A mosaic of visible to near-infrared images of the surface of Mercury, obtained by the MESSENGER spacecraft on 14 January 2008. The circular feature in the upper right is the Caloris impact basin, 1500 kilometers in diameter. Results from the flyby are discussed in a special section beginning on page 58.


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MESSENGER

INTRODUCTION

Mercury, Up-Close Again

TECHNICAL REPORTS

Return to Mercury: A Global Perspective on MESSENGER’s First Mercury Flyby
S. C. Solomon et al. >> Science Podcast

Spectroscopic Observations of Mercury’s Surface Reflectance During MESSENGER’s First Mercury Flyby
W. E. McClintock et al.

Reflectance and Color Variations on Mercury: Regolith Processes and Compositional Heterogeneity
M. S. Robinson et al.

Volcanism on Mercury: Evidence from the First MESSENGER Flyby
J. W. Head et al.

Geology of the Caloris Basin, Mercury: A View from MESSENGER
S. L. Murchie et al.

Laser Altimeter Observations from MESSENGER’s First Mercury Flyby
M. T. Zuber et al.

Mercury Cratering Record Viewed from MESSENGER’s First Flyby
R. G. Strom et al.

The Structure of Mercury’s Magnetic Field from MESSENGER’s First Flyby
B. J. Anderson et al.

Mercury’s Magnetosphere After MESSENGER’s First Flyby
J. A. Slavin et al.

MESSENGER Observations of the Composition of Mercury’s Ionized Exosphere and Plasma Environment
T. H. Zurbuchen et al.

Mercury’s Exosphere: Observations During MESSENGER’s First Mercury Flyby
W. E. McClintock et al.

NEWS OF THE WEEK

Big Land Purchase Triggers Review of Plans to Restore Everglades
California Emissions Plan to Explore Use of Offsets
Life’s Innovations Let It Diversify, at Least Up to a Point
Where Have All Thoreau’s Flowers Gone?

SCIENCESCOPE

Billion-Dollar Cancer Mapping Project Steps Forward
Panel to Take Closer Look at Scientific Whaling
Tiny Transistor Gets a Good Sorting Out

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Preserving Iraq’s Battered Heritage
On Iraq’s Front Lines
Epilepsy: When Death Strikes Without Warning
Competing Teams Plot Two Different Paths to a New Particle Smasher
MOLECULAR BIOLOGY

A Global View of Gene Activity and Alternative Splicing by Deep Sequencing of the Human Transcriptome

M. Sultan et al.
Shotgun sequencing of 27-base pair segments of messenger RNA from human kidney and immune cells identifies previously undescribed transcriptional units and splice junctions.

10.1126/science.1160342

ATMOSPHERIC SCIENCE

BREVIA: N₂O₅ Oxidizes Chloride to Cl₂ in Acidic Atmospheric Aerosol

Laboratory studies affirm that the oxidation of chloride ions in aerosols by N₂O₅ is a significant source of chlorine in the troposphere, a major reactant that helps form ozone.

10.1126/science.1158777

BIOCHEMISTRY

The Crystal Structure of a Sodium Galactose Transporter Reveals Mechanistic Insights into Na⁺/Sugar Symport

S. Faham et al.
The structure of a sugar transporter suggests how these proteins may rearrange to permit the sugar to enter and leave the binding site on opposite sides of the membrane.

10.1126/science.1160406

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The Limits of Water Pumps L. Wang and P. D’Odorico

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Nature’s Machines F. Watts; reviewed by S. Kovats

Ghostwalk R. Stott, reviewed by J. Golinski

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Phanerozoic Trends in the Global Diversity of Marine Invertebrates

J. Alroy et al.
A compilation of more than 3 million specimens of fossil marine invertebrates shows that their diversity increased more in the Jurassic and less since then than an earlier study implied.

10.1126/science.1160342

REPORTS

APPLIED PHYSICS

Self-Sorted, Aligned Nanotube Networks for Thin-Film Transistors

M. C. LeMieux et al.
Treating silicon substrates with a silane layer allows them to absorb spin-coated, semiconducting carbon nanotubes, yielding aligned and densely packed nanotube films.

10.1126/science.1158777

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Four years of data track the spin precession of a pulsar orbiting a second pulsar, providing a positive test of general relativity in a strong gravitational field.

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Rapid sample spinning during nuclear magnetic resonance spectroscopy reveals a highly ordered cation distribution in layered materials.

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In young mice, expression of higher than normal levels of a type of serotonin receptor causes sporadic death with features reminiscent of sudden infant death syndrome. >> Science Podcast

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When strengthened, individual synapses on dendritic spines contain an activated small regulatory protein that spreads to nearby spines, possibly altering their sensitivity.

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K. B. Kjelstrup et al.
The rat hippocampus provides a representation of the animal’s entire spatial environment, coding distances up to 1 meter away in the dorsal region and up to 15 meters at the ventral tip. >> Perspective p. 46
TIMP-dependent dephosphorylation.

Letting go.

SCIENCE NOW
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HIGHLIGHTS FROM OUR DAILY NEWS COVERAGE

Why It’s Hard to Say Goodbye
Study links loss of a loved one to the brain’s pleasure center.

Don’t Judge a Plant by Its Species
An ant, an aphid, and a milkweed are changing thoughts about community ecology.

African Lion-Killer Had Help
Virus conspired with tick-borne parasites and extreme droughts.

Farewell, Micella.

SCIENCE CAREERS
www.sciencecareers.org/career_development
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Educated Woman, Postdoc Edition, Chapter 18:
End of the Road
M. P. DeWhyse
Micella Phoenix DeWhyse celebrates her Independence Day—and we’re sad; with related podcast interview.

Taken for Granted: By the Numbers
B. L. Benderly
A committee calls for better government data collection about jobs for scientists.

In Person: Research in France
A. Bikfalvi
Understanding the French public research system is critical to foreign scientists coming into the country.

July 2008 Funding News
J. Fernández
Learn about the latest in research funding, scholarships, fellowships, and internships.

SCIENCE PODCAST
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Download the 4 July Science Podcast to hear about MESSENGER’s first Mercury flyby, possible clues to sudden infant death syndrome, preserving Iraqi antiquities, and more.

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