

Earth Science

Why some ocean volcanoes grow tall

Contrary to the jokes that fill birthday cards, some things do improve with age. Geophysicists have long known that the ocean floor gains strength as it gets older. A new study suggests that the mature seafloor also makes a better place for growing volcanoes.

The Pacific oceanic plate—a giant piece of Earth's outer shell—holds more than 50,000 undersea volcanoes, but oceanographers have analyzed only a tiny fraction of these in any detail. In the Aug. 8 *SCIENCE*, Paul Wessel of the University of Hawaii in Honolulu used satellite gravity measurements to gauge the sizes of 10,000 seamounts. Bigger volcanoes exert a greater tug on the satellites.

Wessel found that the biggest volcanoes sit on the oldest ocean crust—that exceeding 60 million years in age. Younger crust rarely has big volcanoes. Scientists uncovered hints of this relationship in the early 1980s, but they had data on only 59 seamounts at that time. The new study suggests that young crust is too warm and weak to support large volcanoes, whose weight buckles the plate.

Using the relationship between seamount size and seafloor age, Wessel estimated the age of seamounts in the Pacific. This analysis suggests that certain periods in Earth's history have produced bumper crops of seamounts. —R.M.

Robot completes desert voyage

A car-size robot wandered across the Chilean desert this summer, completing a 215-kilometer journey. This is the longest recorded journey for a remotely controlled robot moving over rough terrain, say its builders at Carnegie Mellon University in Pittsburgh. The four-wheeled rover, named Nomad, drove itself for 17 km and for the rest of the time received instructions from drivers in the United States. Scientists tested

the robot for three potential applications: identifying meteorites in Antarctica, finding fossil life on Mars, and exploring the moon (SN: 6/21/97, p. 382). —R.M.

Damming Gibraltar to avert an ice age

While most climate experts worry about global warming, one physicist warns that Earth will soon tumble into an ice age unless nations construct a dam across the Strait of Gibraltar.

This controversial idea comes from Robert G. Johnson of the University of Minneapolis, who describes his proposal in the July 8 *Eos*. Johnson opposes the conventional explanation of ice ages, which holds that changes in Earth's orbit cool the far northern latitudes, spurring the growth of ice sheets there. He argues that the Mediterranean is the key to starting ice ages, both past and future.

When orbital changes reduce rainfall in Africa, the Nile River carries less water into the Mediterranean and the sea gets saltier. The denser, saltier water flows into the Atlantic and then moves north, where it diverts the Gulf Stream toward the Labrador Sea. The warm gulf waters trigger increased evaporation and more snow, which builds an ice sheet, he suggests.

Dams on the Nile are currently preventing freshwater from reaching the Mediterranean, thus increasing its salinity. Global warming is adding to the problem by accelerating evaporation in the Mediterranean. The result, says Johnson, is that "we're just perilously close to triggering [the ice age] in Canada today." A specially constructed dam could prevent much of this salty Mediterranean water from reaching the Atlantic, he says.

Wolfgang H. Berger, director of the Scripps Institution of Oceanography in La Jolla, Calif., says that many elements of Johnson's climate theory are speculative and run counter to accepted ideas. Other researchers are even harsher, saying that *Eos* was irresponsible in publishing this article. —R.M.

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