

LOCAL NEWS

Civil Defense: Tsunami caused by volcano likely to be minor

Agency developing plans for Montserrat eruption

By CHRIS HAWLEY
Of The STAR Staff

Any tsunami caused by a volcanic eruption on Montserrat would probably be minor, earthquake and Civil Defense officials said Saturday, but they are stepping up work on a tsunami emergency plan just in case.

Officials had been studying the possible effects of a tsunami, or tidal wave, on Puerto Rico's southeast coast since Friday, when geologists warned the Civil Defense that in a worst-case scenario, an explosion on Montserrat could cause a wave up to 17 feet high. The island's Soufriere Hills volcano has been smoking and rumbling for months.

Experts said Saturday the most likely effect would be a 3-foot-high wave that might penetrate a few hundred feet into the land. They also said conditions have to be perfect for

an above-ground volcano like Soufriere Hills to cause such a wave.

"The worst case scenario looks to be one to five meters, but the most probable looks to be about one meter," said Rafael Cabrera, director of planning for the Civil Defense. "It could happen in a month, it could happen in a year, it could never happen at all. But we want to be ready."

A major tsunami would take 40 minutes to an hour to reach Puerto Rico from Montserrat, experts said. A few minutes before its arrival, water would recede from the Puerto Rican coast.

Civil Defense Director Epifanio Jiménez said the geologists' warning has prompted the agency to start work on an island-wide tsunami emergency plan, something officials have previously only attempted in limited areas.

The Civil Defense had intended to develop such a plan as part of its transformation into the State Emergency Management Office. Gov. Rosselló promised during his re-

election campaign to rename the Civil Defense and give it broader powers to help with post-disaster recovery.

"It's something we were going to do eventually, but we're taking advantage of this situation to speed up the development of the plan," Jiménez said. He said officials will use data about the speed of tsunamis, information about their destruction power and geographic studies to determine which areas of Puerto Rico are at risk.

He also said the State Department will begin talking with Caribbean nations about developing a procedure to inform other islands about possible volcanic eruptions.

"We may have an hour to take action if we know about it . . . but imagine if it were the middle of the night and something happened on Montserrat and all of the communications went down," Jiménez said. "They're going to have a lot of things to do before they get around to calling Puerto Rico."

Experts say tsunamis are relatively rare because they require particular conditions. They only occur when there is a sudden up-and-down movement in the

earth, a landslide on the sea floor or an underwater eruption. Earthquakes have to register 6.5 or greater on the Richter Scale to be able to trigger the waves, they said.

Side-to-side movements in the Earth's crust, earthquakes on land and volcanic eruptions above ground usually aren't enough to cause tsunamis, said José Luis Capacete, president of the Civil Defense's Seismic Safety Commission.

"I imagine that none of those [above-ground] volcanoes are going to create an earthquake of that magnitude," Capacete said.

Nevertheless, tsunamis and lesser waves have been reported in the Caribbean at least four times, said seismologist William McCann.

■ A wave caused by a massive earthquake in Lisbon, Portugal, reached as far as the Eastern Antilles in 1755, although records of the event are scarce.

■ In 1867, an underwater earthquake between St. Croix and St. Thomas caused two 20-foot waves that destroyed coastal settlements on those two islands. The wave also crashed into southeast Puerto Rico and damaged buildings on the Yabucoa coast. No deaths were reported.

■ A tsunami caused by an underwater earthquake in 1918 off the coast of Aguadilla caused a 20-foot tidal wave that crushed and washed away houses as far as 450 feet inland. Estimates of the death toll range from 32 to 47 people.

■ On Aug. 4, 1946, witnesses in the Dominican Republic watched the sea recede, then roll back to flood low-lying coastal areas. Scientists say the phenomenon was probably a minor seismic wave.

For years, scientists have watched the volcanos of the Southern Antilles for signs they might erupt underwater and cause a wave, McCann said. He said one particularly active underwater volcano north of Grenada, Kick'em Jenny, got its name because of its frequent underwater shock waves.

Experts said a wave coming from Montserrat would probably flood low-lying areas of the southeast

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coast, especially Yabucoa, Arroyo, Guayama and the Punta Santiago area of Humacao.

Jiménez said a major tsunami would cause damage resembling that of the "cyclonic waves" caused by the winds of a hurricane. In a Category 5 hurricane, such waves can reach 12-

After a major vertical earthquake, underwater explosion or landslide, a tsunami travels through the water at up to 500 mph — the speed of a jet airplane. In deep water, the wave is hardly noticeable, but as it approaches shore it slows down and the water piles up, sometimes reaching as high as 35 feet.

"Major tsunamis strike land at 30 miles per hour, while lesser waves arrive more like a fast tide," McCann said.