



ART & THE COSMIC CONNECTION

NASA Space & Earth Images

Print these images and ask students to select one they would like to draw.

Students should feel free to interpret their image by cropping it or altering the colors.

Encourage students to pay attention to the elements of art as they draw and think about the stories the surface features are revealing.

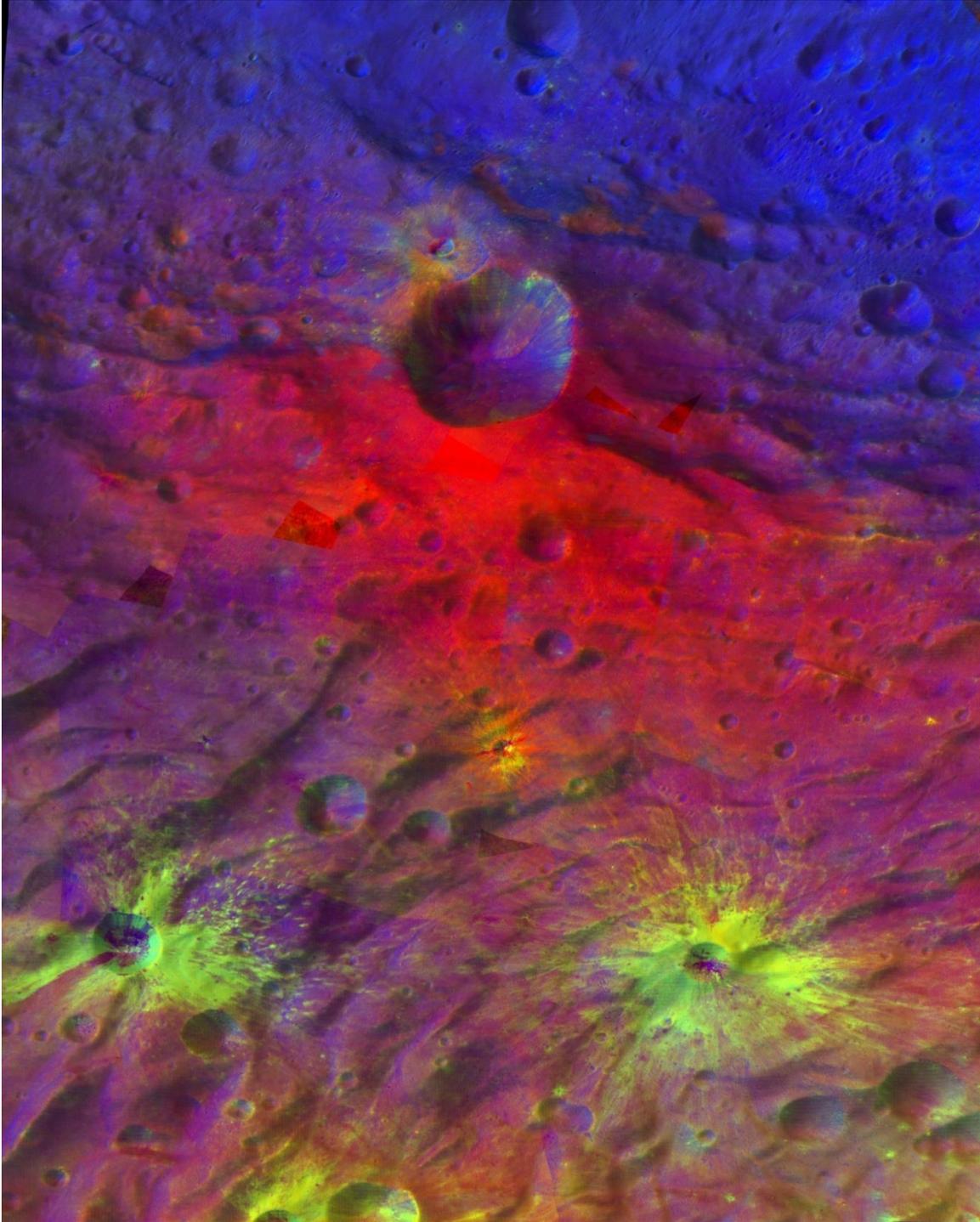
(Laminating or putting the printed images in sheet protectors will help them to last for multiple uses.)



The Color of the Moon

Earth's Moon is normally seen in subtle shades of grey or yellow. This dramatic image uses small color variations to exaggerate the real differences in the chemical makeup of the lunar surface.

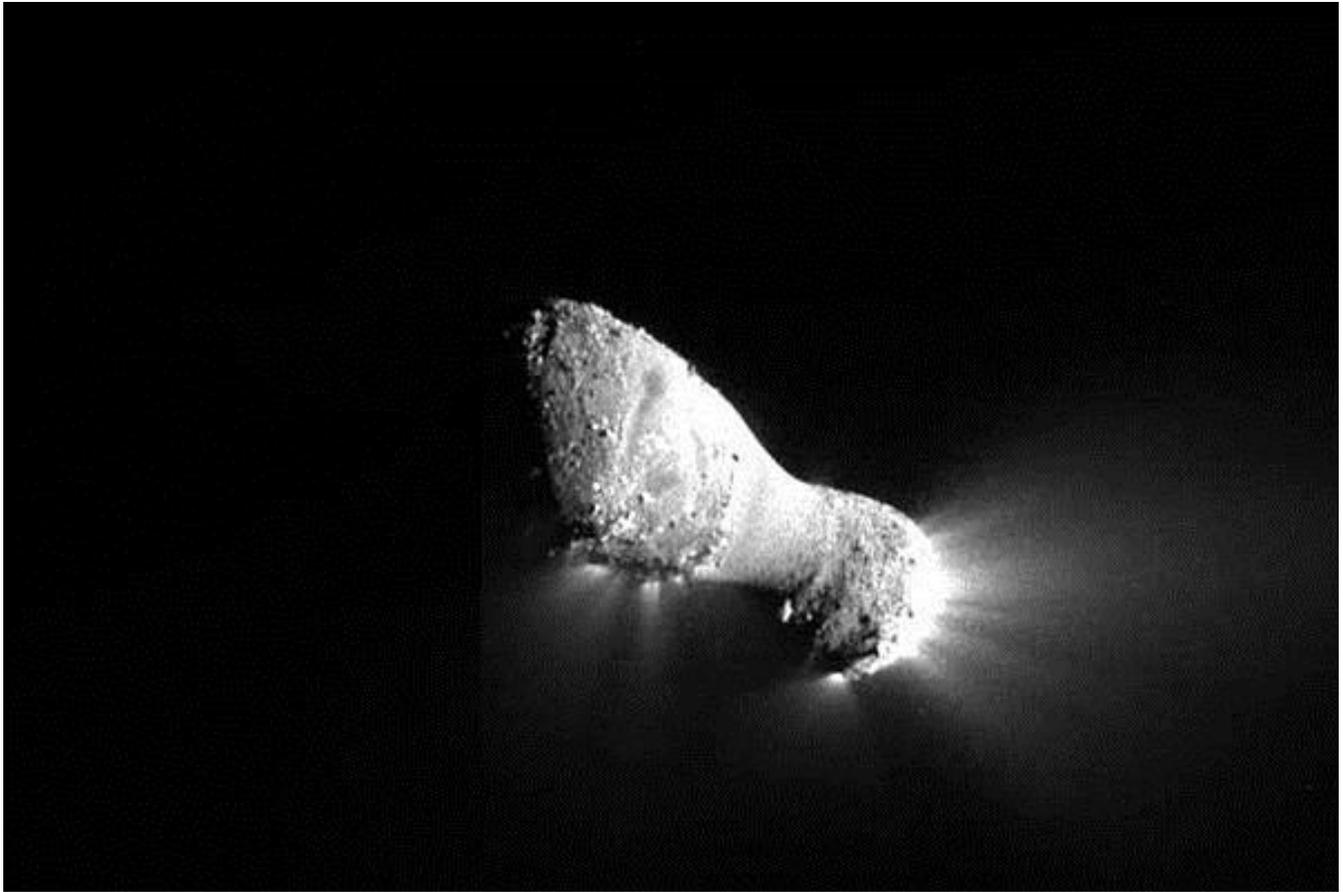
Credit: Johannes Schedler (Panther Observatory)



False Color image of Oppia Crater on giant asteroid Vesta

This is a composite image that has been wrapped on a topographical model to illustrate depth.

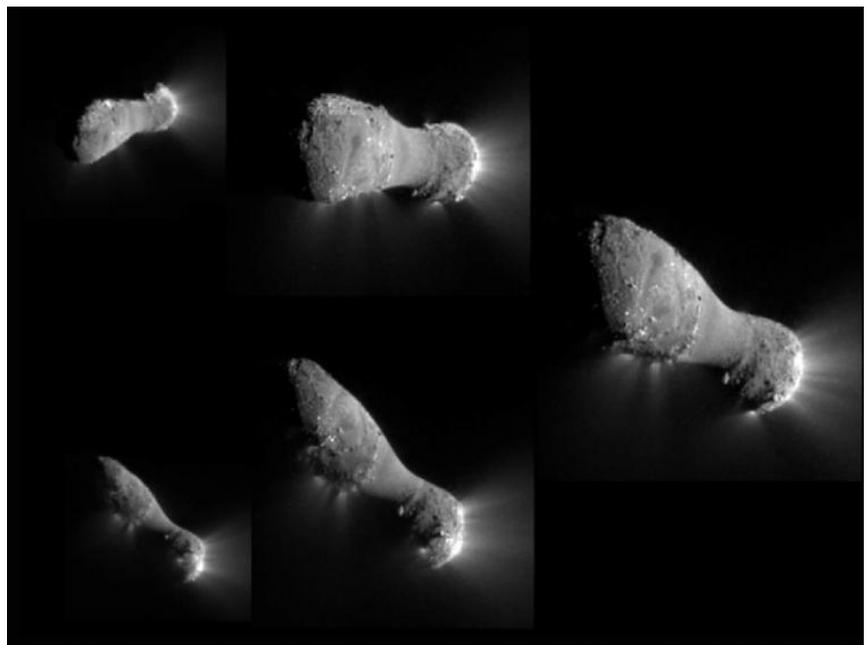
Credit: NASA/JPL-Caltech/UCLA/MS/IDA



Comet Hartley

The comet's nucleus can be seen in glorious detail in this image from NASA's EPOXI mission.

