

Mauna Loa and Kilauea Eruptions Dec 6<sup>th</sup> 2022 Climate Change Group Barb J



The latest eruption on Mauna Loa began Nov 28<sup>th</sup> 2022. Lava is flowing towards the main road linking the E and W sides of the island. There are spectacular images in the news every day. Kilauea is the other active volcano on the island and it is also erupting.

Here is a map of the Big Island. Hilo is the commercial center on the east side where it rains every day. Kona on the west coast is the main tourist area. The Saddle Road links them, Mauna Loa (Long Mountain) and Mauna Kea (White Mountain) dominate the landscape, both about 14,000 ft high. The CO<sub>2</sub> Observatory is at the end of the Mauna Loa access road at 11,000 ft, the astronomical observatory is at the summit of Mauna Kea. Kilauea is SE of Mauna Loa. Both volcanoes are active together now which is unusual.



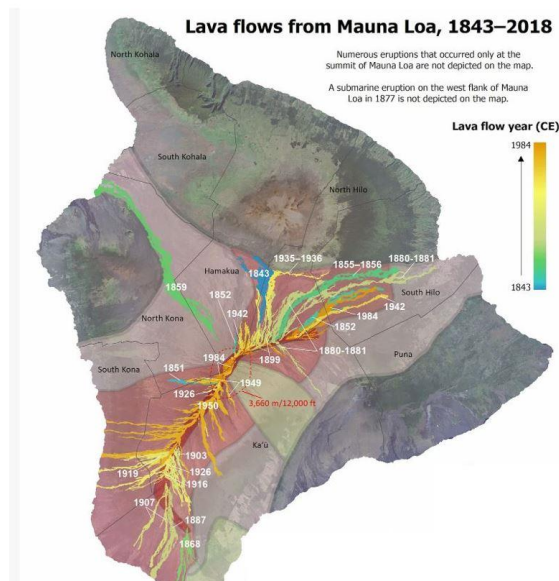
My interest comes from many visits to the astronomical observatory on Mauna Kea. Here you can see the telescopes on the summit of Mauna Kea and Mauna Loa 25 miles away in the background.

This is a close up helicopter view of the lava fountains coming from the NE fissure of Mauna Loa and flowing down towards the Saddle Road. Mauna Kea is in the background.

As of Dec 6<sup>th</sup> the lava is about 2 miles from the Saddle Road which is used by many for commuting across the island. The alternate coastal route is hours longer.



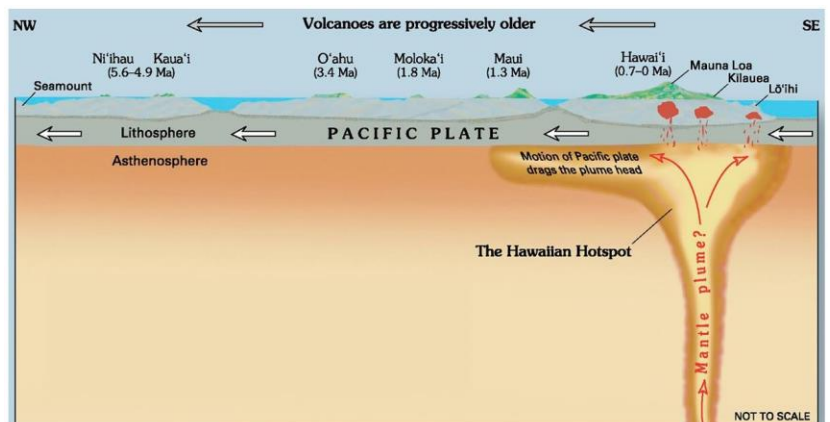
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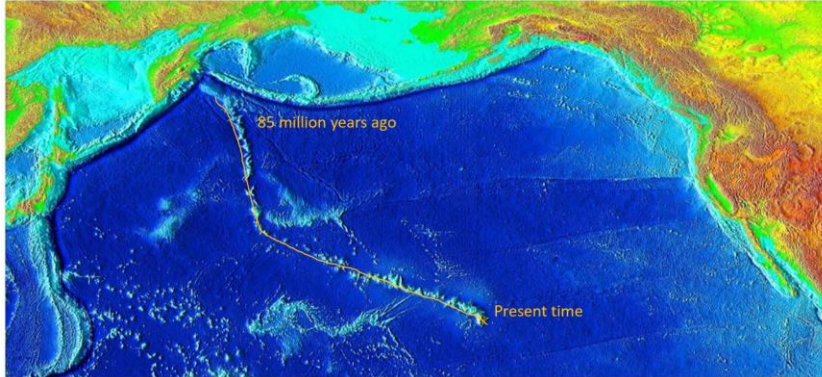
Mauna Loa erupts about once each 50 years. Here are the eruptions in recorded history. Many follow the NE rift like today's eruption. In 1984 the lava almost reached Hilo. As you drive the saddle road you can see the differing ages of the lava flows. With time the lava turns to fertile land and increasing plant life returns. Mauna Kea has not erupted for several thousand years but is not classified as dormant.

