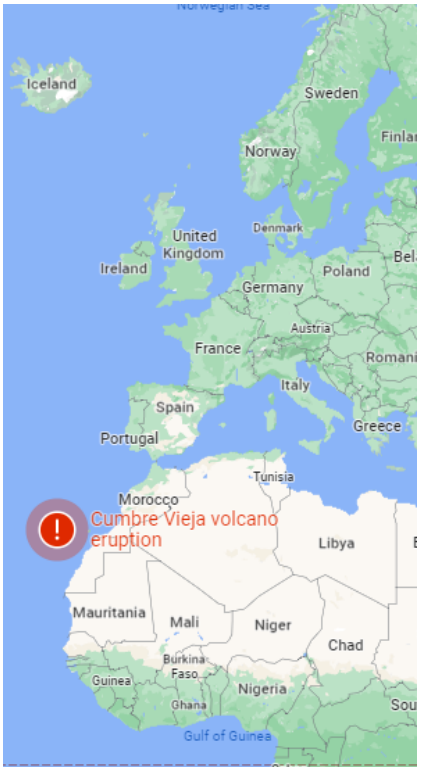
2021 La Palma Volcanic Eruption

Aren't volcanoes absolutely amazing!?! I am always fascinated by volcanoes and other powerful forces of our earth including tornadoes, hurricanes, earthquakes, and tsunamis.

Have you noticed that there is a large volcano currently erupting and in the news? The Cumbre Vieja Volcano is on the island of La Palma, in the Canary Islands, off the west coast of northern Africa. Let's dive into this Washington Post article and learn more.

Be sure to answer the questions at the end.



https://www.washingtonpost.com/weather/2021/10/04/lapalma-volcano-cloud-waves-satellite/

Satellite captures La Palma volcano creating strange cloud ripple

The Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite captured this Oct. 1 image of the Cumbre Vieja volcano eruption on La Palma in the Canary Islands. (Kasha Patel/NASA EOSDIS LANCE and GIBS/Worldview)

By
Matthew Cappucci
Yesterday at 4:25 p.m. EDT

Clouds over the La Palma volcanic eruption Friday looked like a logo for a Target store. A strange series of concentric circles formed over the volcano, captivating social media and eliciting the fascination of meteorologists and the public alike.

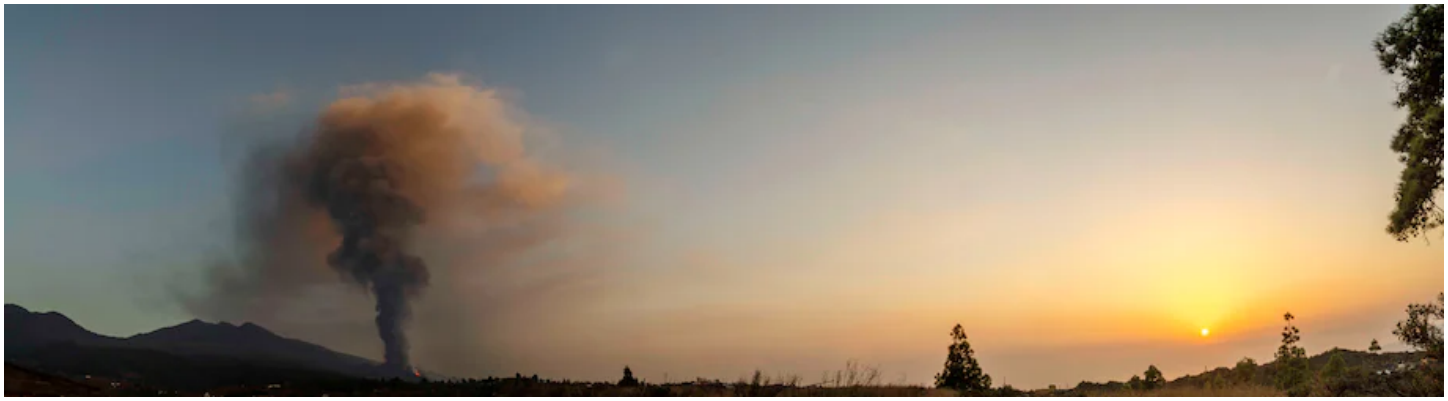
The ongoing eruption, which began Sept. 19 near the district of Las Manchas on La Palma, in the Canary Islands, has damaged or destroyed 1,000 homes and 20 miles of roadway. A collapse of the volcanic crater Sunday unleashed a torrent of lava a quarter-mile wide that has since cascaded downhill toward the coastline. The Smithsonian Institution's Global Volcanism Program noted that

the leading edge of the lava river was between 12 and 18 feet in height.

