

**WTE column of January 16, 2016: Editor's headline: "Volcanoes Ready to Blow"  
Casper Star Tribune of same date "Volcanic eruptions can be frightening, deadly"**

When I took a Chinese friend to Yellowstone National Park, she was agog over its many geysers, mud pots, and hot springs. The geysers, she said, reminded her of the water park in Xi'an.

There is a difference. You can cool off at a fountain but if you stepped beneath Old Faithful, you'd scald the skin right off your bones. These geysers are volcanic in origin, arising as they do from a "hotspot" deep below the surface. This gigantic reservoir causes rock to melt in a magna chamber. It heats the groundwater that flows a few kilometers beneath the Wyoming countryside. When the heated water pushes through fissures in the earth's crust, it shoots skyward as plumes of steam.

The supervolcano called Yellowstone sits in Wyoming because of shifting tectonic plates. Sixteen million years ago it spewed lava in southeastern Oregon. As the North American plate migrated westward above the hotspot, the volcano sent lava into southwestern Idaho. Successively younger tracks are visible between Pocatello and Boise. Today an interstate highway traverses the plains of black lava.

In Wyoming the supervolcano let loose three colossal eruptions that happened successively between 2.1 million and 64,000 years ago. The eruptions spread lava loads over the entire western half of the United States. Combined, they generated enough ash and debris to fill the Grand Canyon.

The Yellowstone is not likely to erupt again anytime soon, but volcanoes in other parts of the world that will. A moderate-sized blast is much more likely to occur than a Yellowstone behemoth, write the authors of "Island on Fire," and "the consequences could be grave." Smaller eruptions, ones that jettison around 1 million cubic meters of debris, "happen about once a week around the globe," write the authors, science journalists Alexandra Witze and Jeff Kanipe who reside in Boulder, Colorado. They tell the story of Iceland's numerous and deadly volcanoes. In March 2010, one of these spewed so much ash into the atmosphere, it grounded flights and stranded countless travelers. Winds ferried the ash to the British Isles. The shut-down may have cost businesses as much as five billion euros.

On the island itself, the eruption soon changed from a tourist attraction to frightening explosions. By April the eruption had moved a few kilometer to the west, directly beneath a glacier, where the magna was mixing with ice. The heat melted the ice from below, then reacted explosively with the newly-formed water.

Iceland was settled in the ninth century, and even then people observed full-throated volcanoes spewing fire and ash. Bubbling hot springs and geysers spouted wildly into the air even as great ice-mountains, or glaciers, wandered down from snow-capped peaks.

Sometimes these eruptions let fly plumes of gases so deadly, they affect global climates.

The authors give a vivid account of such an instance, the 1783 Laki eruption, which caused horrible destruction and death all over Europe, wherever the noxious haze blew in. On the island, rocks falling from the sky killed sheep and cows.

The chances of further, more frequent Icelandic eruptions rise every day, thanks to climate change, write the authors. As Iceland's ice has melted, its volcanoes have become more active. The reason? The overlaying weight of ice is being reduced. "This has been going on since the last ice age ended 12,000 years ago," they observe. Parts of Scandinavia are still in this process of "postglacial rebound."

Today, however, the natural rebound effect is exacerbated by human activity. "Every day, the burning of fossil fuels adds more heat-trapping greenhouse gases to the atmosphere. As a result, ice is melting all the faster."

Since 1890, Iceland has lost 435 cubic kilometers of ice. The loss is changing the geological stresses in the crust beneath and alters "how magna gets made—it's simple cork-and-champagne physics." Geologists estimate that the amount of magna produced beneath Iceland has increased thirty-fold since the last ice age. In the last century alone magna production rates "may have gone up as much as fifteen percent." In turn, this makes more magna available that feed volcanos such as Laki.

And it's not just happening in Iceland. The great ice sheets atop Greenland and Antarctica are shedding so much meltwater, it accounts for one-third of the sea-level rise observed in recent years. The rest of sea-level rise is due to the fact that water expands as it gets warmer.

The planet is not going to rein in its volcanic fire on our behalf, write the authors in conclusion. A Laki-style eruption is not only likely, it seems inevitable. While we may avoid a blast from Supervolcano Yellowstone, a volcano blowing its top in China may send its noxious gases around the glob, and it will affect us. The world of today is interconnected.