Credit: NASA/JPL-Caltech/UMD

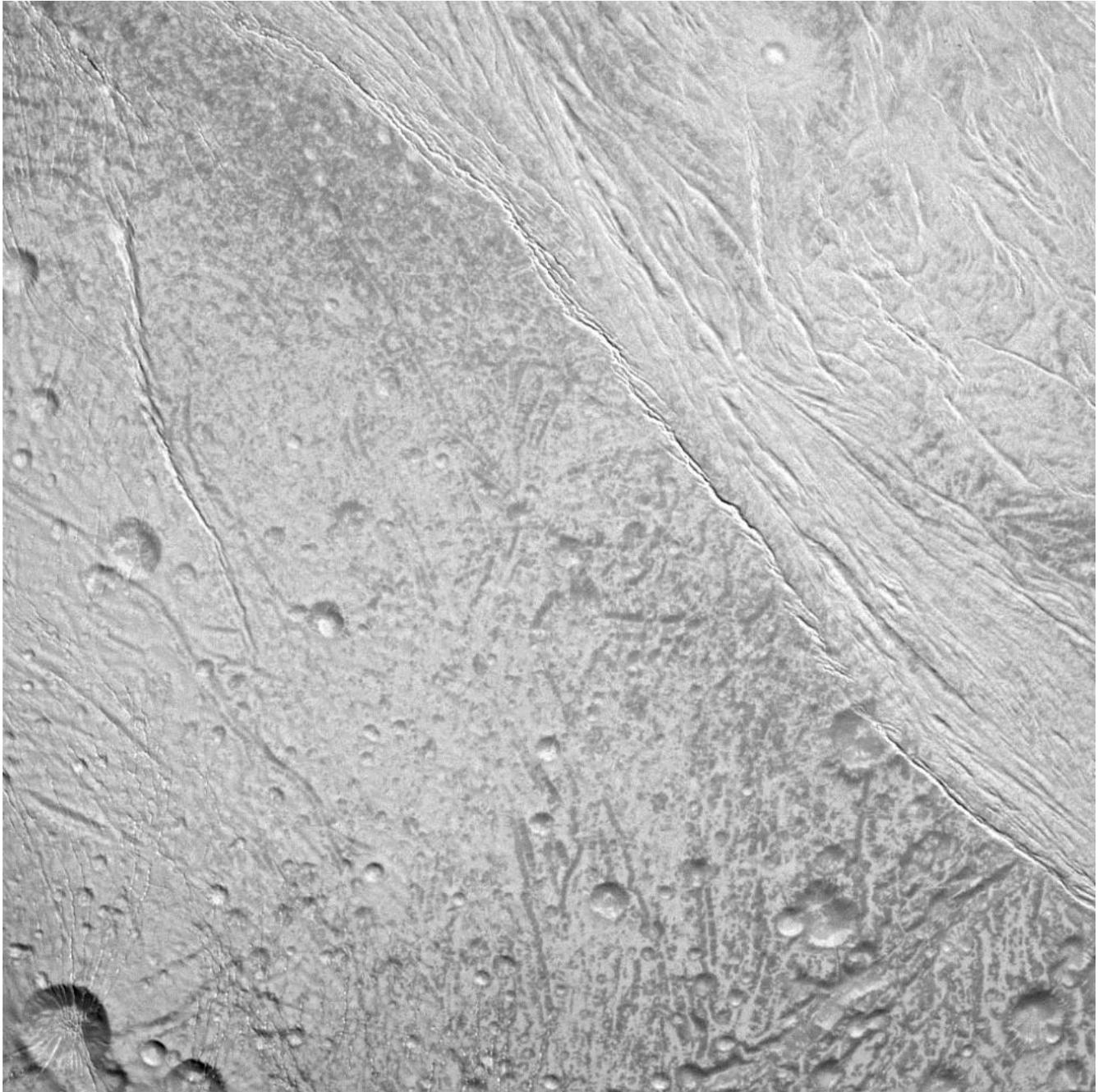




Comet Tempel 1

The Deep Impact mission's flyby spacecraft captured this image 67 seconds after the impactor slammed into the comet.

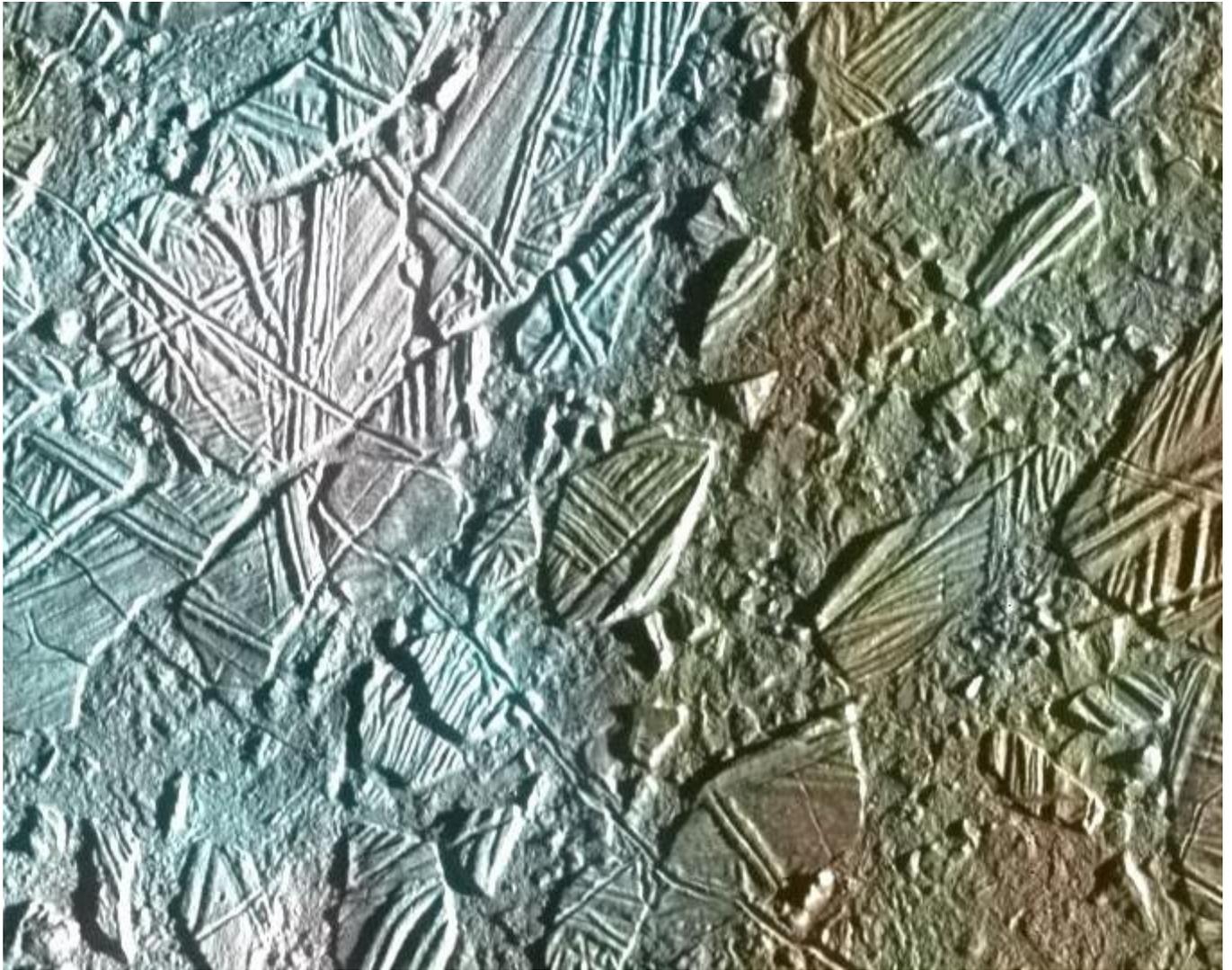
Credit: NASA/JPL-Caltech/UMD



Enceladus' Icy Surface

The cryovolcanoes (jetting ices) on Saturn's moon Enceladus are responsible for the largest of Saturn's rings!

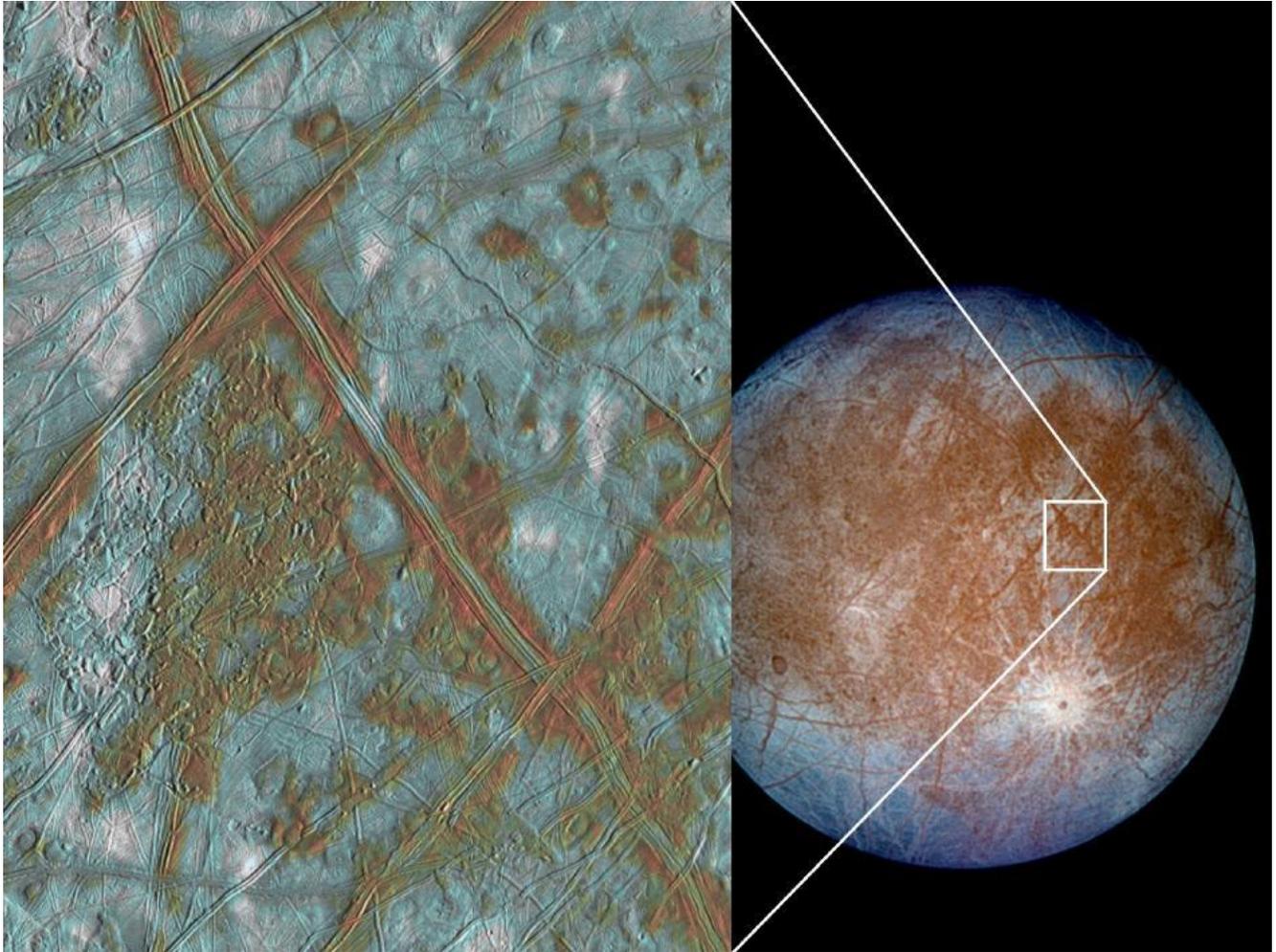
Credit: NASA/JPL-Caltech



Jupiter's Moon Europa: Chaos

The cracks and fault lines and fissures on the icy surface of Europa resemble activity we observe on our own North and South poles.

