

Encyclopedic Entry

Australia and Oceania: Physical Geography

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Oceania is a region made up of thousands of **islands** throughout the Central and South Pacific Ocean. It includes Australia, the smallest continent in terms of total land area. Most of Australia and Oceania is under the Pacific, a vast body of water that is larger than all the Earth's continental landmasses and islands combined. The name "Oceania" justly establishes the Pacific Ocean as the defining characteristic of the continent.

Oceania is dominated by the nation of Australia. The other two major landmasses of Oceania are the **microcontinent** of **Zealandia**, which includes the country of New Zealand, and the western half of the island of New Guinea, made up of the nation of Papua New Guinea. Oceania also includes three island regions: Melanesia, Micronesia, and Polynesia (including the U.S. state of Hawaii).

Oceania's **physical geography**, **environment** and **resources**, and **human geography** can be considered separately.

Oceania can be divided into three island groups: **continental islands**, **high islands**, and **low islands**. The islands in each group are formed in different ways and are made up of different materials. Continental islands have a variety of physical features, while high and low islands are fairly uniform in their physical geography.

Continental Islands

Continental islands were once attached to continents before sea level changes and **tectonic activity** isolated them. Tectonic activity refers to the movement and collision of different sections, or plates, of the Earth's crust.

Australia, Zealandia, and New Guinea are continental islands. These three regions share some physical features. All three have **mountain ranges** or highlands—the Great Dividing Range in Australia; the North Island Volcanic Plateau and Southern Alps in New Zealand; and the New Guinea Highlands in Papua New Guinea. These highlands are **fold mountains**, created as tectonic plates pressed together and pushed land upward. New Zealand and Papua New Guinea also have volcanic features as a result of tectonic activity.

Although they share some **landscape** features, each of these regions has distinct physical features that resulted from different environmental processes. Australia's landscape is dominated by the **Outback**, a region of **deserts** and semi-**arid** land. The Outback is a result of the continent's large inland **plains**, its location along the dry Tropic of Capricorn, and its proximity to cool, dry, southerly winds. New Zealand's **glaciers** are a result of the islands' high elevations and proximity to cool, moisture-bearing winds. Papua New Guinea's highland **rain forests** are a result of the island's high elevations, proximity to tropical, moisture-bearing winds, and location right below the warm **Equator**.

High Islands

High islands, also called volcanic islands, are created as volcanic eruptions build up land over time. These eruptions begin under water, when hot **magma** is cooled and hardened by the ocean. Over time, this activity creates islands with a steep central peak—hence the name “high island.” Ridges and **valleys** radiate outward from the peak toward the coastline.

The island region of Melanesia contains many high islands because it is a major part of the “**Ring of Fire**,” a string of **volcanoes** around the boundary of the Pacific Ocean. This part of the Ring of Fire is on the boundary of the Pacific plate and the Australian plate. This is a **convergent plate boundary**, where the two plates move toward each other. Important volcanic mountains in Melanesia include Mount Tomanivi, Fiji; Mount Lamington, Papua New Guinea; and Mount Yasur, Vanuatu.

Low Islands

Low islands are also called coral islands. They are made of the skeletons and living bodies of small **marine** animals called **corals**. Sometimes, coral islands barely reach above **sea level**—hence the name “low island.” Low islands often take the shape of an irregular ring of very small islands, called an **atoll**, surrounding a **lagoon**. An atoll forms when a coral reef builds up around a volcanic island, then the volcanic island **erodes** away, leaving a lagoon. Atolls are defined as one island even though they are made up of multiple communities of coral.

The island regions of Micronesia and Polynesia are dominated by low islands. The Kwajalein Atoll in the Marshall Islands, for example, is composed of 97 islands and islets that surround one of the largest lagoons in the world, with an area of 2,173 square kilometers (839 square miles). The nation of Kiribati is composed of 32 atolls and one solitary island dispersed over 3.5 million square kilometers (1.35 million square miles) of the Pacific Ocean.

Island Flora and Fauna

The **evolution** of **flora** and **fauna** across the islands of Australia and Oceania is unique. Many plants and animals reached the islands from southern Asia during the last **glacial period**, when sea levels were low enough to allow for travel. After sea levels rose, species adapted to the environment of each island or community of islands, producing multiple species that evolved from a common **ancestor**. Due to its isolation from the rest of the world, Australia and Oceania has an incredibly high number of **endemic** species, or species that are found nowhere else on Earth.

