

Volcanoes in Victoria

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It has been more than 7000 years since the last volcanic eruption in Victoria, but what geologists know as the Victorian volcanic province is far from extinct: it merely rests. By Ben Haywood

TIMELINE

While it shows no signs of waking up soon, volcanoes have shaped Victoria's landscape across the ages, just as they will one day reshape the landscape again.

CAMBRIAN PERIOD

(About 575 million to 509 million years ago)

- Victoria's volcanic history began about 560 million years ago, when Australia's south-east was nothing more than deep ocean.
- Gondwana was the nearest land, several hundred kilometres to the west and north-west.
- Giant volcanoes dotted the ocean floor.
- The remains of these volcanoes and their lava are the oldest known rocks in Victoria. Cambrian greenstone can be found in eastern, central and western Victoria.

ORDOVICIAN PERIOD

(About 509 million to 446 million years ago)

- Volcanic activity was restricted to Victoria's far north-east, where a string of volcanic islands extended northwards through what is today south-eastern NSW.

SILURIAN & DEVONIAN PERIODS

(About 446 million to 359 million years ago)

- The oceans began to retreat by the Silurian and Devonian periods, and about half of Victoria was land.
- This was the time of Victoria's most explosive volcanoes. They ranged from long, narrow valleys to circular depressions.
- The volcanic rocks which filled these depressions remain, most forming plateaus or mountainous areas. The oldest example is Mount Burrowa, in Victoria's north-east. Eruptions happened so many times that the volcanic layers in some parts of central Victoria are at least one kilometre thick.

TRIASSIC & JURASSIC PERIODS

(About 251 million to 145 million years ago)

- By the Triassic period, the oceans were gone and Victoria's landscape was covered in glaciers and sheets of ice.
- The impact of volcanic eruptions through these periods was seen mainly in western Victoria and north-east.

CRETACEOUS PERIOD

(About 145 million to 65 million years ago)

- Major splits formed in the Earth's crust, to form a shallow depression between Victoria and Tasmania as Australia and Antarctica began to break apart.
- Lakes, rivers and swamps formed in the depression - and many plant, insect and small dinosaur fossils have been found in these sedimentary rocks, which now form the Otway and Strzelecki Ranges.

CENOZOIC ERA (About 65 million years ago to present)

- Volcanoes have been active in Victoria for much of this.
- As the Tasman Sea opened up the Earth's weakened crust allowed magma from the mantle to reach the surface. The resulting lava flows can be seen across Victoria.
- The most recent and extensive flows were in the Western District.
- Volcanoes erupting between 2 and 4.5 million years ago created most of the western plains, with eruptions every 25,000 years, almost to the present day.

FUTURE ERUPTIONS

- Future volcanic eruptions are extremely difficult to predict. Though there are often many clues to when a volcano may next erupt, sometimes it can happen with no warning at all.
- The frequency and size of past eruptions can sometimes help scientists predict the timing and nature of future eruptions. But the eruption history of a volcano isn't always known, and even if it is, there isn't always a clear pattern.
- Measuring the summit and slopes of a volcano is an important tool for predicting an eruption, as changes in shape, such as bulging, can indicate the movement of magma.
- Earthquakes around a volcano can also be telling, as eruptions can sometimes be preceded by earthquake swarms, hundreds of small earthquakes that can mean magma is moving upwards.

GEOLOGISTS HAVE CLASSIFIED VICTORIA'S YOUNG VOLCANOES INTO THREE MAIN CATEGORIES

LAVA VOLCANOES

Lava volcanoes built the western lava plains. Very runny lava from these volcanoes streamed away, forming many of today's broad low hills.

Lava volcanoes with stickier lava created much steeper slopes. The lava accumulated in and much closer to the vents.

- Mount Hamilton, near Westmere
- Mount Blackwood, near Bacchus Marsh
- Mount Widderin, near Skipton
- Mount Gisborne, near Gisborne
- Melbourne Hill, near Lancefield

- Hanging Rock, above, near Macedon
- Camels Hump, near Macedon
- Blue Mount, near Trentham

SCORIA VOLCANOES

Scoria volcanoes are much more spectacular. Blasts of escaping gas spout out huge glowing fountains of frothed-up lumps of lava. It accumulates around the vent, producing cones.

Lakes of lava often formed in the cones, and sometimes broke through the crater wall and flowed for a distance. Breached scoria cones like this are very common in Victoria.

Many solidified lava lakes can now be seen as discs capping volcanic hills.

- Mount Elephant, near Derrinallum
- Mount Warrenheip, near Ballarat
- Mount Buninyong, near Ballarat
- Mount Moorookyle, near Smeaton

BREACHED SCORIA CONES

- Mount Noorat, near Terang
- Mount Shadwell, near Mortlake
- Mount Warrenheip, near Ballarat

LAVA CAPPED

- Mount Aitken, Red Rock and Mount Holden, between Sunbury and Gisborne.

MAAR VOLCANOES

When hot magma rises into rocks that are close to the surface and contain lots of ground water, high pressure steam explosions blast magma and surrounding rocks into clouds of small fragments. The fragments build up to form a ridge around a shallow crater. These are maar volcanoes.

- Lakes Purrumbete, Keilambete and Bullenmerri, near Camperdown
- Lake Terang (dry), near Terang

COMPLEX VOLCANOES

- Tower Hill, near Warrnambool, is a group of scoria cones in a large, lake-filled maar crater.
- Mount Rouse, near Penshurst, includes a large scoria cone with several smaller craters that produced a lava flow that is the longest in western Victoria, over 60 kilometres.
- The scoria cone eruptions of Mount Noorat, Mount Leura and Mount Warrnambool have almost buried their former maar craters.

GROUND ZERO

Volcanic activity in Victoria climaxed between 360 and 370 million years ago during the last part of the Devonian period. At least six giant caldera volcanoes were active, some of them at the one time. Eruptions would have blanketed the surrounding areas in thick layers of ash, having a devastating impact on vegetation and early aquatic life. The gases and dust sent into the upper atmosphere mean the eruptions would have been felt globally.

All of this ash has long since eroded, leaving only the harder volcanic layers that filled the calderas. These remains now form Mount Macedon, the Dandenong Ranges, the mountainous region between Healesville, Warburton and Eildon (including Mount Donna Buang and the Cerberean Ranges) and near Violet Town, in the northern part of the Strathbogie Ranges.

Sources: Bill Birch, senior curator (geology) Museum Victoria; Volcanoes in Victoria by William B. Birch, Royal Society of Victoria 1994; Geo science Australia; Victorian Department of Primary Industries.

Thanks: Bill Birch, senior curator (geology) Museum Victoria

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