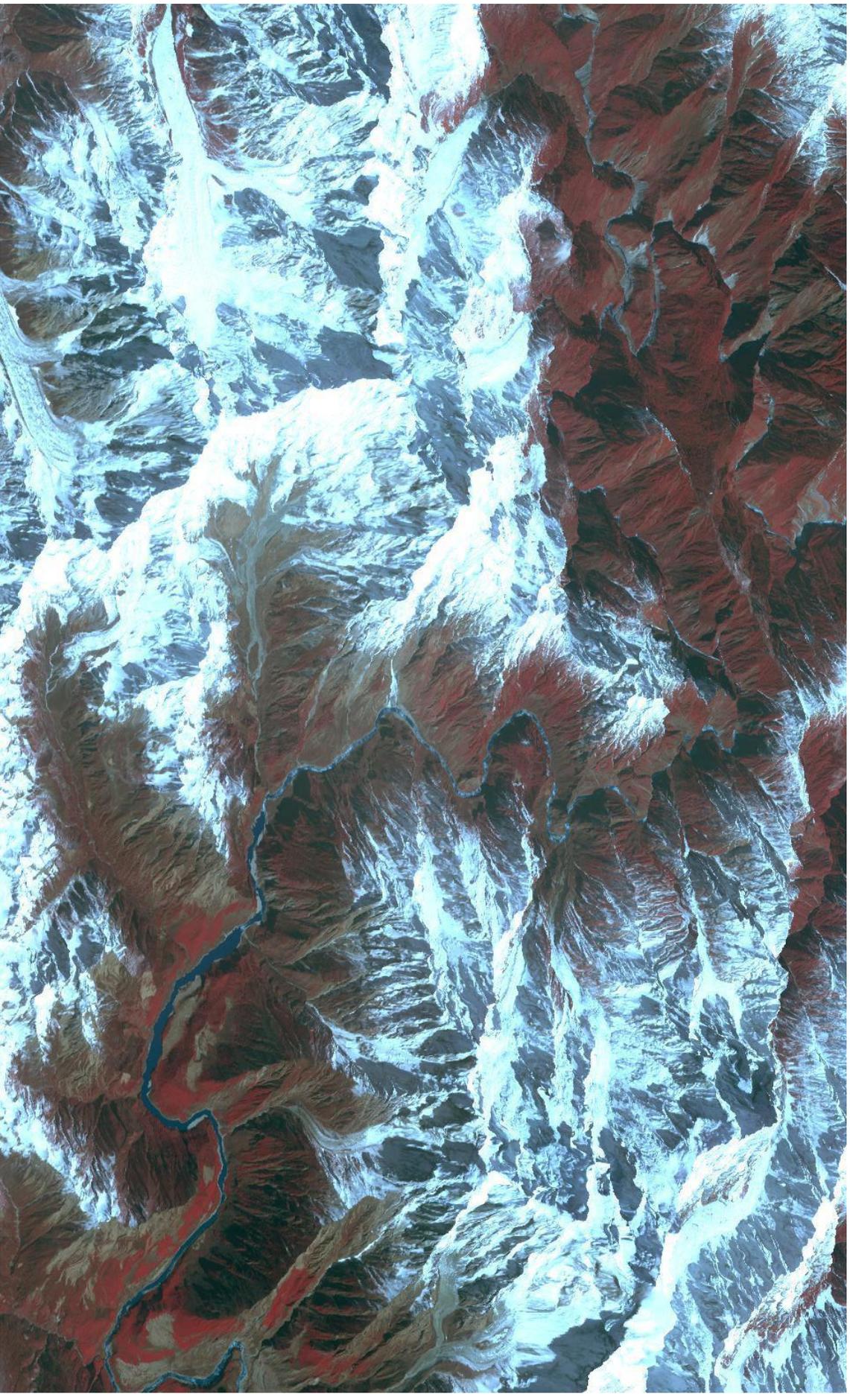
Credit: NASA/JPL-Caltech



Jupiter's Moon, Europa

Faults in the moon's icy surface.

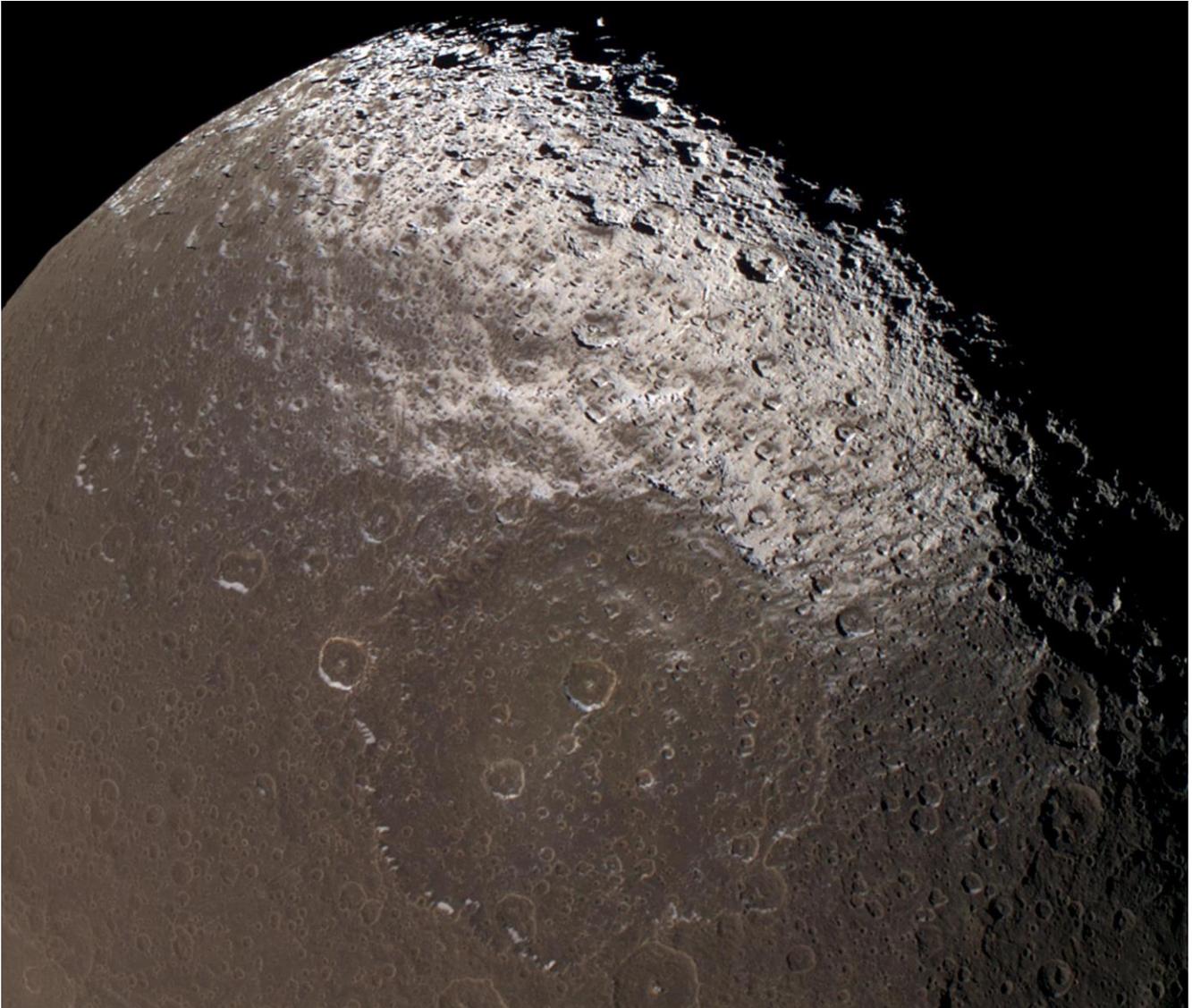
Credit: NASA/JPL-Caltech



Yarlung Zangpo Grand Canyon, Tibet

Astronomers and geologists look at topographical features (craters, volcanoes, mountains, patterns left by water) on Earth to help them understand distant planets, moons, comets and asteroids. This image was captured by the ASTER instrument on the Terra satellite.

Credit: NASA/GSFC/METI/ERSDAC/JAROS and U.S./Japan ASTER Science Team



Saturn's moon, Iapetus

Brown is the actual color of the surface of this intriguing moon, while the black areas are in shadow. Iapetus has extreme values, among the brightest and darkest surfaces in the solar system.

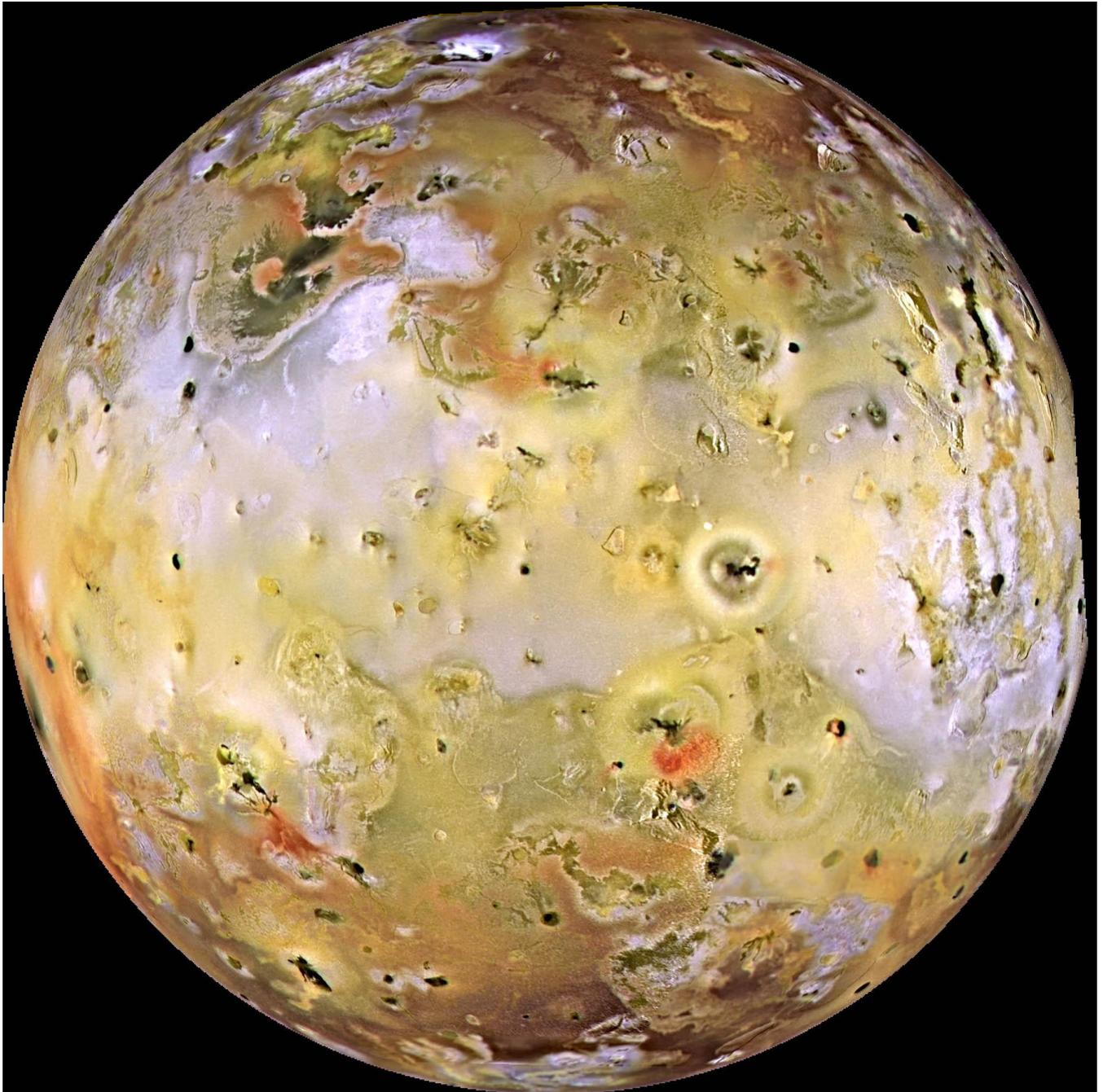
Credit: NASA/JPL-Caltech



Jupiter's moon, Io

Io is the most volcanic solar system body. Io's volcanoes continually resurface it, so that any impact craters have disappeared.

Credit: NASA/JPL-Caltech



Jupiter's Moon, Io

The most volcanic solar system body, Io is so close to Jupiter that the land is pulled 15 meters daily, like our Earth's ocean tides! This is a true color image.

