

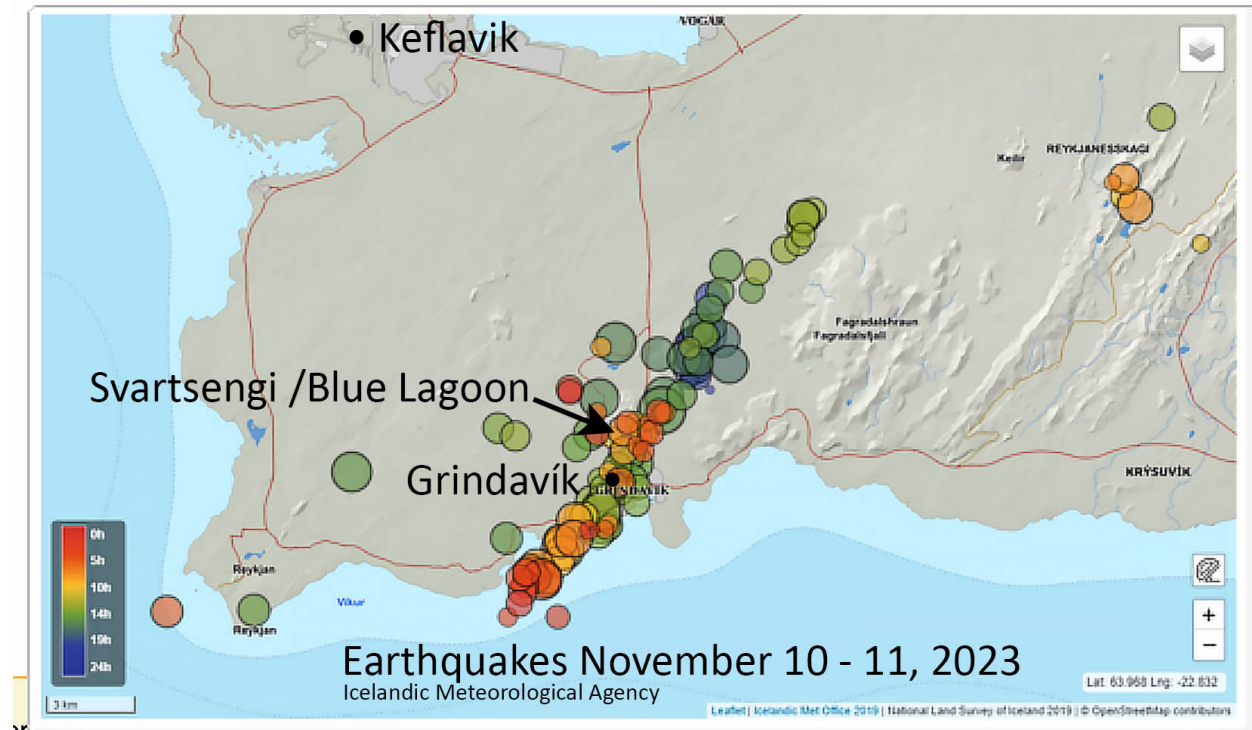
# Times Standard

## Not My Fault: Iceland on the verge of a new eruption?

Lori Dengler for the Times-Standard

Posted November 11, 2023

<https://www.times-standard.com/2023/11/11/lori-dengler-iceland-on-the-verge-of-a-new-eruption/>



*Earthquakes on Iceland's Reykjanes Peninsula recorded November 11 - 12 color coded by age. The epicenters define the accumulation of magma near the town of Grindavik and the Svartsengi Power Plant.*

Hindsight is great asset for understanding events. But when one is unfolding, it's much more difficult to see where it is heading and what the ultimate impacts will be. Such is the situation Saturday morning as I write about volcanic activity in Iceland.

Two days ago, Blue Lagoon Spa and Resort in southwestern Iceland took the unprecedented step of closing. The geothermal baths are a world-renowned tourist destination and on every Iceland "must-visit" list. It was our first stop last July the morning we stumbled off an airplane in Keflavik after the all-night flight from Portland. And yesterday, Icelandic Civil Protection authorities called for an evacuation of the town of Grindavik, where we stopped for lunch after a two-hour soak in Blue Lagoon.

Blue Lagoon is not a natural feature. Pools began forming in 1976 as runoff from the newly opened Svartsengi geothermal power plant. At first an informal bathing spot, word quickly spread that the silica-rich waters had healing properties and formal bathing facilities opened in

1987. The Blue Lagoon Company formed seven years later and has become one of Iceland's most profitable tourist spots. More than 700,000 people visit the Lagoon each year, with annual revenues of about \$135 million in US dollars.

Both the power plant and the lagoon exist because of a buried magma body that heats ground waters to temperatures of 240°F. Svartsengi was the world's first dual purpose geothermal plant providing both hot water and electricity for the most populated area of Iceland, the Reykjanes Peninsula, and the capital Reykjavik.

Blue Lagoon and the International Airport are on the Reykjanes Peninsula, a 35-mile-long block of land that juts off the SW corner of the Island. Reykjavik occupies a natural harbor where the Peninsula joins the main island. More than half the population of Iceland reside in this area.

