

Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

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Iceland – The Making of an Island



Iceland is literally splitting apart along the rift valley that extends completely across the island and separates the North American and Eurasian Plates.

Back in January, the first port on our 4-month voyage was Hawaii, a volcanic island in the mid-Pacific. The final stop on our return home was Iceland, another island that owes its existence to volcanism. This is where the similarities end, however. Iceland extends almost to the Arctic Circle. While Hawaii's temperatures this time of year are in the balmy 70s and 80s, most of Iceland is in the 30s and 40s.

Iceland is also almost exactly 10 times larger. So while you can drive around Hawaii in a long day, Iceland, if the roads are all open, takes closer to a week, at least if you stop occasionally to take in the geology. We took 7 days to explore this cold, stark and tranquil, but geologically active, and sparsely populated country. With a population of 322,000, Iceland has less than 1% of California's population.

Everywhere you look, this island's geologic origins surround you- volcanoes and lava flows; hot springs and geothermal steam; glaciers and icebergs. The island nation also has the world's 3rd largest ice cap, after Antarctica and Greenland. If you have absolutely no interest in the Earth and its geologic activity and history, however, you can probably skip a trip to Iceland and this column.

There are 22 “active” volcanoes on the island’s central plateau, meaning that they have erupted within the last few centuries. Over a 100 more are “inactive” or “dormant”, meaning they might or might not erupt again. You just never know about volcanoes.

Over an 8-month period between 1783 and 1784, Lakagigar or Laki, poured out the largest lava flow witnessed on Earth in the last thousand years. More damaging than the lava, however, were the massive clouds of poisonous hydrofluoric acid and sulfur dioxide compounds that killed over 50% of Iceland's livestock population, leading to a famine that led to the loss of about one fourth of Iceland's entire human population.

The volcanic ash and poisonous gases from the Laki eruption and its aftermath obscured the sun around the world for weeks, and caused a drop in global temperatures. This led to crop failures across Europe and is believed to have caused droughts and famine in India and led to the death of perhaps six million people globally, making the eruption the deadliest in historic times.

Some of you may have been stranded temporarily at an airport in northern Europe in 2010 when another of Iceland’s active volcanoes, the somewhat difficult to pronounce, Eyjafjallajokull, erupted. The ash cloud drifted eastward and shut down most of northern Europe’s airports, grounding hundreds of planes for days. Volcanic ash and airplane engines don’t mix well.

Why all this volcanic activity and havoc in the North Atlantic? Well, Iceland straddles the mid-Atlantic Ridge, a 10,000-mile long stretch of the larger globe circling oceanic ridge system. Molten magma rising from deep within the Earth and surfacing along the ridge crest has created this island over the past 20 million years. The North American and Eurasian plates have been split apart along the ridge and are having a tug of war, stretching Iceland apart in the process.