

Scientists are mapping Yellowstone's plumbing to find out why it's so explosive

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That is a question scientists are trying to answer as they launch an effort to map the subterranean systems of hot water and rock that constitute the plumbing for Yellowstone's famous geysers. Starting this week, researchers with the U.S. Geological Survey, the University of Wyoming and Aarhus University in Denmark will survey the national park's hydrothermal features using a giant, hoop-like electromagnetic monitor suspended from helicopters flying 200 feet above the ground.

"This is really kind of a last frontier if you will, in Yellowstone, of being able to look at a large part that's underground that people have not looked at," Carol Finn, one of the scientists on the surveying team, told [Wyoming Public Media](#). "This survey can visualize the geology and the water down to about 500 meters, so 1,500 feet."

The monitor senses and records tiny pulses of electricity related to the interactions between hot water and rock underground.

The electromagnetic survey will help Finn and her colleagues understand the causes of geysers and much bigger hydrothermal explosions. More than 13,000 years ago, one of these explosions created the 1.5 mile crater that forms the bottom of Yellowstone Lake. It is thought to be the largest crater of its kind on the planet. A [study](#) published in spring 2015 found a massive reservoir of molten rock lurking beneath the park. A calderic eruption, in which that magma came rushing to the surface, would eject 1,000 times more material than the 1980 eruption of Mount St. Helens and could create a caldera dozens of miles wide. The last time this happened, 640,000 years ago, *Homo sapiens* didn't even exist yet. No one is certain what causes such an eruption, or when the Yellowstone supervolcano might erupt again.

Nor do scientists fully understand hydrothermal explosions — which occur when superheated water trapped beneath the surface of the Earth becomes steam and blasts upward, expelling rock, mud and water into the sky. This is the same phenomenon behind geysers like Old Faithful, but geysers do not spew mud and rock. Research suggests that the hot water that powers Yellowstone's explosive activity comes from rain and snow that percolates down through the crust and is heated by the park's subterranean furnace. But it is not clear how the water travels down, what happens as the it warms or what causes it to explode violently back toward the surface.

"Nobody knows anything about the flow paths" for the hot water that erupts from Yellowstone's geysers, Finn told the [Associated Press](#). "Does it travel down and back up? Does it travel laterally?"

The survey will take two to four weeks, [USGS](#) said, and the data collected will be used to inform ground-based studies. It will also help officials find unstable ground, so some unsuspecting tourist doesn't inadvertently wind up on a weak spot in the park's plumbing.