Iceland owes its existence to volcanic activity and is home to many very capable seismologists and geologists. When Svartsengi was being developed in the 1970s, volcanologists were well aware of the volcanic nature of the region. After all, it's the magma body that drives the geothermal activity.

Driving out of the airport last July, we were struck by the youthful appearance of the basalt lava flows that covered the terrain. There is no such thing as a truly ancient lava flow on Iceland. The oldest rocks exposed at the surface are only 12 million years old, infants geologically speaking. The landscape we passed looked particularly young with jagged black basalt flows and little vegetation.

Despite appearances, the lava fields we passed were all at least 800 years old. Rock weathers slowly in cold northern latitudes. The most recent eruptions prior to 2021 occurred in 12<sup>th</sup> century, documented in tales of the Krýsuvík fires of the early Norse settlement period. 800 years may seem long to us, but the entire Reykjanes Peninsula straddles a strand of the Mid-Atlantic ridge, the spreading center between the North American and European plates. With the two sides moving away from each other at about the rate your fingernails grow, a renewal of volcanic activity was inevitable.

The reawakening occurred in early 2021, heralded by a burst of seismic activity. More than 40,000 earthquakes were recorded between February and mid-March. Most were too small to be felt but six were in the magnitude 5 range and the largest (M5.6) caused some damage. Lava erupted on March 19<sup>th</sup> and continued for the next seven months, making it Iceland's longest duration volcanic activity in the 21<sup>st</sup> century.

The eruption was declared over in mid-October 2021, only to renew the cycle the following year – a sudden increase in seismic activity in July 2022 including two M5s followed by the opening of a new fissure close to 2021 vents. This eruptive phase was much shorter than the previous years', over by the end of August.

We were on hand for the third recent eruptive cycle. Earthquake activity rapidly intensified on July 4, 2023, a 5.2 occurred on July 9<sup>th</sup> and shortly after, lava began flowing out a mile-long rift zone. When we landed in Iceland on July 11<sup>th</sup>, we were welcomed by a modest gas plume less than 12 miles away from us. We never got close enough to see lava, but volcano cams of the eruption ran continuously on TV monitors wherever we went. By the time we left nearly three

weeks later, the plume was a mere wisp; the Icelandic Meteorologic Agency declared the eruption over in early August.

These three eruptive episodes are all part of the Fagradalsfjall volcanic zone. They have been modest by Icelandic standards and caused almost no damage. They were not explosive, no ash was produced, the only products fluid basaltic lava flows and some potentially noxious gas. Authorities restricted access to the vent area over concerns of toxic gas emissions. Planes continued to fly in and out of Keflavik, with no aviation disruption.

Seismic activity renewed on October 24<sup>th</sup>. and GPS stations detected uplift and horizontal displacement. By November 6<sup>th</sup>, about three inches of uplift centered very close to the Svartsengi Power Plant had been measured. Elevated earthquake activity continued in a narrow zone about 3 miles beneath the surface. Volcanologists at the Icelandic Meteorological Agency believed magma from depth was flowing tunnel-like into a seam creating a sill, a horizontal accumulation of the molten rock.

As magma pushes its way underground, it cracks the rock around it producing earthquakes. Like the three previous eruptive sequences, many of these earthquakes were large enough to be felt. No surprise that the Blue Lagoon Company chose to close the spa; guests were feeling several earthquakes an hour and becoming alarmed.

On Friday, significant changes were observed in both seismic activity and surface deformation. Ten magnitude 4.5 or larger earthquakes occurred in the past 24 hours including two in the M5 range. Uplift rates ramped up from less than an inch a day to nearly half a foot. Authorities have called for a complete evacuation of the small fishing port Grindavik and, for the first time in the past three years, raised the aviation alert to orange meaning that an eruption could occur in the next few days with the potential of producing ash emissions.

Why are Civil Protections authorities taking more serious actions this time? Several reasons. The volume of accumulating magma appears larger than in the last three eruption episodes. The location of the accumulation and likely venting sites is closer to populated areas and critical infrastructure, and the proximity to the coast means a small possibility of ocean water interacting with magma creating a more explosive eruption with more ash production.

The Svartsengi Power Plant is one of the biggest concerns. Disruption to operations could shut off power and hot water to over half of the population. Plans have been okayed to build an 27-foot concrete moat around both the Plant and Blue Lagoon to deflect lava flows but it is estimated that such a construction project will take 45 days to build.

By the time you read this, an eruption could be in process, or the land and tensions continuing to rise. The best source for reliable updates on Icelandic eruptions is the Icelandic Meteorological Agency <https://en.vedur.is/about-imo/news/a-seismic-swarm-started-north-of-grindavik-last-night>

-----  
Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. The opinions expressed are hers and not the Times-Standard's. All Not My Fault columns are archived online at <https://kamome.humboldt.edu/taxonomy/term/5> and may be reused for educational purposes.

Leave a message at (707) 826-6019 or email [Kamome@humboldt.edu](mailto:Kamome@humboldt.edu) for questions and comments about this column. Downloadable copies of the North Coast preparedness magazine “Living on Shaky Ground” are posted at <https://rctwg.humboldt.edu/prepare/shaky-ground>.