Quakes could alter Yellowstone

Sawmill Geyser erupts in the morning sun in Yellowstone National Park in this January 2008 file photo. (Mark Gocke, Star-Tribune correspondent)

By The Associated Press
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JACKSON -- The recent swarm of small earthquakes in Yellowstone National Park could alter some of the park's thermal features but should not raise any concern about the park's large volcano erupting anytime soon, a researcher said.

More than 500 earthquakes have been recorded in the area around Yellowstone Lake in the past 10 days.

The earthquakes appear to be subsiding and caused no property damage. But they have left scientists and park officials wondering what it means for the world's first national park.

While the park has experienced earthquake swarms before, the recent activity is unusual because of its intensity.

Robert Smith, a professor of geophysics at the University of Utah, has studied Yellowstone's seismic activity for the past 40 years.

As director of the Yellowstone seismic and GPS network, Smith is overseeing a team of researchers in the Department of Geology and Geophysics who are reviewing data from each of the tremors. The team has analyzed 300 of the earthquakes so far.

"Earthquakes ... up to magnitude 3.9 are considered small," he said, explaining that the largest earthquakes in the past week or so were felt at Grant Village and Old Faithful. "...The concern that we

have is that this is such an energetic swarm."

While Smith doesn't anticipate any volcanic eruptions as a result of the earthquake swarm, he said there is potential for hydrothermal explosions and more earthquakes.

Yellowstone normally records between 1,000 and 3,000 earthquakes per year. Most often, these are small earthquakes. Since 1984, Smith and his team have also identified 70 to 80 well-defined earthquake swarms, consisting of anywhere from a few to hundreds of earthquakes.

Smith said he is interested in the most recent swarm because of its unusual number of earthquakes in such a short time frame, and because a similar swarm in 1985 coincided with changes to the Yellowstone caldera.

The 37- by 25-mile caldera is one of the world's largest volcanoes, or known popularly as a supervolcano. It rests upon a magma plume that extends roughly 400 miles beneath the Earth's surface. The Yellowstone volcano's last eruption was a lava flow about 70,000 years ago. The last "supervolcano" eruption 640,000 years ago dumped ash across a large swath of the continent.

In November 1985, an earthquake swarm occurred between West Yellowstone and Madison Junction, Smith said.

"It shook the town of West Yellowstone pretty well for a month or so," he said. "The earthquakes migrated from southeast to northwest over a distance of about 10 miles. We modeled that as being a release of fluids from the caldera."

About that time, the caldera, which had been rising for about 20 years at a rate of 2 centimeters per year, began to subside. Then, in 2004, Smith demonstrated that the Yellowstone caldera went into a period of "accelerated uplift," the north end of Yellowstone Lake rising up to 7 centimeters per year before slowing to about 4 centimeters per year.

Whether this recent swarm of earthquakes will result in yet another movement of the caldera is unknown, Smith said.

But since the earthquakes occurred in an area that includes thermal features, the tremors could result in some changes for those features, he said.

"It is an area of northern Yellowstone Lake (that is) basically a geyser basin under water," Smith said.

Regardless, Smith said there is little cause for concern. The current "volcano alert level" is normal.

Yellowstone spokesman Al Nash said park officials have convened an incident management team for the earthquakes, similar to the type of team that would monitor and manage a wild fire.

But Nash said concerns about a caldera eruption, at this point, are unwarranted.

"Those not as well-versed in how this activity may impact the park often go immediately to the supervolcano question," he said. "We did not have any indications that there was magma activity."