Plants traveled between islands by riding wind or ocean **currents**. Birds carried the seeds of fruits and plants and spread them between islands with their droppings. Ferns, mosses, and some flowering plants rely on spores or seeds that can remain airborne for long distances. Coconut palms and mangroves, common throughout Australia and Oceania, produce seeds that can float on salty water for weeks at a time. Important flowering plants native to Australia and Oceania include the jacaranda, hibiscus, pohutukawa, and kowhai. Other indigenous trees include the breadfruit, eucalyptus, and banyan.

Birds are very common in Australia and Oceania because they are one of the few animals mobile enough to move from island to island. There are more than 110 endemic bird species in Australia and Oceania, including many seabirds. Many flightless birds, such as emus, kiwis, cassowaries, wekas, and takahes, are native to Australia, Papua New Guinea, and New Zealand. The Pacific Islands have more than 25 species of birds of paradise, which exhibit colorful plumage.

Lizards and bats make up the majority of Australia and Oceania’s native land animals. Lizard species include the goanna, skink, and bearded dragon. Australia and Oceania has more than a hundred different species of fruit bats.

The few native land animals in Australia and Oceania are unusual. Australia and Oceania is the only place in the world that is home to **monotremes**—mammals that lay eggs. All monotremes are native to Australia and Papua New Guinea. There are only five living species: the duckbill platypus and four species of echidna.

Many of the most familiar animals native to Australia and Oceania are **marsupials**, including the koala, kangaroo, and wallaby. Marsupials are mammals that carry their newborn young in a pouch. Almost 70 percent of the marsupials on Earth are native to Oceania. (The rest are native to the Americas.)

In Australia and Oceania, marsupials did not face threats or competition from large **predators** such as lions, tigers, or bears. The red kangaroo, the world's largest marsupial, can grow up to 2 meters (6 feet) tall, and weigh as much as 100 kilograms (220 pounds). In the Americas, marsupials such as possums are much smaller.

Marine Flora and Fauna

The marine environment is an important and influential physical region in Australia and Oceania. The region is composed of three marine realms: Temperate Australasia, Central Indo-Pacific, and Eastern Indo-Pacific. **Marine realms** are large ocean regions where animal and plant life are similar because of shared environmental and evolutionary factors.

The Temperate Australasia realm includes the seas surrounding the southern half of Australia and the islands of New Zealand. This realm is one of the world's richest areas for seabirds. Its cold, **nutrient**-rich waters support a diversity of plants and fish that seabirds feed on. These seabirds include different species of albatross, petrel, and shearwater, as well as the Australasian gannet and rockhopper penguin.

The Central Indo-Pacific realm includes the seas surrounding the northern half of Australia, Papua New Guinea, Solomon Islands, Vanuatu, New Caledonia, Fiji, and Tonga. This marine realm has the greatest diversity of tropical coral in the world and includes the world's two largest coral formations: Australia's Great Barrier Reef and the New Caledonia Barrier Reef. The Great Barrier Reef, a **UNESCO** World Heritage Site off the coast of northeast Australia, is 344,400 square kilometers (133,000 square miles).

The Great Barrier Reef and the New Caledonia Barrier Reef are underwater hotspots for **biodiversity**. The Great Barrier Reef is home to 30 species of whales, dolphins, and porpoises; six species of sea turtles; 215 species of birds; and more than 1,500 species of fish. The New Caledonia Barrier Reef is home to 600 species of sponges, 5,500 species of mollusks, 5,000 species of crustaceans, and at least 1,000 species of fish.

The Eastern Indo-Pacific realm surrounds the tropical islands of the central Pacific Ocean, extending from the Marshall Islands through central and southeastern Polynesia. Like the Central Indo-Pacific realm, this realm is also known for its tropical coral formations. A variety of whale, tortoise, and fish species also inhabit this realm.

