



# Volcanoes

## The Ultimate Light Show

How Pele's molten legacy is reshaping Hawai'i

STORY BY LESLIE LANG

PHOTOS BY G. BRAD LEWIS

“The smell of sulfur is strong, but not unpleasant to a sinner.”

—MARK TWAIN

(Below) A lava river flows from Kilauea, shown in elapsed time. (Right) A newly formed littoral cone near the ocean, surrounded by new lava. (Previous pages) Lava pours into Kaimu Bay at Kalapana, a Big Island village destroyed by lava flows in the 1990s.

**A**ncient Hawaiian chants tell us that the fire goddess Pele formed the Hawaiian Islands with her violent wrath, leaving erupting, land-forming volcanoes in her wake as she traveled from Kaua‘i to Hawai‘i (the Big Island) in search of a new home.

Scientists confirm that these age-old stories are remarkably accurate in terms of geological history. It is Kaua‘i’s volcanoes that are the oldest, while the Big Island’s volcanoes (the only ones currently active) are the newest. Pele is said to still reside in Halema‘uma‘u crater, located at the summit of the Big Island’s Kilauea volcano.

According to geologists, Hawai‘i’s volcanoes formed more than 70 million years ago, as the Hawaiian archipelago sits over a molten lava hot spot in the earth’s mantle, some 65 miles





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—ISABELLA BIRD

(From top) A large flow destroys a lowland tropical forest; a slow-moving pāhoehoe flow; a new spatter cone on the side of the Pu‘u Ō‘ō vent.



below the ocean floor. The Pacific plate on which the Islands reside moves about an inch per year—the approximate rate at which fingernails grow—toward the northwest. As the plate slowly shifts, underwater eruptions from that fixed hot spot create a mountain range, the tips of which make up the main Hawaiian Islands. Kaua‘i, at the northwestern end of the chain, was the first to reach sea level, and as the plate moved to the northwest, the fixed hot spot created more land to the southeast. This is why currently active Hawaiian volcanoes are located at the southeastern end of the island chain.

Haleakalā, in east Maui, last erupted in the 17<sup>th</sup> century and is thought to be dormant, rather than extinct. It was from the crater of Haleakalā (the House of the Sun, known as the god Maui’s home) that Maui’s grandmother helped him capture the sun and slow its journey across the sky, making the days longer.

Today, Haleakalā is a part of Haleakalā National Park, where visitors can enjoy everything from the summit views and excellent stargazing to hiking, camping, seeing endangered species and exploring the coast. Outside companies also offer downhill biking tours at Haleakalā.

The Big Island is made up of five volcanoes—Mauna Kea, Hualālai, Kohala, Mauna Loa and Kīlauea. The latter two are among the world’s most active volcanoes. Both are located within a 333,000-acre area designated as Hawai‘i Volcanoes National Park, which extends from sea level to more than 13,677 feet.

Mauna Loa has erupted 39 times since records were first kept in 1832. It erupted most recently in 1984, when fast-moving lava flowed to within a nerve-racking four miles on the outskirts of Hilo before stopping.

Kīlauea has been erupting almost continually since 1983. In recent years, lava tubes in its east rift zone have carried lava to the ocean and added more than 500 acres of new land. But Pele also takes away: More than 187 homes and structures, including a National Park visitors center, have been destroyed so far during this eruption.

Kīlauea is sometimes referred to as the drive-up volcano because its eruptions are comparatively gentle rather than explosive, and therefore it’s possible to observe the volcanic events from the edges of active vents. Just as their ancestors did, hula and other



(Above) Fingers of lava spill off the sea cliff and into the Pacific Ocean. (Right) Spectators watch lava explode into the ocean.

cultural practitioners still gather there to pay homage to Pele. At night, one can stand on Halema'uma'u crater, peer into the eruption and admire its orange glow.

Mark Twain visited Halema'uma'u in 1866 and wrote about the eruption for a Sacramento newspaper. At great length, he described the view, the eruption's noises ("a rushing, a hissing and a coughing or puffing sound") and the aroma: "The smell of sulfur is strong, but not unpleasant to a sinner," wrote the satirist.

A few years later, in the 1870s, the adventurer and writer Isabella Bird described the scene when her party reached the rim of Halema'uma'u: "I think we all screamed, I know we all wept, but we were speechless, for

a new glory and terror had been added to the earth. It is the most unutterable of wonderful things. The words of common speech are quite useless."

Hawai'i Volcanoes National Park is also a biological wonder, with more than 90 percent of its native flora and fauna found only in Hawai'i. Located in the most geographically isolated chain of islands in the world, it's almost 2,000 miles from the nearest continental land mass. Each of its seven ecological zones—seacoast, lowland, mid-elevation woodland, rain forest, upland forest, sub-alpine and alpine—harbors its own species of plants, animals and insects.

It's not uncommon to see the endangered nēnē, the Hawaiian goose and state bird, near the Jaggar Museum of volcanology situated near the rim of Halema'uma'u crater. Other endangered species living in the park include the hawksbill turtle, the dark-rumped petrel, the hawk and hoary bat, who share the land with oddities such as the carnivorous caterpillar and the endemic "happy face spider," named for what resembles a giant happy face on its yellow body.

And where else can you take a hike such as the four-mile, moderate-to-challenging one at Kīlauea Iki? Its trail starts along the pit crater's rim in a rainforest filled with native birds, then heads down through rainforest and across the crater floor.



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(From top) Hikers at the Thurston Lava Tube entrance; ferns sprout from smooth, recently cooled pāhoehoe lava, the beginnings of the next rainforest.

Miraculously, the trail is safe but still steaming some 50 years after its spectacular, most recent fountaining eruption.

With its eruptions, volcanic calderas, pit craters, cinder cones and walk-through lava tube, as well as steam that seems to rise randomly from the ground, Hawai‘i Volcanoes

National Park is not your typical national park. Tree molds are another exceptional feature—ghostly shapes form when lava encircles a tree and hardens, causing the tree inside to burn away. The Park provides daily updates on volcanic eruptions and subsequent area closures, as the process of destruction and regeneration is ongoing.

As this publication goes to press, Pele’s fire still breeds new land: Craters are collapsing, the location of Kīlauea’s active flow is changing, and an up-and-coming Hawaiian island is in the works. Scientists call this youngest volcano the “Lō‘ihi seamount,” and it’s bubbling up from the depths right now, about 21 miles southeast of the Big Island, rising more than 9,842 feet above the floor of the Pacific Ocean. Its summit, however, is yet 3,000 feet below sea level.

In 250,000 years or more, the new island will push up through the sea, and Hawai‘i’s story will continue. 🌿