The Geology of Yakushima

Yakushima is located about 60 kilometers south of Kyushu, the southernmost of Japan's four main islands. Only 132 kilometers in circumference, this small island contains the Kyushu region's highest peak, 1,936-meter Mt. Miyanoura, and 46 peaks over 1,000 meters, earning the island the nickname "the Alps of the sea." Yakushima has a range of climates and vegetation varying from subtropical at the coast to subarctic on the peaks. By contrast, Tanegashima, an island just 18 kilometers away, is mostly flat, with its highest point at only 282 meters.

The striking difference between the two islands is the result of magmatic activity that affected Yakushima but had a minimal impact on Tanegashima. On Yakushima, underground magma cooled slowly and hardened into large masses of granite called plutons. These pushed up sedimentary layers that formed the high peaks of the island.

Early Formation

Around 40 million years ago, both Yakushima and Tanegashima were covered by the sea. Sediment flowing from the Asian continent accumulated on the ocean floor, forming strata of sand and mud deposits, known as the Hyuga Group, that were compressed over time.

Magmatic Activity

About 15.5 million years ago, magmatic activity more than 10 kilometers below the Earth's surface caused granitic magma to intrude into faults in the Hyuga Group strata and formed a magma reservoir. The magma solidified into granite, which rose about one meter every 1,000 years, uplifting the sedimentary basement rock of Yakushima. This granite intrusion continues to rise, while Tanegashima, composed mostly of sandstone and shale, remains largely unaffected.

Unlike the magma that erupts out of a volcano in the form of lava, granite is magma that has cooled slowly deep below the Earth's surface. Yakushima, in fact, has no active volcanoes. Yakushima granite is one of the rarest granites in the world, composed of white K-feldspar megacrystals 6 to 15 centimeters long. The granite has an overall white color due to the abundance of colorless minerals such as quartz and feldspar.

Recent Formation

The Hyuga Group strata have weathered and eroded over a long period of time, exposing the granite that makes up the mountains and rock formations that cover around 90 percent of Yakushima. Sandstone and shale that came in contact with Yakushima granite at temperatures over 700°C metamorphosed into the rock called hornfels, which is found throughout most of the island.

Granite Monoliths

Granite makes up most of Yakushima, particularly the central mountainous area. Erosion and weathering have changed the shapes of granite peaks and monoliths into forms that resemble works of art or other objects. "Tofu Rock," for example, on top of Mt. Kobandake, is named after its resemblance to a sliced block of tofu. The following are some other examples of the formations created by magmatic activity and tectonic plate movements.

Senpiro-no-taki Waterfall

Senpiro-no-taki Waterfall drops 60 meters into a V-shaped valley where the Tainoko River has carved its course through a granite boulder. The monolith measures 200 meters high and 400 meters wide. It is said that the rock is as wide as *senpiro*, or 1,000 people holding hands. The falls can be viewed from observation decks. <u>Getting there</u>: By car, about 23 minutes from Anbo Port, 52 minutes from Miyanoura Port or 35 minutes from Yakushima Airport

Pillow-shaped Lava Field

The lava field at Tashiro Coast is part of Yakushima National Park, and it is called the "Pillow-shaped Lava Field" due to the lava outcroppings' resemblance to pillows. The outcroppings give the coast a distinctive appearance. Sometime around 40 million years ago, an undersea volcano erupted, spewing lava that hardened into these forms. The movement of the Pacific Plate eventually transported this lava from the Pacific Ocean to Yakushima's coast, adding it to the Hyuga Group strata.

<u>Getting there</u>: By car, about 7 minutes from Anbo Port, 23 minutes from Miyanoura Port or 7 minutes from Yakushima Airport

Yudomari Hot Spring

The alternating layers of sandstone and shale that make up the Hyuga Group strata are visible at Yudomari Hot Spring on the Yudomari Coast. It is not currently known whether the hot spring water is groundwater that has gone deep into faults in the strata, and been heated by geothermal heat before gushing up, or water heated by residual heat from deep in the granite. The hot spring is open 24 hours a day. The suggested donation for bathers is ¥200.

<u>Getting there</u>: By car, about 31 minutes from Anbo Port, 58 minutes from Miyanoura Port or 40 minutes from Yakushima Airport