Both volcanoes are about 500,000 years old. Over time each eruption adds to the height, width and mass of the mountains resulting in the largest mountains on earth when measured from the sea floor. Mauna Kea measures 33,484ft from the sea floor vs 29,029 ft above sea level for Mt Everest.

The Hawaii hot spot fuels the action. The Pacific plate moves about 4 inches per year. The older islands in the Hawaii chain are about 10 million years old and have eroded significantly. Mauna Loa, Kilauea, and Lo'ihi are over the hot spot now. Lo'ihi is a seamount ie it has not yet grown to reach the ocean surface. Mauna Loa is not a volcano on the "ring of fire" where tectonic plates are colliding. Like the Yellowstone hot spot it is in the middle of a plate. But the

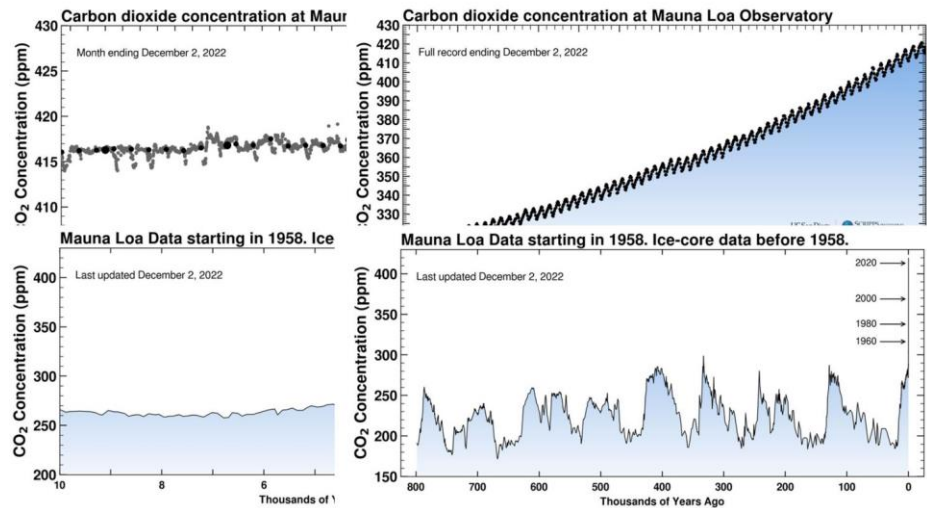


Yellowstone hot spot is under a continental landmass where the crust is thick, Mauna Loa is in the ocean where the thin crust is easier to break through and the basalt rock makes runny non-explosive lava.



Here is a big view of the Pacific Ocean from North America to Japan. The Hawaiian-emperor seamount chain shows the movement of the hotspot relative to the Pacific plate over the last 85 million years. It reaches almost 4000 miles to the Aleutian Islands.

