

GEOLOGY AND FOSSILS

Kangaroo Island is world-renowned for its wildlife, spectacular landforms and coastal scenery. When you're standing amid the landscape admiring rugged coastal cliffs, or inland sand dunes, or deep underground in a karst system have you ever wondered what happened thousands of years ago that led to the formation of these beautiful and varied landscapes?

For much of geological time Kangaroo Island sat in the centre of a much larger land mass, known as Gondwana. The island was not exposed on the southern edge of a continent, as it is now. Some fascinating landforms exist today providing a window back in time.

Christmas Cove

The small boat harbour of Christmas Cove is on the western side of the Penneshaw town, surrounded by 20 metre high bluffs. The cove is an important geological site, with Palaeozoic glacial erratics lying on the beach. Glacial erratics occur when glaciers pick up chunks of rocks from an outcrop or from bedrock and transport them over long distances far from their origin. They eventually 'drop' these rocks that are then known as glacial erratics and record the story of a glacier's travels. Look for the ice scratches in the cliff face caused by ice action over 250 million years ago. Large granite boulders carried by a glacier are also now a monument to Captain Matthew Flinders.

Emu Bay

The dark grey shale at Emu Bay holds records from some 500 million years ago, when ancient sea creatures were teaming on the seafloor. More than 50 species of trilobites have been identified in the Emu Bay area, when these prehistoric creatures were preserved in perfect condition. The most common fossil encountered is the trilobite Redlichia, and has been discovered at sites near Emu Bay. Please remember to always leave nature as you find it. Along with a giant ancestral crayfish (Anomalocaris) and a range of other interesting creatures, the best place to see these specimens is at the SA Museum.

Remarkable Rocks

Sitting around 200 metres above the wild Southern Ocean is the iconic and aptly named, Remarkable Rocks. An enormous granite outcrop perched near the cliff edge, covered with a hazy golden orange lichen, they are nature's true monument.

At a time when Kangaroo Island was part of Gondwanaland, a mind blowing 500 million years ago, molten rock bubbled up to the earth's surface, and as it cooled solidified into granite. Over time as rain percolated through, boulders were gradually formed and exposed, and over centuries of wind and rain erosion, the boulders have been sculpted into a range of intriguing shapes. The base dome platform rock is the remnants of lava with the eroded granite boulders sitting atop, forming over millions of years.

The darker patches of Remarkable Rocks are believed to be the remnants of Cambrian rocks, made of black mica, bluish quartz, and pinkish feldspar, into which the granite jutted, to form an intrusion.

Little Sahara

There have been points in Kangaroo Islands geological history that sea levels have been low enough for the island to be linked by land to the mainland. Records indicate that around eight times, this has occurred in the past 700,000 years. The main implication of this is a vast series of fine-grained sand dunes, which have literally blown onshore and inland across most of the southern and part of western Kangaroo Island by winds like we could hardly imagine today and for long periods of time, carrying the sand grains for kilometres across the coastal shelf.

Most of these dune areas are now stabilised and covered by native vegetation along the south coast. However three areas still see large inland mobile sand dunes exposed, the most iconic is Little Sahara around four kilometres inland, along with Gantheaume Dunes south of Murray Lagoon and Bales Dunes east of Seal Bay.

The great depth of pure white calcium carbonate sands has also masked the deeper sediments underneath, preventing larger trees from growing and becoming established.

Little Sahara dunes are around two and a half square kilometres, with the largest dune reaching around 70 metres above sea level. Surrounded by coastal shrubland the site is privately owned and in 1979 was classed as a Significant Australian Heritage Geological Monument.

Caves and Arches

Inland dune systems were formed when great volumes of sands were literally blown onshore and inland across most of the southern and part of western Kangaroo Island, carrying sand grains for kilometres across the coastal shelf.

Today some of these dune systems have stabilised over time, and can be seen not as sand, but as soft and porous limestone. These porous sediments are easily eroded, and in some cases have formed spectacular geological formations and well known attractions including Kelly Hill Caves, Weirs Cove cliffs and Admirals Arch.

As rainwater soaks through the soil, it seeps into the soft limestone and begins to dissolve it. In the case of Kelly Hill Caves, a series of water fuelled events, ceiling collapses and eventually an underground system of caves is formed. Kelly Hill Caves are now a 'dry' limestone cave system. There has been no rainwater seepage through the caves for over 25 years, and only rarely can a small drop of water be seen on the tip of a stalactite.

Viewed as a young cave system at around 500 million years old, Kelly Hill Caves are essentially petrified sand dunes formed from the soft porous dune limestone, and are a truly spectacular ecosystem.

Admirals Arch is unique again in that it developed at the junction of the same porous limestone and the harder cambrian sediments, forming the arch we see today, which is enjoyed by a resident fur-seal population as a haul-out spot.

Wisanger Hills

The Wisanger Hills to the south of Emu Bay, sit some 35 metres high above the surrounding plateau. One of the few igneous or 'lava' rocks - unique because unlike many other formations it formed already at the surface of the earth, rather than deep underground and then exposed by erosion. These are Jurassic-aged basalts, that flowed down an ancient river channel and were subsequently left "high and dry" by the erosion of the surrounding sediments. Known as table-top hills, or mesas, due to their flat top that almost looks like it has been cut off!

These sediments are thought to be the result of the rifting which occurred when Australia and Antarctica separated around 170 million years ago. The 'Gap Road' actually meanders south through the only gap in the hills providing a scenic drive and views of the northern and southern sides of the Wisanger Hills.

Discover more....

By necessity this is a broad overview – far more detailed explanations are available on geological maps or more in-depth guidebooks. Including:

- Coastal Landscapes of South Australia, Robert P. Bourman, Colin V. Murray-Wallace, Nick Harvey (2016) Publisher: University of Adelaide Press
- A guide to the geology of Kangaroo Island **https://sarigbasis.pir.sa.gov.au/WebtopEw/ws/samref/sarig1/image/DDD/BROCH040.pdf**
- A guide to the geology of Kangaroo Island – the map **https://energymining.geohub.sa.gov.au/portal/apps/MapSeries/index.html?appid=b1f164c1cc034bd3ae4c52993ae70f40**

To discover more about Kangaroo Island's landscapes and attractions, visit **www.tourkangarooisland.com**