The erupting Cumbre Vieja volcano as seen Oct. 4 from the village of El Paso on La Palma. (Carlos De Saa/EPA-EFE/Shutterstock)

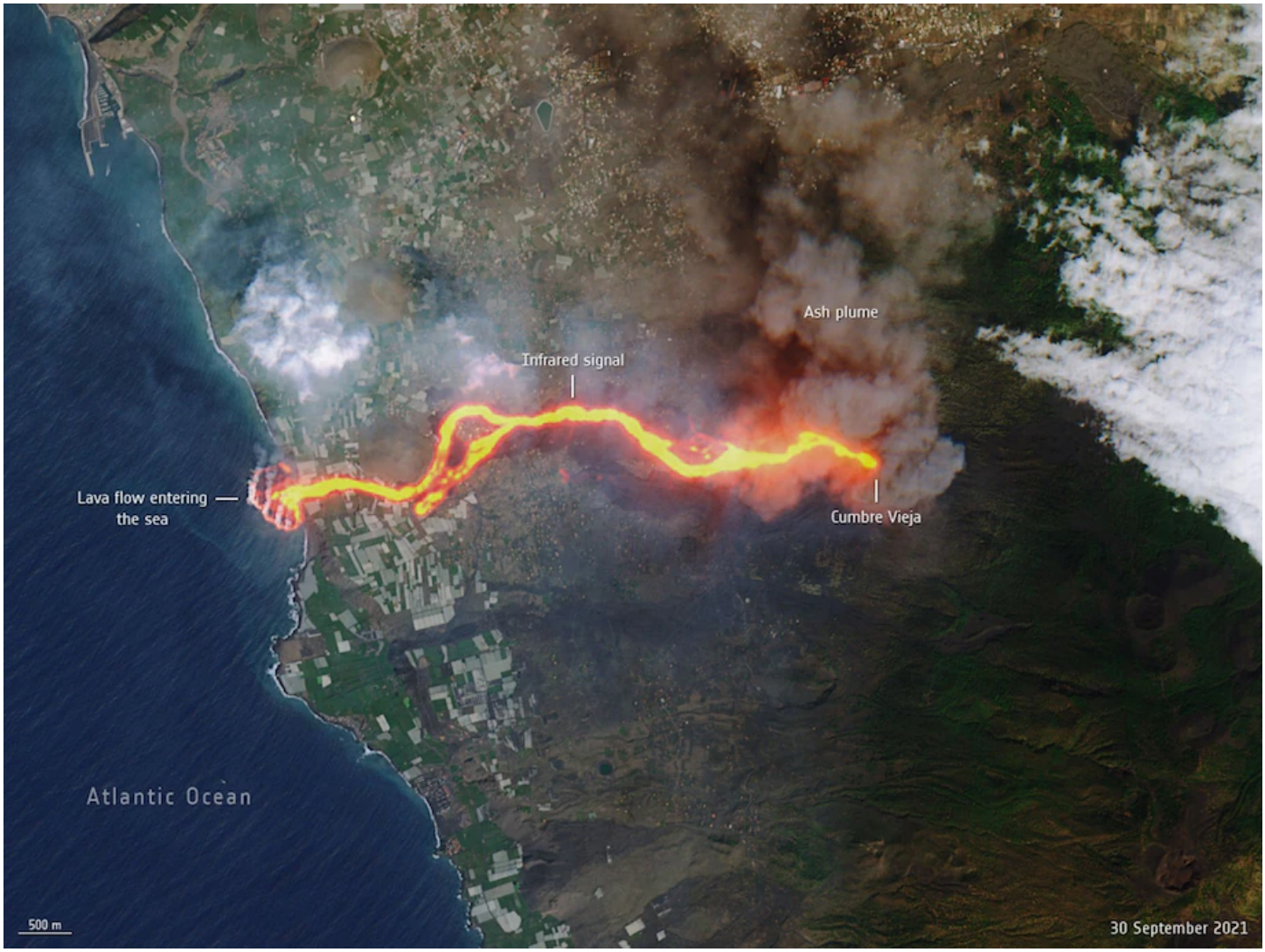
Captivating images of the erupting volcano in La Palma