The CO<sub>2</sub> monitoring station at 11,000 ft on Mauna Loa established in 1958 is not damaged but is evacuated and has no power as the lava flowed across the access road and took down the power lines. Note the Keeling curve shows no sign of flattening and that we are at historic high CO<sub>2</sub> levels.



This is a view of the 2018 Kilauea eruption. The land is weathered old lava flows which is very fertile. The climate is very comfortable, but you cannot buy home insurance.

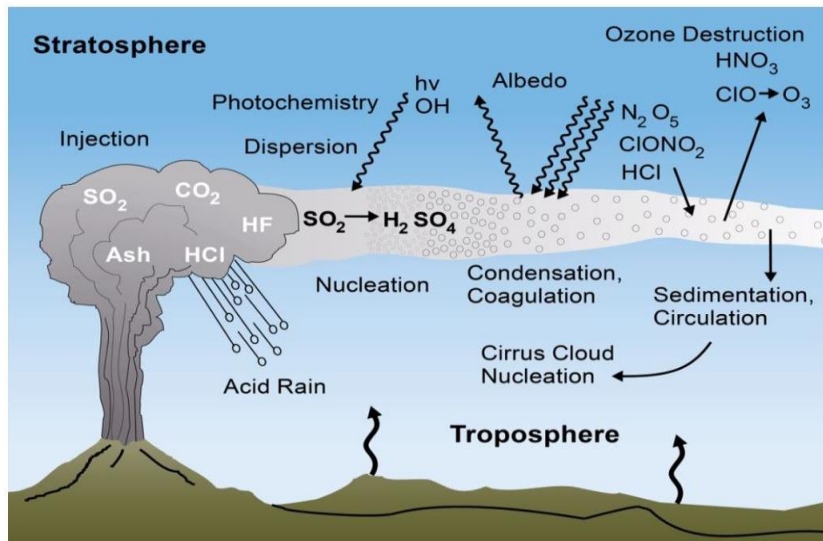


There are 2 main types of lava, pahoehoe is smooth or "ropey" and a'a is rough on all size scales. It rips your boots and if you fall it rips your pants and gloves, hence the name a'a.

When the lava enters the ocean it creates new land and forms “pillow” lava.



We have a prime example here in Ely which is 2.7 billion years old but was formed the same way.



Volcanoes are important for both short term weather and long term atmospheric conditions. In the short term sulfur dioxide rises to the upper atmosphere and forms aerosol particles which reflect sunlight. This lowers the sun’s energy reaching the ground and has a cooling effect. There were years “without a summer” after some major eruptions (for example Pinatubo 1991, Krakatau 1883, Tambora 1815, Laki 1783). This effect lasts 2-10 years.

Artificially injecting some form of sulfur into the high atmosphere is one of the geo-engineering possibilities being discussed to mitigate climate change.

Volcanoes also emit a lot of CO<sub>2</sub>. Recent eruptions amount to about 1% of human caused fossil fuel emissions. But over the billions of years of earth’s history volcanic CO<sub>2</sub> has played an important part in keeping earth’s temperature stable which in turn makes a suitable environment for life to develop. If CO<sub>2</sub> levels fall too low (from weathering which removes carbon from the atmosphere) the earth’s temperature can fall to freezing point or below resulting in a “snowball” earth. This has happened twice in earth’s history 640 and 710 million years ago. CO<sub>2</sub> from volcanoes thawed us out again.

Here are some websites to watch:

<https://youtu.be/pHWtxjppKDM> Nov 29<sup>th</sup> overflight, recorded, spectacular

[https://www.youtube.com/watch?v=so\\_qJJsibaM](https://www.youtube.com/watch?v=so_qJJsibaM) U Hawaii live webcam on Mauna Kea pointed to eruption

<https://www.youtube.com/watch?v=SnjGqn1K9ZQ> USGS M8 camera, close up, live