

vol. 57 ■ no. 4 www.earthmagazine.org

APRIL 2012

DANGER IN PARADISE

The hidden hazards of volcano geotourism

Globally, injuries and deaths at volcanoes are on the increase, driven by the rise in popularity of touring active volcanoes, from Japan to Hawaii to Costa Rica to Italy. Surprisingly, lava is not usually to blame.

Sara E. Pratt



FEATURE

MANAGING THE SEISMIC RISK POSED BY WASTEWATER DISPOSAL

Earthquakes can be triggered by the injection of wastewater underground. But with proper planning, monitoring and response, the associated risks can be effectively managed.

Mark D. Zoback



FEATURE

TRAVELS IN GEOLOGY:

Chile: Exploring the Archaeology, Volcanoes and Hot Springs of the Northern Atacama Desert

Although some regions of the Atacama are stark and barren, the northern section of this vast desert contains diverse ecosystems, a rich archaeological history and intriguing geologic features.

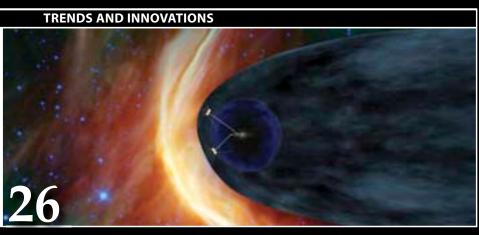
John Van Hoesen



VOYAGER 1: Probing the Limits of the Solar System

The two Voyager spacecraft have been exploring the reaches of outer space for decades, teaching us about the outer planets. Now they are uncovering secrets of the heliopause, the region that marks the boundary between the solar system and interstellar space.

Harvey Leifert



ON THE COVER: Geoscience students from Lillestrøm high school in Norway watch the 2010 eruption of Eyjafjallajökull volcano in Iceland from a safe distance, as determined by geologists. Lillestrøm geoscience students travel to Iceland every year to study the geology, learning about plate tectonics, plate spreading, hot spots, volcanic systems, glaciers and earthquakes. Photo is courtesy of Helene Eide.

NEWS

- LA NIÑA COULD SET THE STAGE FOR FLU PANDEMICS
- **OUT WITH SILICON,** IN WITH MOLYBDENITE
- **FORETELLING NEXT MONTH'S TORNADOES**
- **ANTARCTIC EARTHQUAKE** UNFELT
- PLANETS ORBITING BINARY STARS APPEAR ABUNDANT





- 16 OXYGEN'S WILD **RIDE INTO OUR ATMOSPHERE**
- 17 LEAPING LIZARDS ... **AND DINOSAURS**
- **18 SCIENTISTS GROW BACTERIA TO IMPROVE OIL SANDS REMEDIATION**
- 19 EARTHQUAKES CHANGE GROUNDWATER TEMPERATURE — AT LEAST "TEMPORARILY"
- SILENT EARTHQUAKES TRIGGERED JAPAN'S **MAJOR RUPTURE**
- **CITIZEN SCIENTISTS STUDY GRAVESTONES**
- **ASTEROID** 21 **RESPONSIBLE FOR MERCURY'S ODD SPIN**
- 22 UNEARTHING THE MECHANICS OF **CRUSTAL THINNING**
- 23 WARMER AUTUMN CAUSES WILDER WINTER
- LIFE DISCOVERED AROUND ANTARCTIC VENTS



- **GASSY GIANTS GOING CORELESS**
- AT EARTH ONLINE ...
- MINERAL RESOURCE OF THE MONTH: AGGREGATES

71 A COMMENT

THE GIVING SEA

Following the lead of Shel Silverstein, who wrote the touching tale "The Giving Tree" in 1964, the authors wrote a similar story about the Giving Sea. Will the oceans give all before we realize what we've taken?

Sheril Kirshenbaum and Michael E. Webber

72 GEOLOGIC COLUMN

A STEP FURTHER: FLYING, WRITING, GEOLOGIZING, PHOTOGRAPHING ... AND iPADING?

The author has been covering geology for years using an airplane, camera and pen and paper (and more recently, a computer). But an iPad? Where does that contraption fit in? **Michael Collier**

DEPARTMENTS

- 4 FROM THE EDITOR
- **6 LETTERS:** PERSPECTIVES FROM READERS

53 GEOMEDIA

Books: Travels Through One Man's Personal History of Science: A Review of "Boltzmann's Tomb"

Art: Turning Topo Maps into Abstract Art



- **56 CROSS-SECTION:** A PUZZLE
- 57 WHERE ON EARTH?
- 58 BENCHMARKS

April 1, 1946: Hawaii Tsunami Ushers in a Pacific-wide Warning System



- 61 DOWN TO EARTH WITH VOLCANOLOGIST, SCIENTIFIC HUMANITARIAN STEPHEN SPARKS
- **63 EARTH PRODUCT SPOTLIGHT**
- GEOMARKETPLACE
- **66 CLASSIFIEDS:** CAREER OPPORTUNITIES