtually uneroded cone, Mount Schank is one of the youngest volcanoes in Australia. It consists of two impinging craters, both of which were created by explosive volcanic activity. Carbon dating has shown that the main activity occurred about 5000 years ago, certainly within the known period of Aboriginal occupation of the area.

Longitudinal sand dunes, Simpson Desert (N.T.)
Sandplains, typical of much of Australia's arid interior, developed initially from alluvium deposited on extensive plains during a formerly wetter climate. With the onset of more arid conditions water tables dropped and vegetation disappeared, enabling wind to erode the loose sediments. Fine particles blew away as dust, leaving behind the sand from which dunes were formed by the prevailing winds.

Ribbon reefs forming part of the Great Barrier Reef, near Cooktown (Qld)
This vast reef system extends for more than 2000 kms along the continental shelf off the Queensland coast. The reefs, which are accumulations of limestone secreted by coral organisms over thousands of years, are still forming today.