Earthquakes have rattled the island. More than five dozen quakes greater than 3.0 in magnitude have occurred in the area in the past two weeks. The strongest was a 3.8, which shook La Palma on the evening of Sept. 20. A 3.7 occurred Monday.



The Cumbre Vieja volcano continues to spew smoke and ash Oct. 4. (Miguel Calero/EPA-EFE/Shutterstock)

One river of lava reached the ocean near Playa de Los Guirres on Sept. 28. It poured off a 300-foot-tall cliff into the seawater below, prompting authorities to urge residents to remain indoors with their windows closed to limit the entry of outside air. When lava enters the ocean, it heats up seawater extremely rapidly, splitting water molecules into hydrogen and oxygen ions. Some of the hydrogen combines with chlorine ions in the seawater to form hydrochloric acid and produce a gas that is toxic when inhaled.



Satellite imagery shows the flow of lava from the Cumbre Vieja volcano erupting on La Palma on Sept. 30. (European Space Agency/EPA-EFE/Shutterstock)

How the concentric cloud rings formed

An emerging story with the unfolding situation on La Palma has been remarkable atmospheric aberrations, including ring-like ripples emanating outward from around its plume.

A unique set of ingredients enabled this spectacle.

Video of the clouds on Twitter

When it comes to the atmosphere, air will continue rising as long as it is less dense than its surroundings. Density is usually tightly linked with temperature; warmer fluids, like air, are less dense when heated.

The volcano produced a plume of air that ascended quickly because it was warmer, and therefore less dense, than its surroundings. Like a chimney, that plume climbed 20,000 feet into the atmosphere. Eventually, the air entrained into the gaseous plume cooled slightly, becoming acutely less buoyant. But it was still rising.

Then, suddenly, it slammed into an atmospheric lid of sorts — a cap of hot, dry air, probably originating in the Sahara, several miles above the ground. That meant the plume couldn't rise anymore and subsequently spread out and flattened. It's analogous to why thunderstorms are marked by crisp anvil-like tops that resemble the floppy hats that chefs wear.

The updraft of a thunderstorm is relatively continuous, but the eruption of La Palma occurred in spurts and bursts. That meant irregular jolts of upward motion. Each triggered a "gravity wave" that rippled outward from there when the plume collided with the cap.

Think about a bobber in a pond. Its density allows it to sit on the surface of the water without sinking. If you press it downward, it bobs back up, but if you lift it into the air, gravity pushes it back down. A similar process is unfolding over the volcano, with each surge of updraft producing a perturbation that ripples radially outward like the circular waves that would surround a bobber.

Where the air rises on one side of each gravity wave, it cools and condenses, forming a band of cloud. But when the air sinks, it warms up and dries out, eroding any cloud cover and bringing clear skies. That's why each concentric gravity wave is marked by its own ring-like cloud.

One may also note an abrupt, sharp cutoff to a deck of stratocumulus clouds on the east side of the ripple-like features. That's where air is subsiding or sinking, eating away at the clouds. What goes up must come down.

What kind of circles formed in the clouds over the volcano?

Answer here

As of the time of this article, how many homes had been damaged or destroyed?

Answer here

A river of lava ¼ of a mile wide flows from the crater to the Atlantic ocean. If a ¼ of a mile is 1,320 feet, and a yard is 3 feet, how many yards long is the river of lava?

Answer here

What is the toxic gas made from, which is created by the chemical reaction from the hot lava falling into the sea?

Answer here

Why did the plume of air rising from the volcano ascend so quickly?

Answer here

What caused the rising plume of air from the volcano to stop climbing higher and spread out in rings?

Answer here