VOCABULARY

Term	Part of Speech	Definition
ancestor	<i>noun</i>	organism from whom one is descended.
arid	<i>adjective</i>	dry.
atoll	<i>noun</i>	a coral reef or string of coral islands that surrounds a lagoon.
biodiversity	<i>noun</i>	all the different kinds of living organisms within a given area.
continent	<i>noun</i>	one of the seven main land masses on Earth.
continental island	<i>noun</i>	land once connected to a continent but broken off by shifting tectonic plates.
convergent plate boundary	<i>noun</i>	area where two or more tectonic plates bump into each other. Also called a collision zone.

coral	<i>noun</i>	tiny ocean animal, some of which secrete calcium carbonate to form reefs.
coral reef	<i>noun</i>	rocky ocean features made up of millions of coral skeletons.
crust	<i>noun</i>	rocky outermost layer of Earth or other planet.
current	<i>noun</i>	steady, predictable flow of fluid within a larger body of that fluid.
desert	<i>noun</i>	area of land that receives no more than 25 centimeters (10 inches) of precipitation a year.
elevation	<i>noun</i>	height above or below sea level.
endemic	<i>adjective</i>	native to a specific geographic space.
environment	<i>noun</i>	conditions that surround and influence an organism or community.
Equator	<i>noun</i>	imaginary line around the Earth, another planet, or star running east-west, 0 degrees latitude.
erode	<i>verb</i>	to wear away.
evolution	<i>noun</i>	process of how present types of organisms developed from earlier forms of life.
fauna	<i>noun</i>	animals associated with an area or time period.
flora	<i>noun</i>	plants associated with an area or time period.
fold mountain	<i>noun</i>	areas of the Earth's crust that have been bent and forced up by movement of tectonic plates.
glacial period	<i>noun</i>	time of long-term lowering of temperatures on Earth. Also known as an ice age.
glacier	<i>noun</i>	mass of ice that moves slowly over land.
high island	<i>noun</i>	an oceanic or volcanic island.
human geography	<i>noun</i>	the study of the way human communities and systems interact with their environment.
island	<i>noun</i>	body of land surrounded by water.
lagoon	<i>noun</i>	shallow body of water that may have an opening to a larger body of water, but is also protected from it by a sandbar or coral reef.
landscape	<i>noun</i>	the geographic features of a region.
low island	<i>noun</i>	continental island.
magma	<i>noun</i>	molten, or partially melted, rock beneath the Earth's surface.
marine	<i>adjective</i>	having to do with the ocean.
marine realm	<i>noun</i>	large ocean region, including its underwater landscape, climate, and organisms.
marsupial	<i>noun</i>	mammal that carries its young in a pouch on the mother's body.
microcontinent	<i>noun</i>	a type of large continental island.
monotreme	<i>noun</i>	type of mammals that lay eggs instead of giving birth to live young.
mountain range	<i>noun</i>	series or chain of mountains that are close together.
nutrient	<i>noun</i>	substance an organism needs for energy, growth, and life.
Oceania	<i>noun</i>	region including island groups in the South Pacific.

Outback	<i>noun</i>	remote, sparsely populated interior region of Australia.
physical geography	<i>noun</i>	study of the natural features and processes of the Earth.
plain	<i>noun</i>	flat, smooth area at a low elevation.
predator	<i>noun</i>	animal that hunts other animals for food.
rain forest	<i>noun</i>	area of tall, mostly evergreen trees and a high amount of rainfall.
resource	<i>noun</i>	available supply of materials, goods, or services. Resources can be natural or human.
Ring of Fire	<i>noun</i>	horseshoe-shaped string of volcanoes and earthquake sites around edges of the Pacific Ocean.
sea level	<i>noun</i>	base level for measuring elevations. Sea level is determined by measurements taken over a 19-year cycle.
tectonic activity	<i>noun</i>	movement of tectonic plates resulting in geologic activity such as volcanic eruptions and earthquakes.
tropical	<i>adjective</i>	existing in the tropics, the latitudes between the Tropic of Cancer in the north and the Tropic of Capricorn in the south.
UNESCO	<i>noun</i>	the United Nations Educational, Scientific, and Cultural Organization.
unique	<i>adjective</i>	one of a kind.
valley	<i>noun</i>	depression in the Earth between hills.
volcano	<i>noun</i>	an opening in the Earth's crust, through which lava, ash, and gases erupt, and also the cone built by eruptions.
Zealandia	<i>noun</i>	a microcontinent that broke off from Australia about 80 million years ago. Zealandia is almost totally underwater.

For Further Exploration

Articles & Profiles

- National Geographic Magazine: Australia's Monsoon
- National Geographic Magazine: Murray-Darling Basin—Australia's Dry Run

Maps

- National Geographic Events: Giant Traveling Map of the Pacific Ocean

Websites

- The Encyclopedia of New Zealand: Deep-Sea Creatures
- National Geographic Travel: Australia and Oceania



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