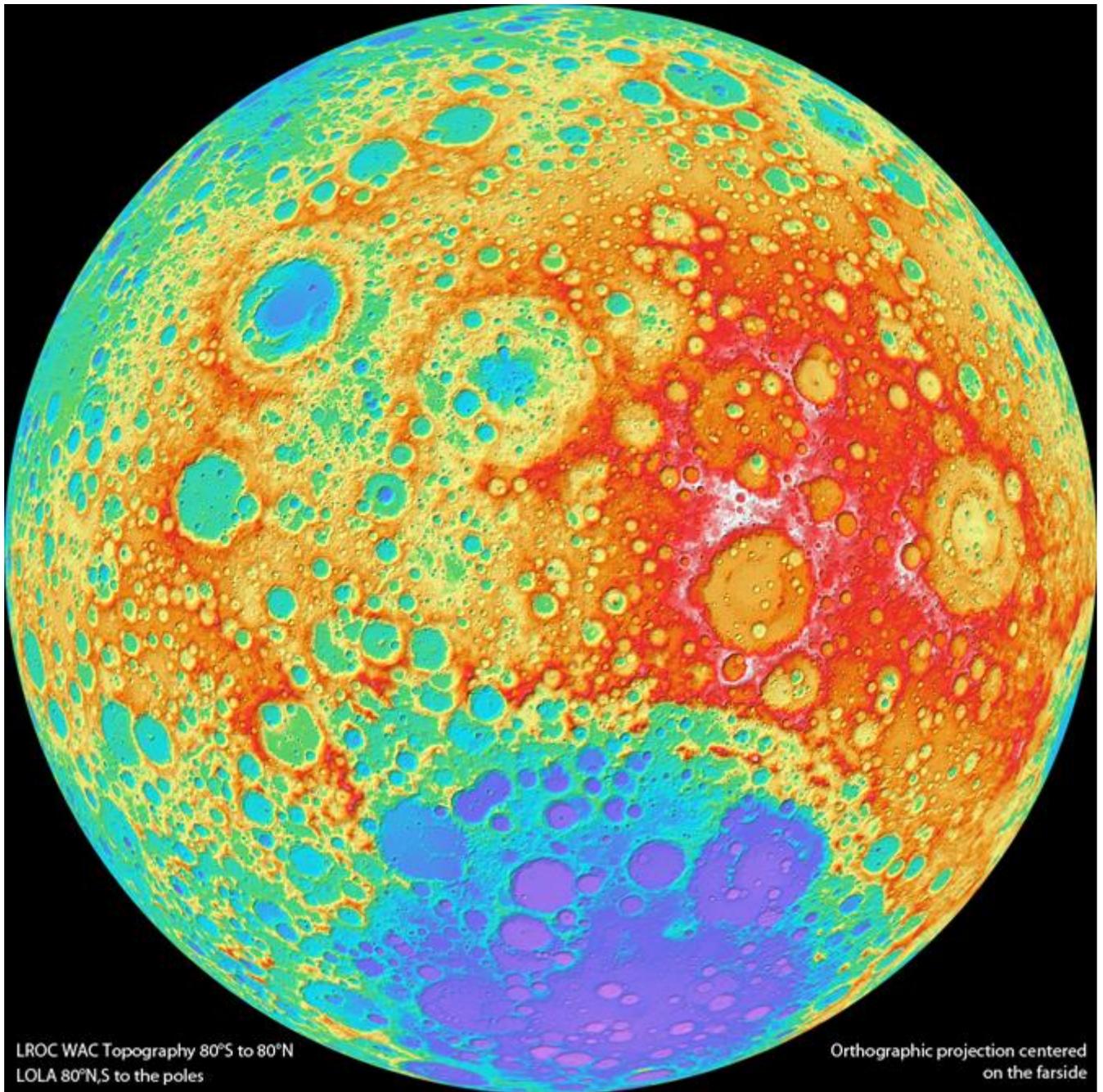
Credit: NASA/JPL-Caltech



Mercury's vast crater, Kalidasa

Taken by the MESSENGER spacecraft... check out the crater in the crater!

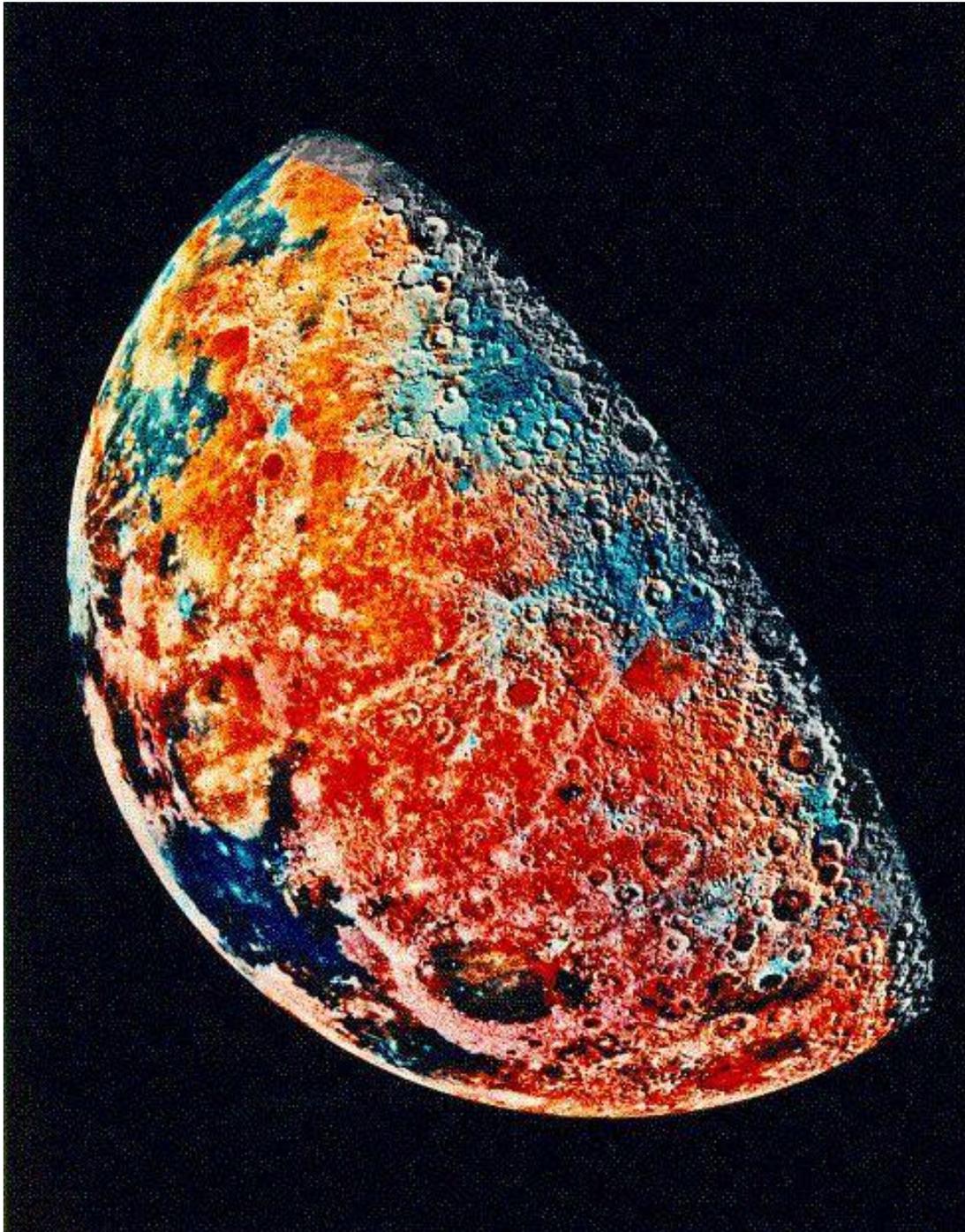
Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Arizona State University/Carnegie Institution of Washington



Far Side of the Moon

Thanks to Lunar Reconnaissance Orbiter, this is the highest resolution composite topographical map of the Moon.

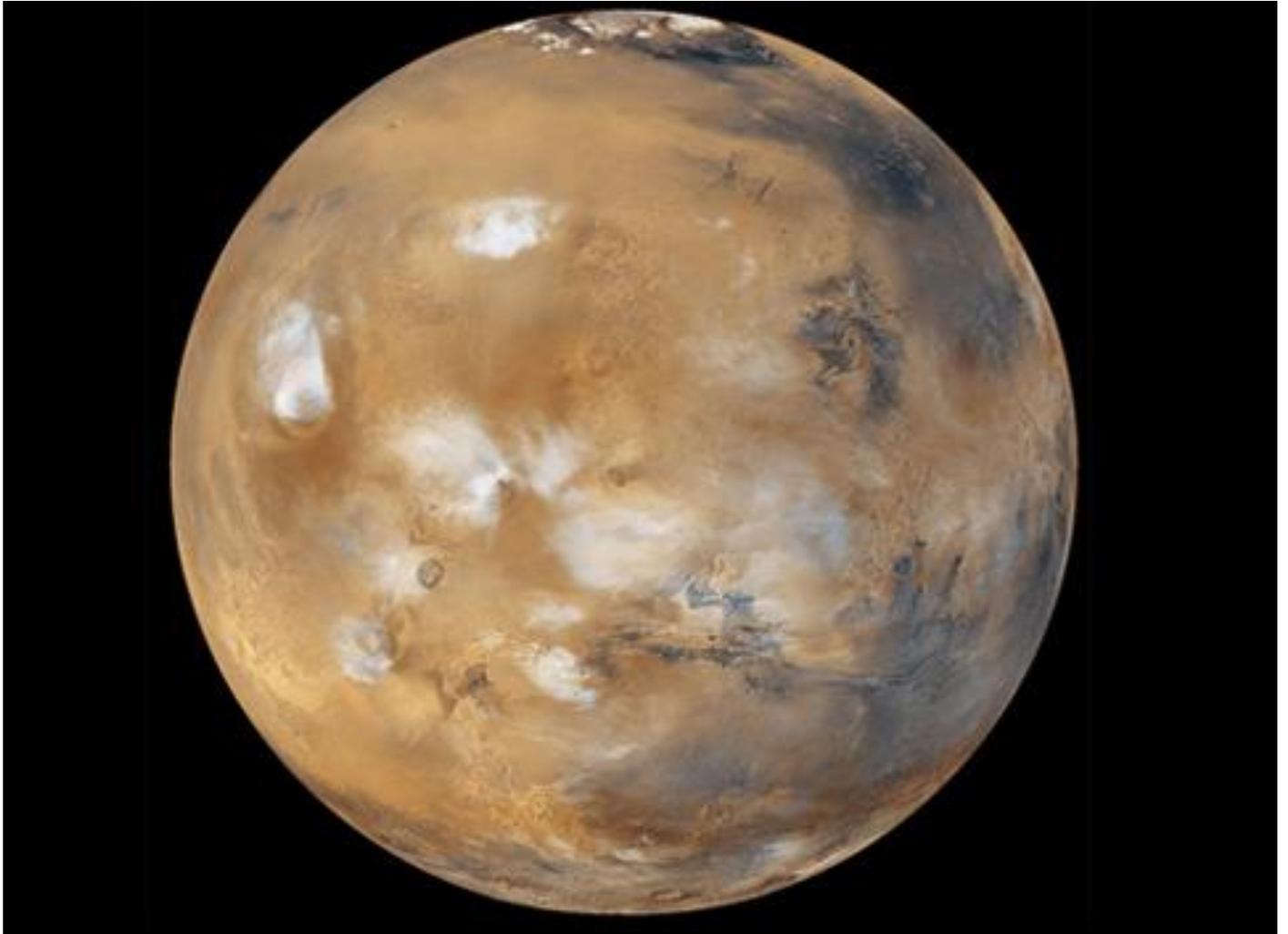
Credit: NASA/JPL/University of Arizona



Earth's Moon

This false-color mosaic was constructed from 53 images taken by the Galileo spacecraft. It shows compositional variations in the northern hemisphere.

