

8 December 2003

FOR IMMEDIATE RELEASE

American Geophysical Union Fall Meeting 2003

Contact: Tara Hicks, AGU Press Room, SOEST Booth 715, (808) 429-7007

Hawaii contact information: (808) 956-3151 hickst@hawaii.edu

Note: Note: A press briefing will be held on this subject at 4:00 pm on Monday December 8th in Moscone West 2012.

Megatsunami Generation From Giant Submarine Landslides on Oceanic Islands: New Insights Gained From the Hawaii Evidence and Modeling

San Francisco – Researchers at the University of Hawaii have found the most convincing evidence yet of truly prodigious tsunamis within the Hawaiian Islands resulting from massive landslides down the islands' flanks.

Gravels laden with marine fossils occur up to 1,000 feet in elevation on the islands of Lanai and Molokai. Their origin is controversial: they either mark uplifted shorelines, or they were left by massive tsunamis. Unfortunately, not enough is known about the subsidence or uplift history of those islands to rule out either explanation.

The Hawaii researchers have instead been investigating Kohala, the oldest of the five volcanoes making up the Big Island of Hawaii. "It is well established that Kohala has been sinking about an inch per decade for the last half-million years" says Gary McMurtry, one of the researchers. "That rapid subsidence means Kohala can have no upraised reefs, so any marine carbonates there would have to have a different explanation."

The investigation was successful: "In 1935, geologist Harold Stearns described a marine fossiliferous conglomerate on the Kohala coast, but that was before we knew the island was sinking, so people just thought it was an old high-stand reef," says McMurtry. "We wanted to see it for ourselves. We found a boulder conglomerate with a matrix of broken corals and marine shells that occurs in small patches from the present shoreline up to an elevation of 200 feet. We have managed to trace it half a mile inland. We got the corals dated and found that they were the same age, about 120,000 years old, as the giant Alike 2 landslide down the submarine slope of nearby Mauna Loa volcano."

"The old shoreline from 120,000 years ago is now at a depth of 1,300 feet and three miles out to sea," says Gerard Fryer, another researcher on the project. "Whatever left this deposit had to carry the material three miles in from the ocean and sweep it up the slope to 1,500 feet elevation. No storm could have done that; it had to be a truly monstrous tsunami."

"It was a very energetic event," says David Tappin of the British Geological Survey, who has been working with the Hawaii researchers. "The fossils have been smashed into tiny pieces, and some of the soil the conglomerate rests on has been ripped up and incorporated into the deposit. The underlying soil still contains the roots of plants that were sheared off at ground level when the tsunami came ashore."

Philip Watts, a fluid engineering consultant in Long Beach, California, has modeled the tsunami to be expected from the Alike 2 landslide. His modeling reproduces the huge run up of waves at Kohala and shows extensive inundation on all the other islands. The tsunami easily exceeds the 1,000-foot run up necessary to explain the marine fossils on Lanai.

"The challenge now is to figure out why these great landslides occur," says McMurtry. "The giant landslides seem to seem to correlate with high sea level. High sea level means glacial retreat and warmer temperatures, which hints at a climate trigger. Perhaps unusually high rainfall induces Mauna Loa to have explosive eruptions which shake the mountain apart. Whatever the reason, we now know that these large volcanic failures inevitably generate megatsunamis."

"Should the public worry about such monstrous tsunamis? We can't say until we understand the mechanism of collapse better," adds Fryer. "But don't lose sleep over it. The last one was over 100,000 years ago, so the next one is unlikely to happen tomorrow. You are far more likely to be hit by a truck than to be killed by a megatsunami."

For more information, contact

Gerard Fryer, gerard@hawaii.edu (808) 956-7875

Gary McMurtry, garym@soest.hawaii.edu (808) 956-6858

Hawaii Institute of Geophysics and Planetology, School of Ocean and Earth Science and Technology, University of Hawaii, Honolulu, HI 96822 United States

Images are available online at http://www.soest.hawaii.edu/SOEST_News/AGU2003

Related presentations:

The Growth and Collapse of Hawaiian Volcanoes II

V11G-02 10:40h Monday, MCC3006

North Kona Slump: a Recent Giant Submarine Landslide in Hawai'i *G J Fryer, G M McMurtry, J R Smith

V11G-07 12:00h Monday

Megatsunami Generation From Giant Submarine Landslides on Oceanic Islands: New Insights Gained From the Hawaii Evidence and Modeling *G M McMurtry, D R Tappin, G J Fryer, P Watts

Izu-Bonin-Mariana Arc Processes and Progress III Posters

T32A-0912 13:30h 13:40h, Tuesday, MCC Level 2

Complexities of Eruptive Processes at Mariana Forearc Serpentinite Mud Volcanoes and Implications for Serpentinite Melange Development *P Fryer, N C Becker, C G Wheat, S Hulme, G J Fryer, J Gharib, M J Mottl POSTER