

## New Technology Allows Geophysicist To Test Theory About Formation of Hawaii (w/ Podcast)

December 11 2009, By Suzanne Taylor Muzzin

(PhysOrg.com) -- If you've ever been to Hawaii, you probably spent your time enjoying the scenery of the beautiful islands, rather than wondering how they got to be there in the first place. But that's just what scientists have been trying to figure out for nearly 40 years, since a theory about their formation was first proposed that suggests volcanic hotspots like Hawaii are the result of plumes of hot rock, which rise from deep down in the Earth's mantle.

Now a team of geophysicists from multiple institutions — including David Berco vici, professor and chair of Yale's Department of Geology and Geophysics — set out to test the plume theory with a major field experiment. The results of the study, appearing in the Dec. 4 issue of the journal *Science*, give the most convincing evidence yet in support of the plume model.

"There has been a fair amount of circumstantial evidence for plumes based on the melting, chemistry and the very old observation that these hotspots seem to be deeply anchored in the <u>mantle</u>, since they remain fixed while <u>tectonic plates</u> ride over the top of them," Bercovici says. "But mantle plumes are very difficult to directly image, so their existence has been controversial until now."

To test the plume theory, the team of <u>geophysicists</u> — which was led by Cecily Wolfe at the University of Hawaii and Gabi Laske at the Scripps



Institute of Oceanography — deployed and recovered dozens of oceanbottom seismometers (OBS) in the oceans surrounding Hawaii. The experiment required four oceanographic research expeditions to the islands over the past five years, in which four of Bercovici's graduate students participated.

The instruments recorded the speed of seismic waves from large earthquakes around the world. Because the quakes travel more slowly through hot rock, the scientists were able to construct a 3-D "map" of the mantle and demonstrate that there indeed appears to be a large plume of hot material deep below the islands, which continues to fuel Hawaii's volcanoes.

"Although <u>Hawaii</u> was thought to be the quintessential mantle plume, the deep ocean around the islands made it impossible to do this kind of experiment until recently," Bercovici says. "But now with the new OBS technology, we were finally able to look deep into the mantle for the Hawaiian plume and confirm its presence."

Provided by Yale University (<u>news</u> : <u>web</u>)

Citation: New Technology Allows Geophysicist To Test Theory About Formation of Hawaii (w/ Podcast) (2009, December 11) retrieved 27 April 2024 from <u>https://phys.org/news/2009-12-technology-geophysicist-theory-formation-hawaii.html</u>

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