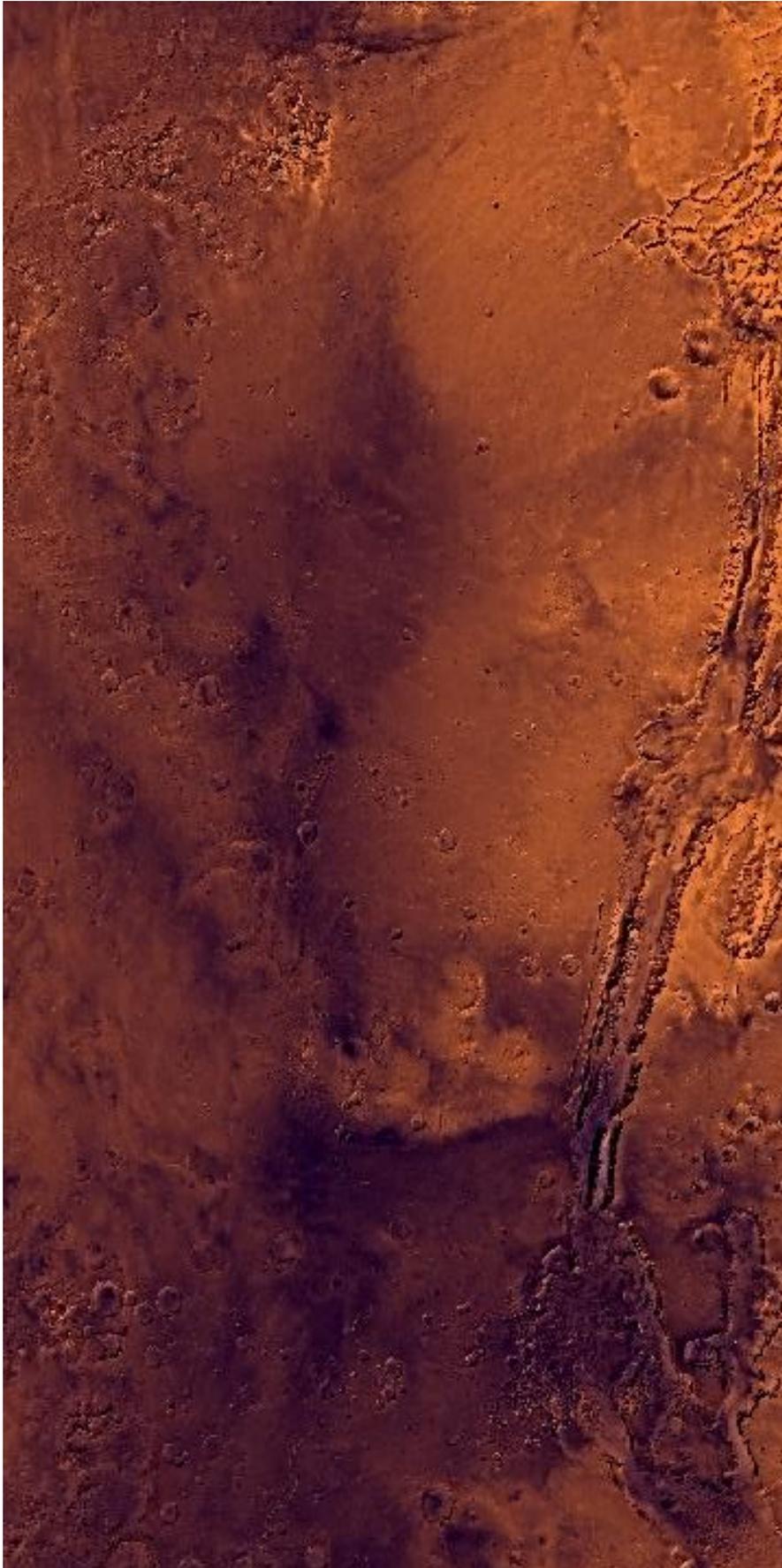
Credit: NASA/JPL-Caltech



Mars

Twelve orbits a day provided the Mars Global Surveyor wide angle cameras a global snapshot of Martian weather patterns. Bluish-white water ice clouds hang above the Tharsis volcanoes.

Credit: NASA/JPL-Caltech/MSSS



Mars: Merged Color Image

This mosaic of the Coprates region of Mars shows moderately cratered and faulted highland ridged plains cut by the prominent, vast Valles Marineris canyon.

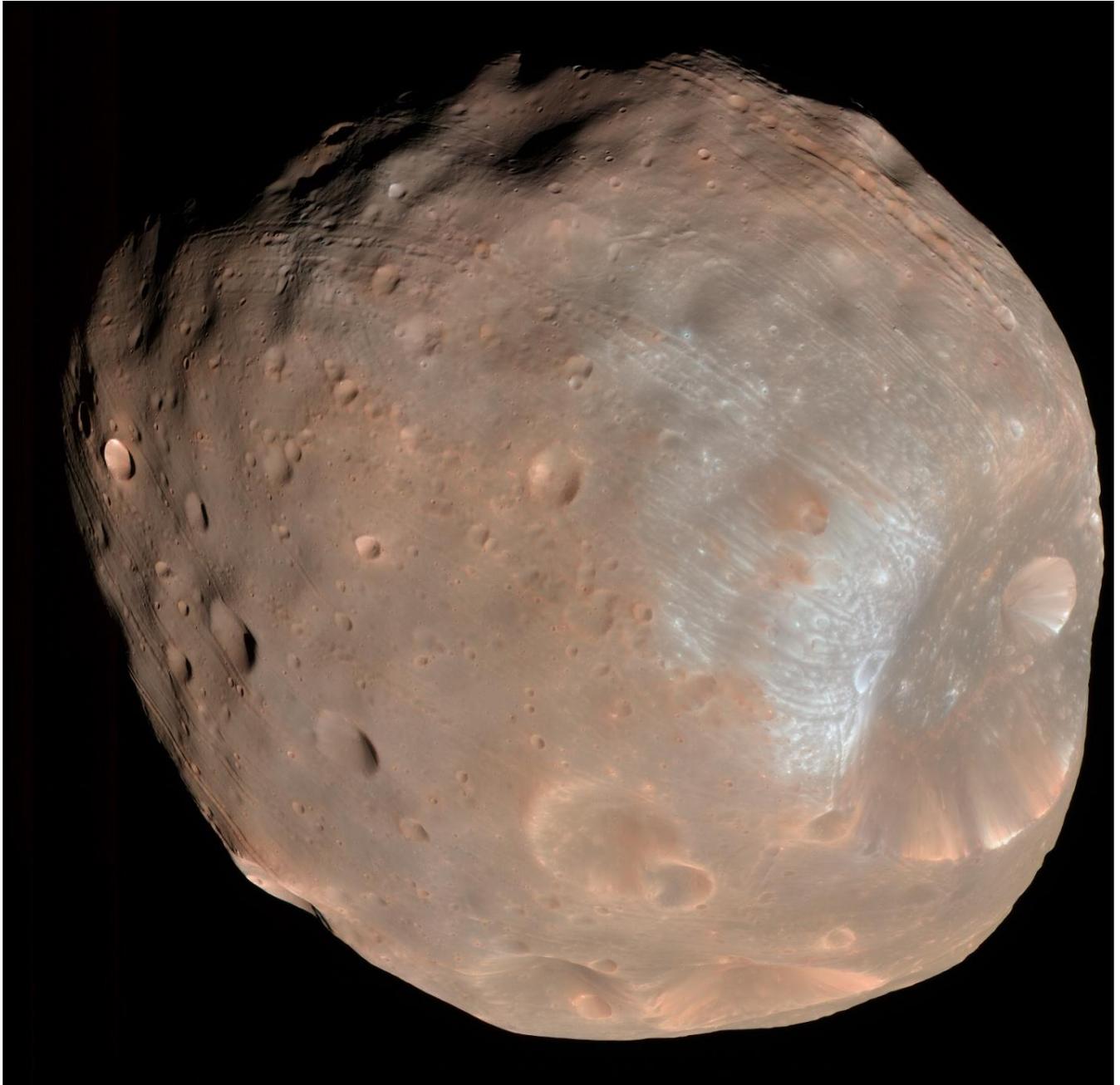
*Credit: NASA/JPL-Caltech/
USGS*



Mars' Moon, Deimos

Did Mars' gravity capture it from the main asteroid belt?

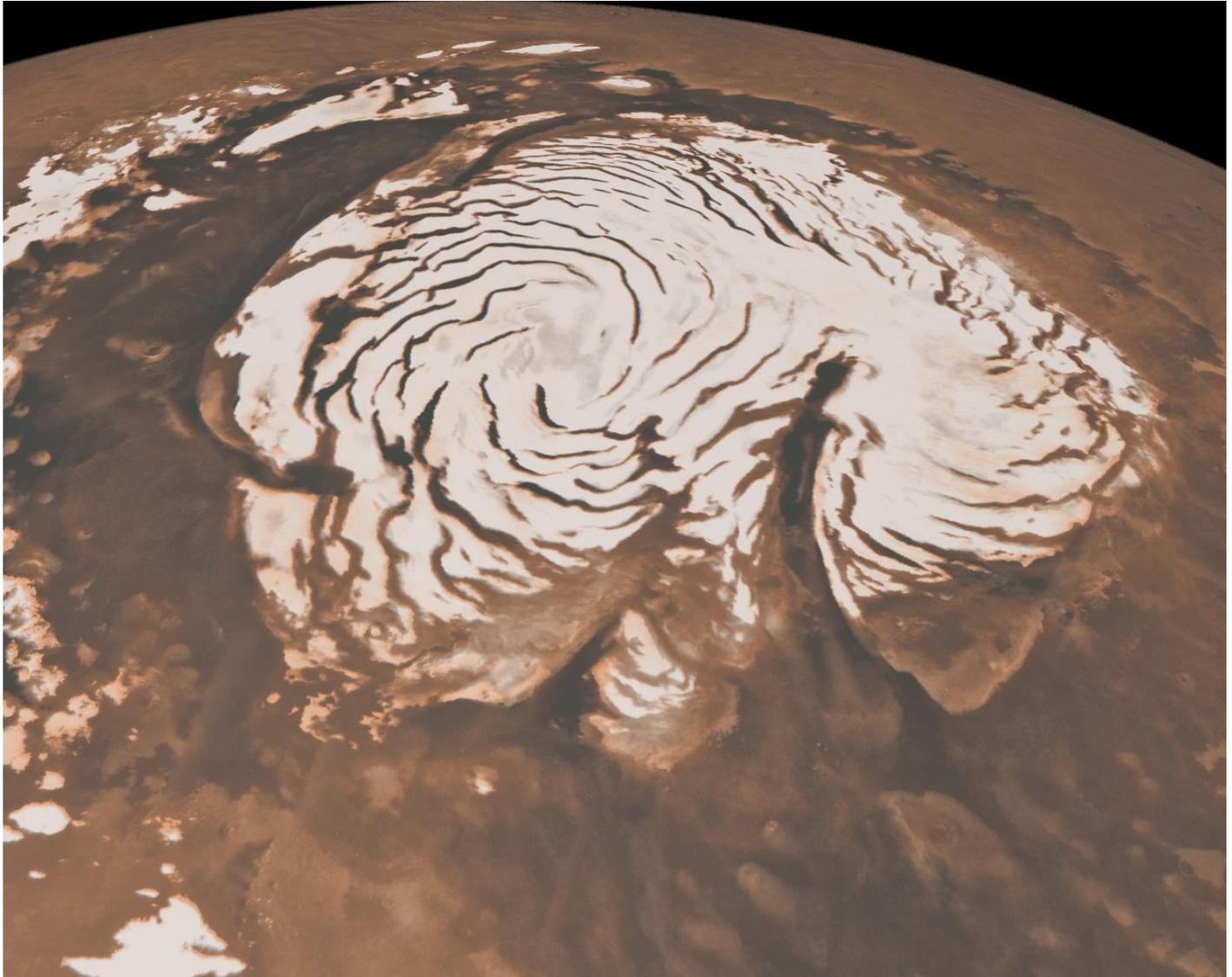
Credit: NASA/JPL-Caltech/HiRISE/U of Arizona (LPL)



Mars' Moon, Phobos

Did Mars' gravity capture it from the main asteroid belt?

