Sharper View Reveals Earth’s Innards

By probing thousands of kilometers of solid rock with seismic waves, seismologists have found a new kind of deep-Earth feature. The hottest rock—such as the plume rising through the mantle beneath Hawaii—has been particularly hard to image, driving a decades-long debate over how deep the sources of such hot spot plumes actually are.

Thanks to powerful computers, however, seismologists can now spot new features using hot rock’s effect on the wiggles of seismic waves—not just the waves’ speed, as in earlier seismic imaging. Seismologist Scott French of the University of California, Berkeley, and colleagues report online in Science this week that by using this “full-waveform inversion” technique, they have traced the Hawaiian plume (yellow) to a depth of at least 1000 kilometers. That suggests plumes span the entire 2900-kilometer-thick mantle, not just its uppermost layer as many scientists have contended.

The new imaging also reveals long “fingers” streaked across the Pacific 250 kilometers to 400 kilometers down (red)—apparently hot rock from the plumes flowing perpendicular to midocean ridges, where new ocean tectonic plates form.

A Cap on Mammal Virus Numbers

There are at least 320,000 viruses in mammals still waiting to be discovered, report scientists who have studied flying foxes in Bangladesh. From 2006 to 2010, the researchers caught hundreds of the big bats and collected urine and fecal samples as well as throat swabs before letting them go again. They then fished out all the viral sequences they could find belonging to nine virus families, including coronaviruses, herpesviruses, and influenza A viruses.

They found 55 viruses in all, 50 of which had never been seen before. Using statistical methods, they found that three viruses were likely missed, for a total of 58. Extrapolating to the 5486 other mammal species, that means about 320,000 viruses in total, the team reports this week in mBio.

The research cost approximately $1.2 million, the authors calculate, and identifying all 320,000 mammal viruses in the wild would cost about $6.3 billion. Peter Daszak, president of EcoHealth Alliance and one of the authors, says that identifying all viruses would help in combating future outbreaks. “It would be the beginning of the end for pandemics.” http://scim.ag/mammvir

NOTED

> The chairman of the U.S. House of Representatives science committee says that the Environmental Protection Agency (EPA) isn’t giving him the health and air pollution data he demanded in a controversial 1 August subpoena (Science, 9 August, p. 604), and that the agency now stands in default. “You did not provide … anything new,” Representative Lamar Smith (R–TX) wrote on 3 September to EPA chief Gina McCarthy. Smith set a new deadline of 30 September.