

EARTH

NOT DONE YET

Next frontiers
in oil and gas

- The Arctic
- The Falkland Islands
- The Levant
- Trinidad and Tobago
- Sudan



Plus:

- OPEC: The next 50 years
- Rocks, ruins and churches in Turkey
- Rethinking dinosaur origins
- Redating the Grand Canyon, again



**COLORADO'S
MAMMOTH
DISCOVERY**

February 2011
www.earthmagazine.org



SERVING THE GEOSCIENCES WORLDWIDE
AGI
THE AMERICAN GEOLOGICAL INSTITUTE



EARTH

FEBRUARY 2011
vol. 56 ■ no. 2
www.earthmagazine.org

FEATURE

FINDING NEW OIL AND GAS FRONTIERS

Where to next in the search for oil and gas? EARTH examines several new frontiers — including the Arctic, the Falkland Islands, the Levant, Trinidad and Tobago, and Sudan — where oil and gas exploration are starting to take hold.

Carolyn Gramling, Erin Wayman and Megan Sever



32

FEATURE

OPEC AND OIL: THE NEXT 50 YEARS

Over the past five decades, OPEC has controlled much of the world's oil production and prices. Will it continue to do so for the next 50 years?

Rasoul Sorkhabi



42

FEATURE

TRIASSIC PARK: ON THE ORIGIN OF DINOSAUR SPECIES

Fossil discoveries are revealing a new story about the rise of the dinosaurs. Instead of quickly taking over the world, dinosaurs had a slow climb to the top, aided by a little luck.

David B. Williams



48

FEATURE

TRAVELS IN GEOLOGY: EVER-CHANGING TURKEY

Whether you're interested in centuries-old cathedrals, millennia-old ruins or million-year-old rocks, you'll find something to love in Turkey, a country that is constantly changing.

Callan Bentley



58

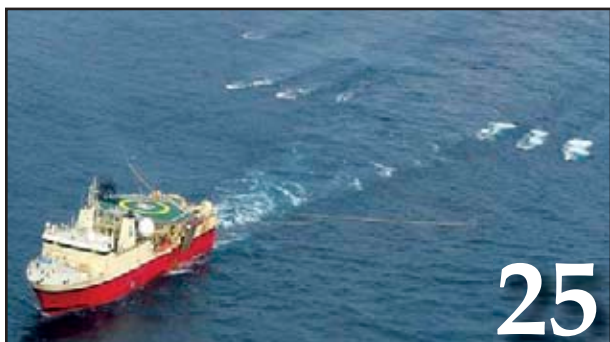
ON THE COVER: The Gjøa platform in the North Sea. Norway and other Arctic nations are starting to expand their search for oil and gas farther into the Arctic. Photo courtesy of Tommy Solstad, Statoil.

NEWS

- 8 NEWS SHORTS
- 9 TSUNAMI RISK HIGHER THAN THOUGHT IN LA, ISTANBUL
- 10 CLUES TO BOMBS' ORIGINS IN NUCLEAR DEBRIS
- 11 CO₂ THREATENS YOUNG CORALS' SURVIVAL
- 12 A MAMMOTH DISCOVERY IN COLORADO



- 17 BRAIN DEVELOPMENT DIFFERENTIATES HUMANS FROM NEANDERTHALS
- 18 QUESTIONS ARISE OVER EARLIEST EVIDENCE OF HUMAN TOOL USE
- 19 SCIENTISTS MAP THE PLAGUE'S TRAVELS
- 20 LATE CAMBRIAN ICE AGE?
- 21 SIMPLE CHEMICAL REACTION MAY REVEAL ANCIENT ATMOSPHERES
- 21 MORE BARK THAN BITE IN THE CAMBRIAN SEAS
- 22 CALIFORNIA ROCKS HINT AT OLDER GRAND CANYON
- 23 MOTHER NATURE'S POWER ILLUSTRATED IN NEW ZEALAND
- 24 LISTENING TO LANDSLIDES TO PREDICT THEIR MOVEMENT
- 25 BURPING OR STREAMING METHANE OFF JAPAN?



- 26 EPIC ORIGINS OF AMAZONIA
- 28 ANCIENT PLANTS AND FUNGI TEAMED UP TO GREEN EARTH
- 29 MINERAL RESOURCE OF THE MONTH: COPPER

VIEWS

- 86 **A COMMENT**
HUMANS AT HIGH TEMPERATURES: RECONSIDERING THE ECONOMIC IMPLICATIONS OF CLIMATE CHANGE
How climate has affected economies in the past provides telling details about how climate change might affect economies in the future. It's not exactly what you'd think.
Solomon M. Hsiang
- 88 **GEOLOGIC COLUMN**
LEADING BY STAYING OUT OF THE WAY
Deciding whether — and when — to visit a natural disaster site can be tricky. Fortunately, geologists now have tools that allow them to help from afar in the wake of a natural disaster.
Lisa A. Rossbacher

DEPARTMENTS

- 4 FROM THE EDITOR
- 6 **LETTERS:** PERSPECTIVES FROM READERS
- 66 **GEOMEDIA**
Books: Getting to Know "The Species Seekers"
Books: Hope Grows from "Pandora's Seed"
Books: On the Shelf: "Packing for Mars"
- 70 **CROSS-SECTION:** A PUZZLE
- 71 **WHERE ON EARTH?**



- 72 **BENCHMARKS**
February 26, 1896:
Henri Becquerel
Discovers Radioactivity
- 74 **DOWN TO EARTH WITH**
MARINE GEOCHEMIST
KATERYNA KLOCHKO

- 76 **GEOMARKETPLACE**
- 78 **CLASSIFIEDS:** CAREER OPPORTUNITIES