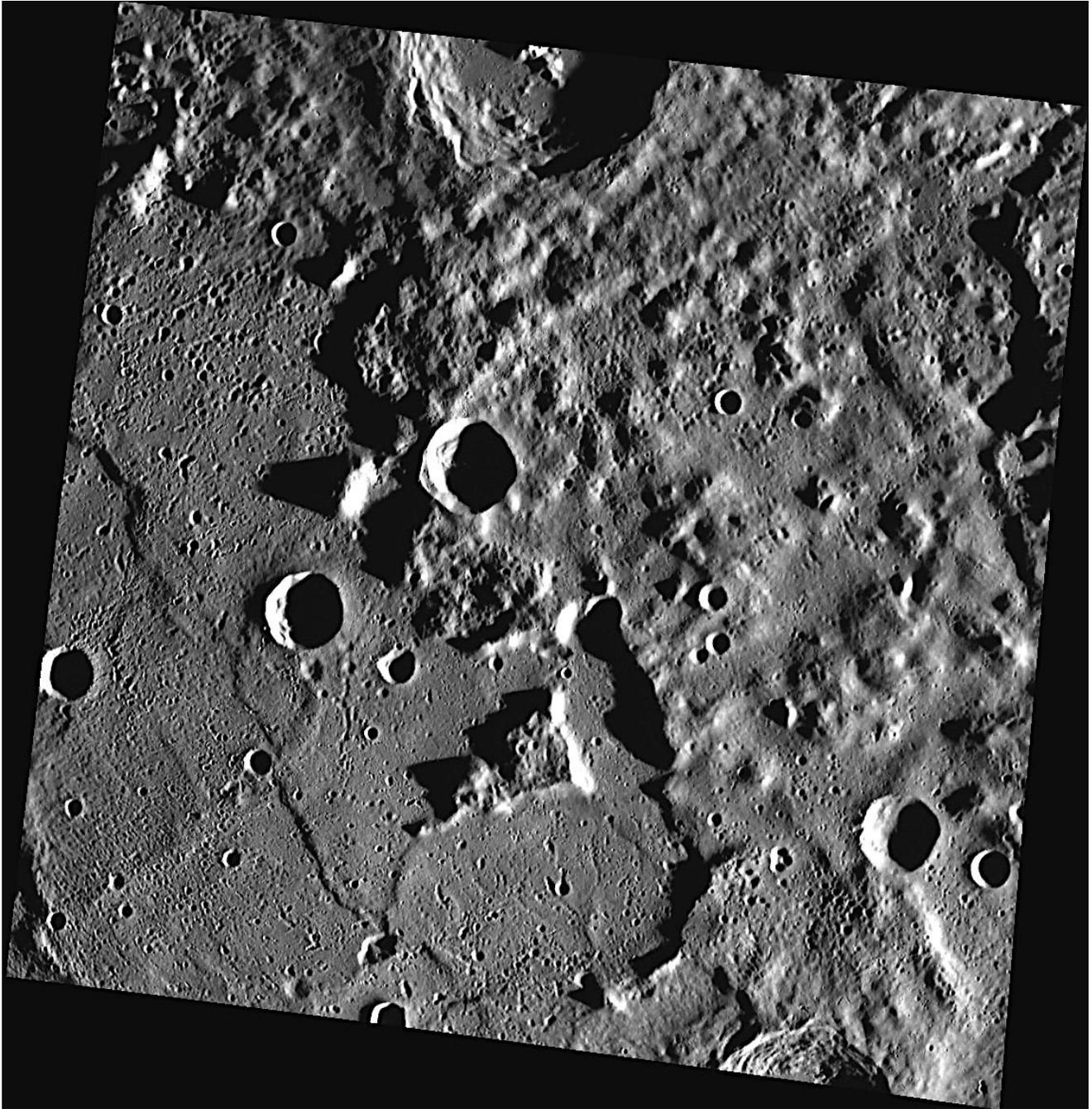
Credit: NASA/JPL-Caltech/HiRISE/U of Arizona (LPL)



Mars' North Pole

The two-mile-tall, Texas-sized ice cap at the north pole of Mars was a mystery for forty years until Mars Global Surveyor data helped scientists determine that the spiral troughs and giant canyon were formed by katabatic winds, which blow down from the top of the ice cap.

Credit: NASA/JPL-Caltech/MSSS



Mercury Up Close

The floor of Mercury's Caloris basin is filled with volcanic plains, while a ring of mountainous peaks is found along the basin's rim. Near the edge of the huge impact basin, "islands" of rough terrain are surrounded by smooth volcanic plains.

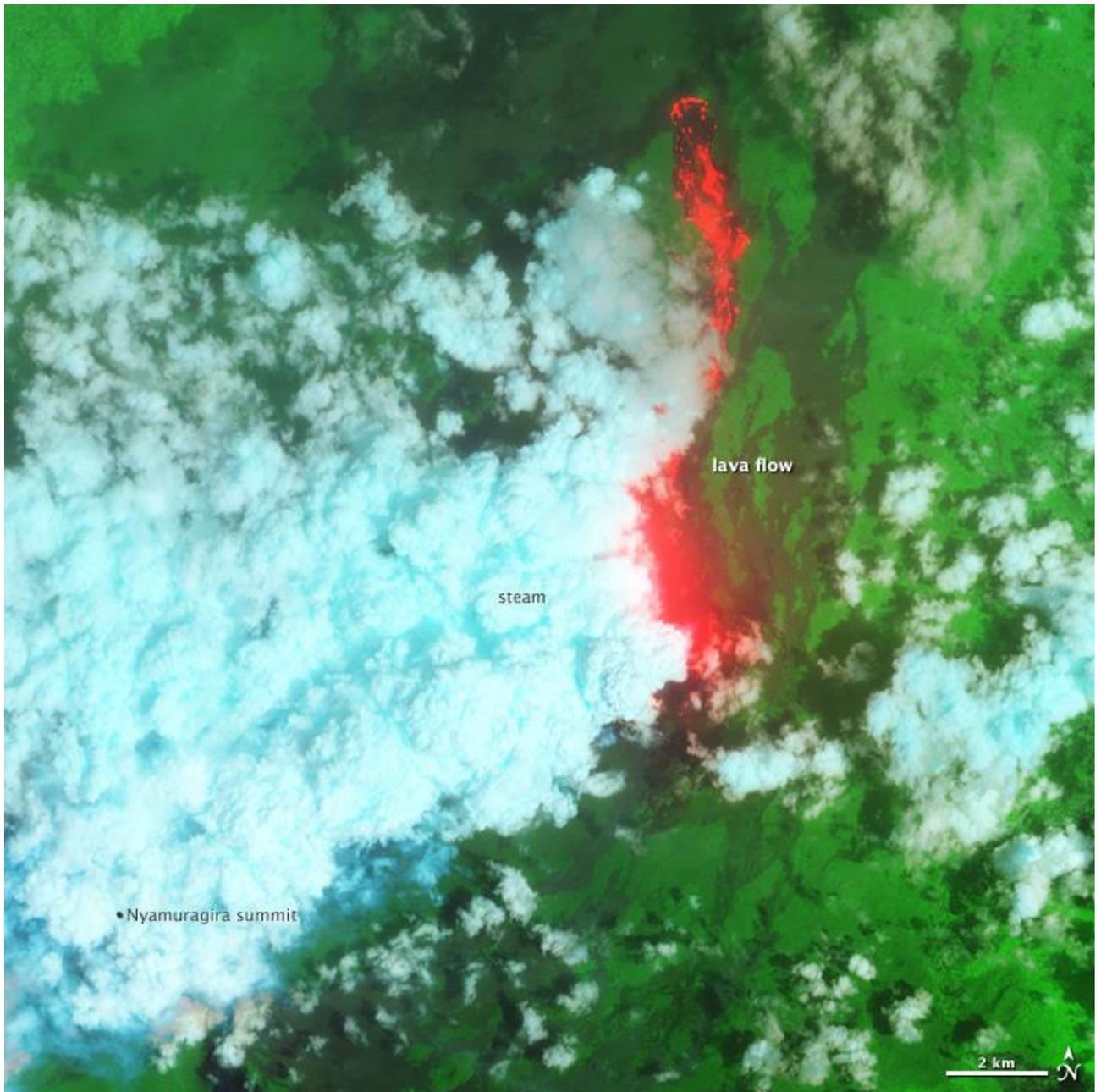
Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington



Mercury Crater Trails

What might cause the crater chains shown in this image, taken by the MESSENGER spacecraft? Scientists think these features form when ejecta from a primary impact is thrown outward. As chunks of ejecta fall back to the surface, they can form chains of secondary craters that often overlap.

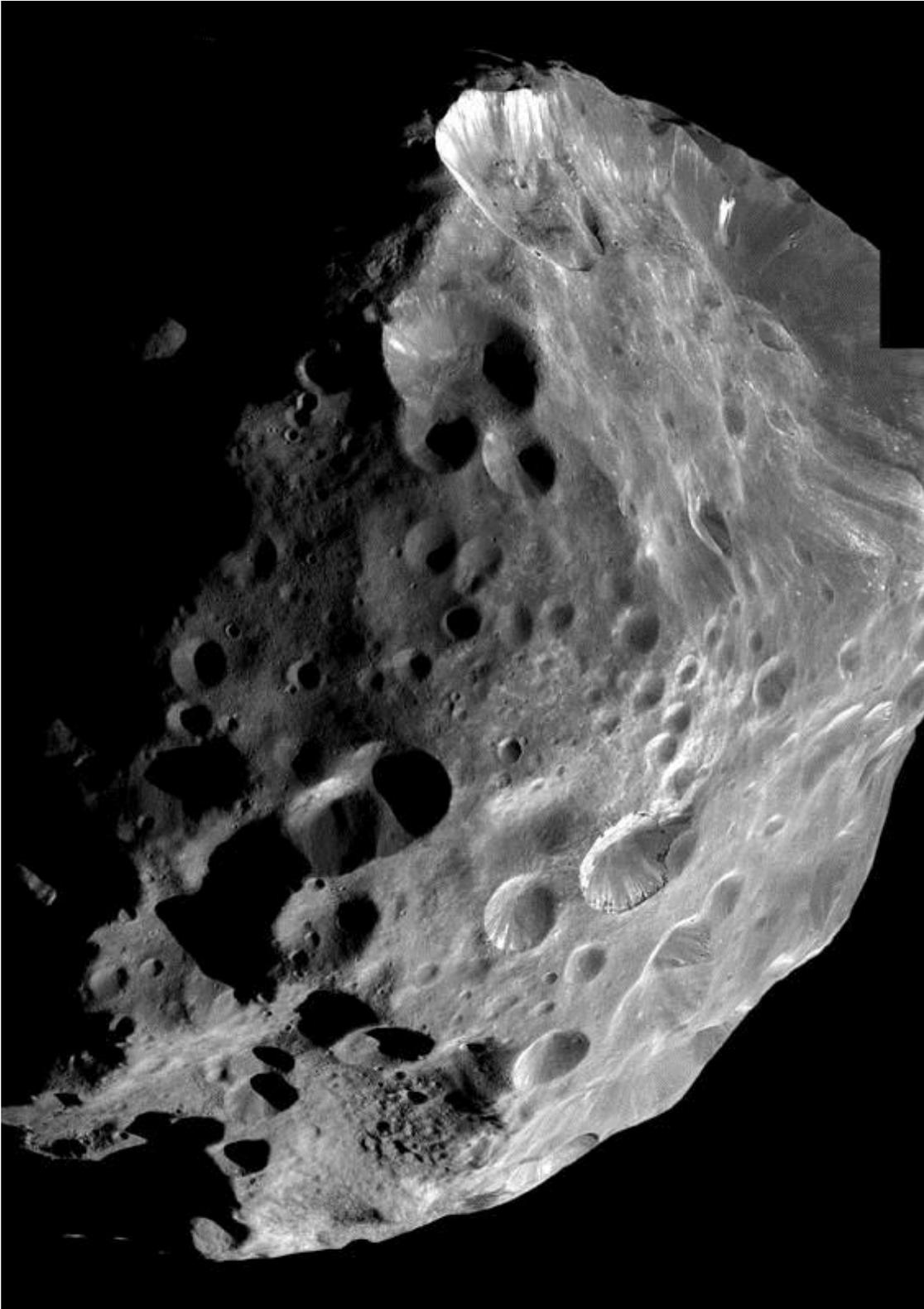
Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington



Nyamuragira Eruption, Africa

Nyamuragira is one of the world's most active volcanoes. It erupts roughly every two years, producing large fluid lava flows. This photo from NASA's Earth Observatory shows fresh lava in red.

Credit: NASA



Phobos

Mars' moon Phobos taken by the Cassini spacecraft on its way to Saturn.

Credit: NASA/JPL-Caltech

**Pine Island
Glacier:** huge ice
stream flowing into
Hudson Bay in
northern Canada.

Astronomers and
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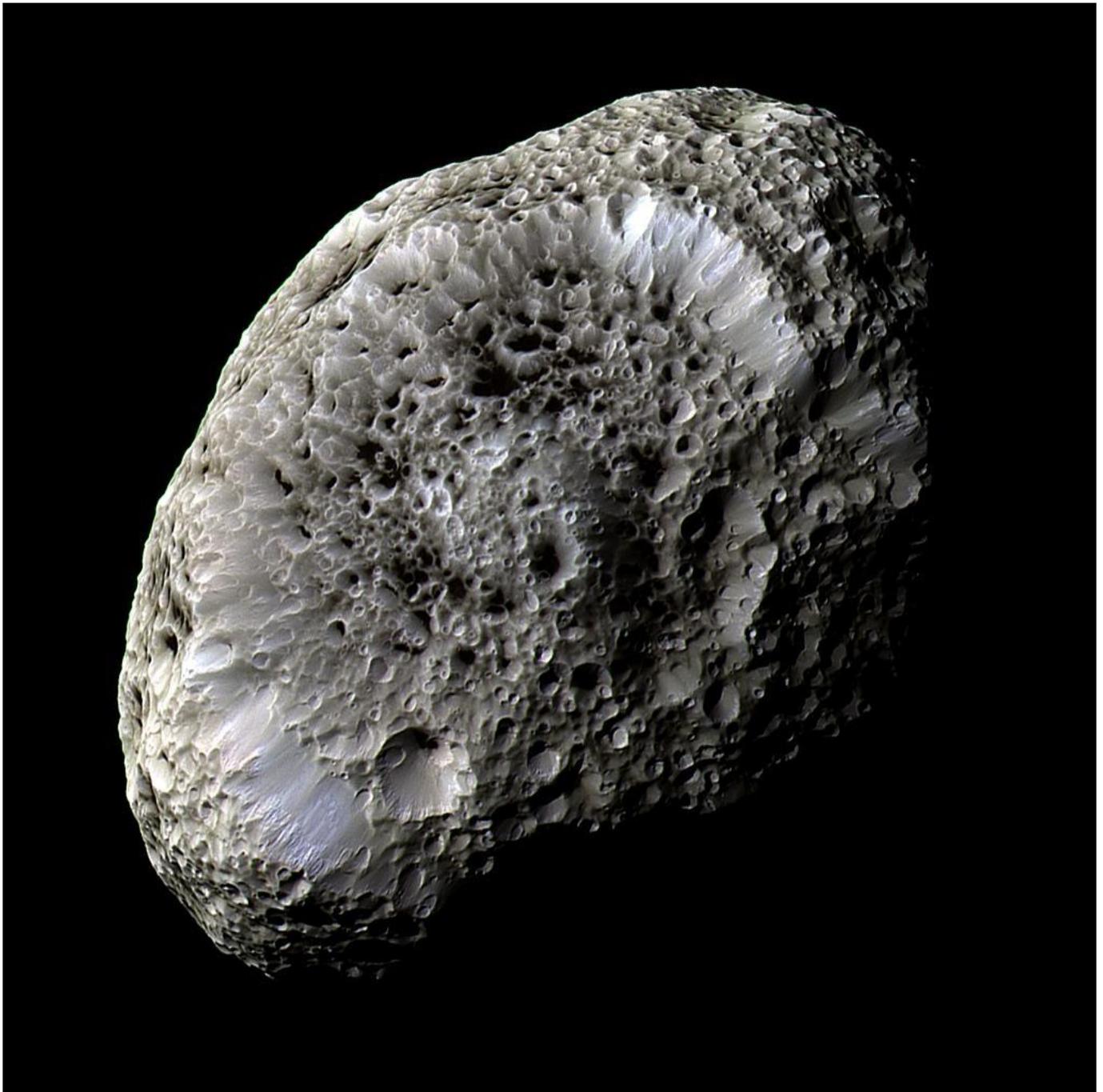
Credit: NASA



Saturn's Odd Moon, Hyperion

Check out the unusual surface topography of Hyperion. Can you think of something that looks like that on Earth? Why might its craters look like that?

Credit: NASA/JPL-Caltech

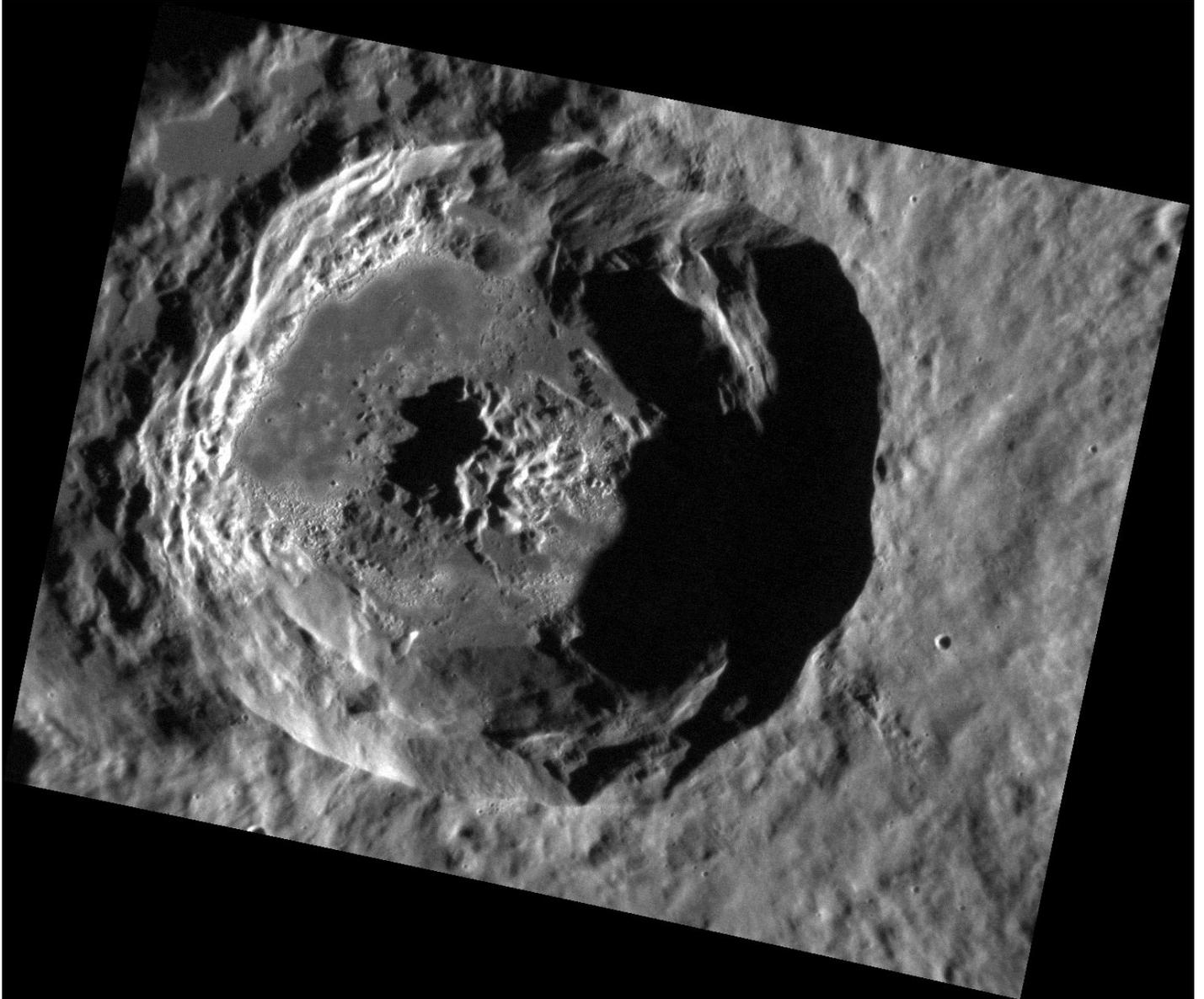


Storms over the Gulf of Mexico and the Atlantic, 11/22/11

Astronomers and geologists look at topographical features (craters, volcanoes, mountains, patterns left by water, etc.) on Earth to help them understand patterns on distant planets, comets, asteroids.

Credit: NASA

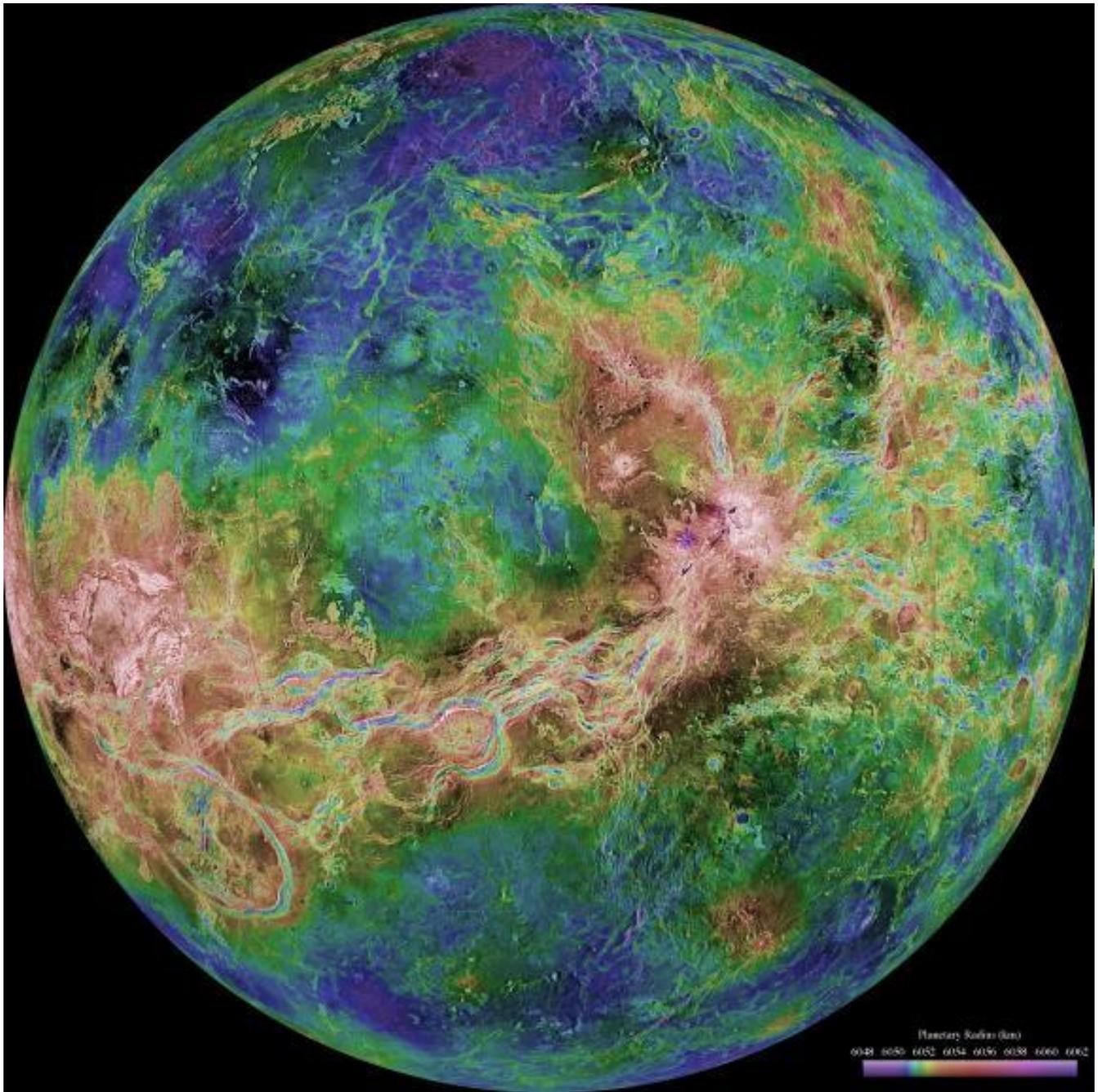




Mercury: Unnamed Hollows

MESSENGER took this image... is it a depression or a dome? Don't let your eyes deceive you!

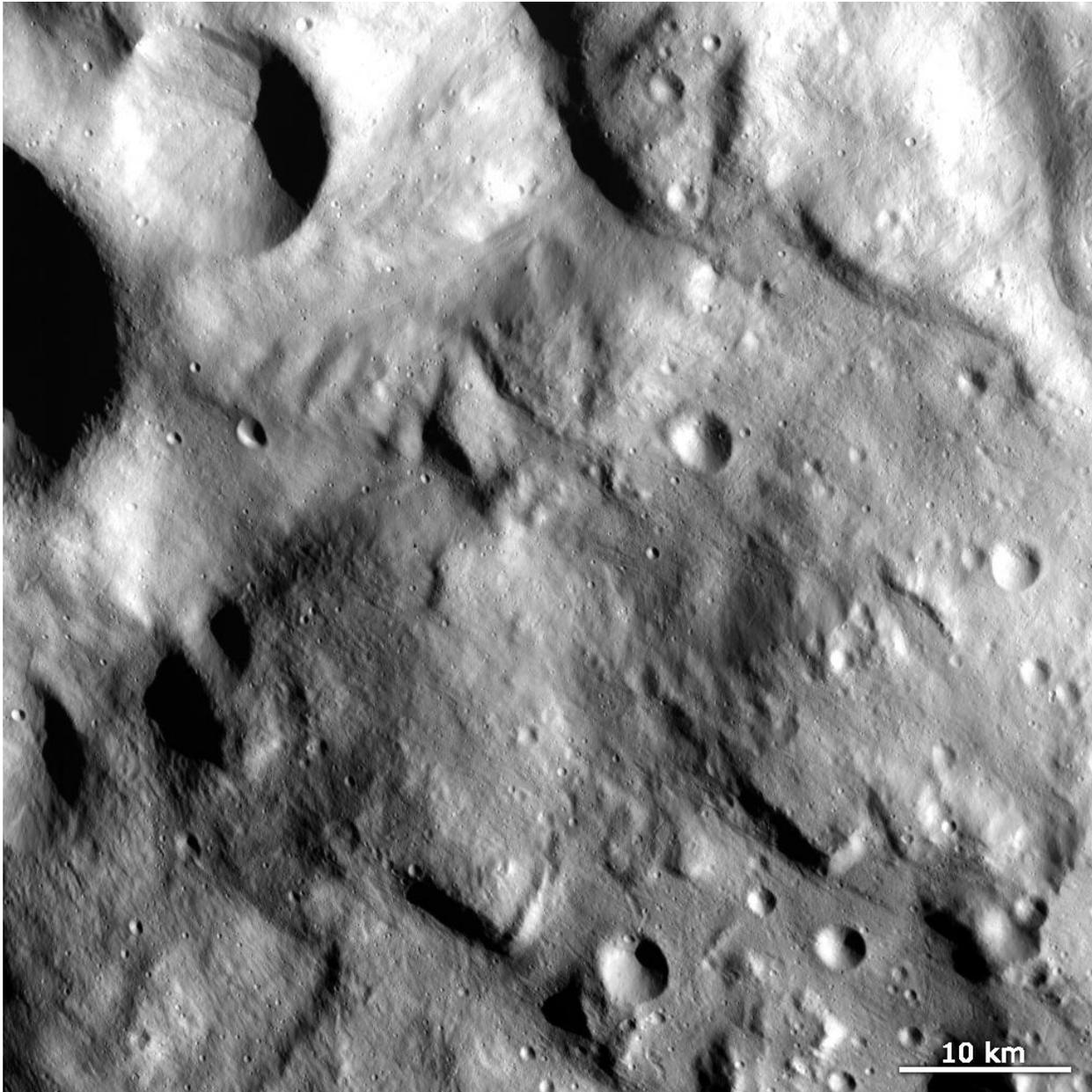
Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington



Venus Colorized

Scientists use color to emphasize variations such as mineral composition, temperature variation, and topography.

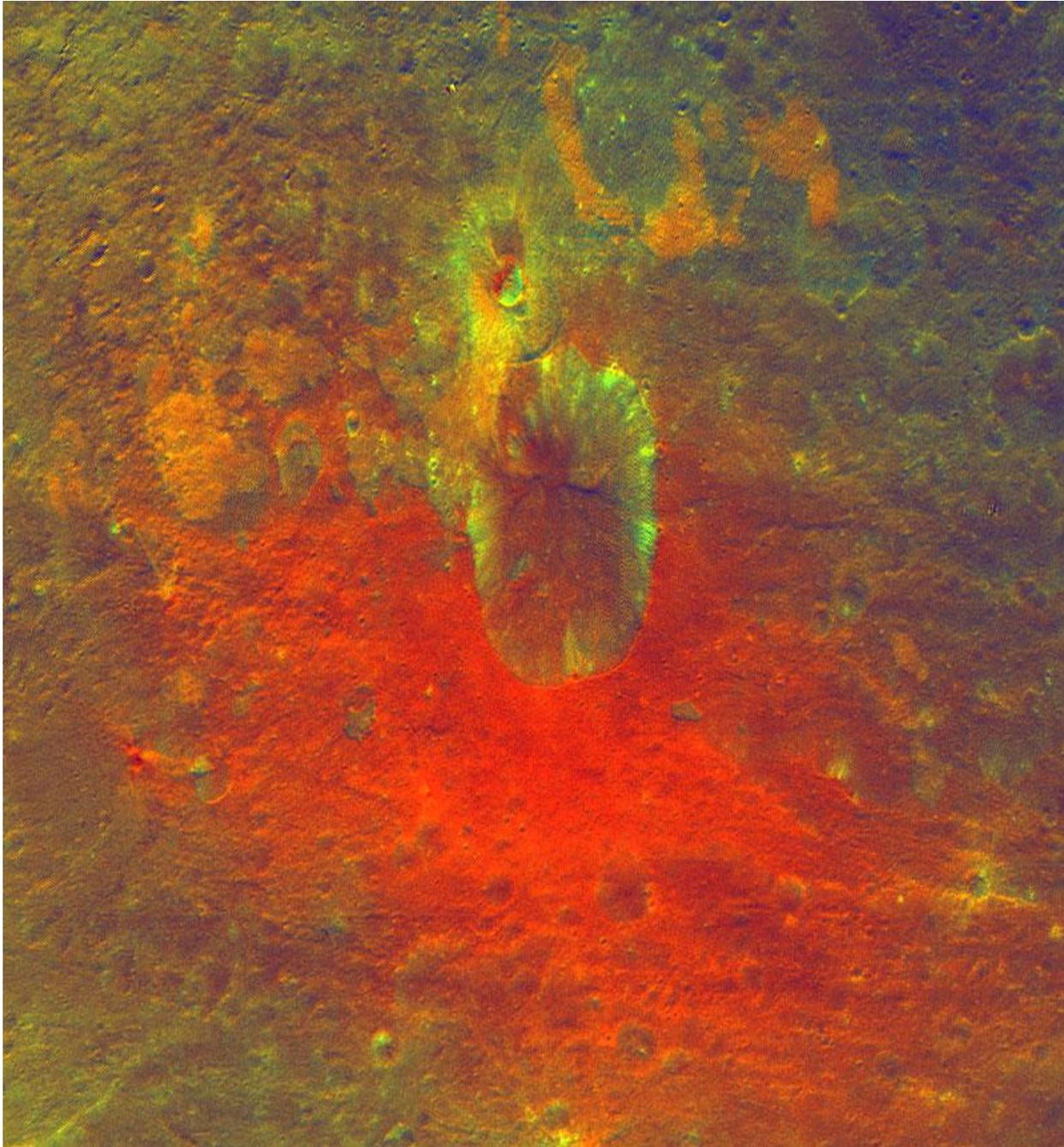
Credit: NASA/JPL-Caltech



Vesta Close Up

The Dawn spacecraft took this detailed image of giant asteroid Vesta during its year-long orbit.

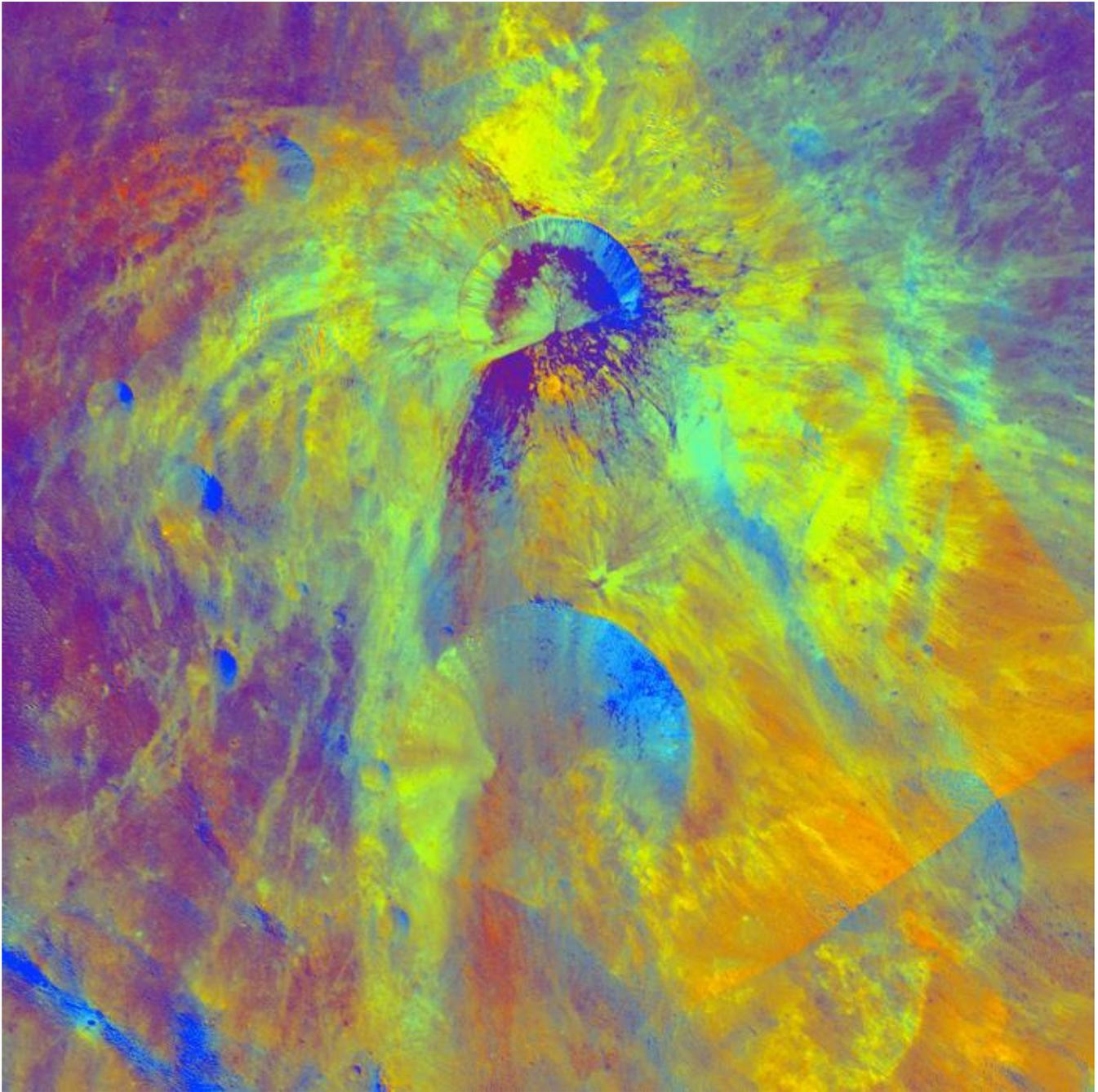
Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



Vesta: False Color Crater

Scientists use color to emphasize variations such as mineral composition, temperature variation, and topography. This image highlights the ejecta left from the impact of the crater.

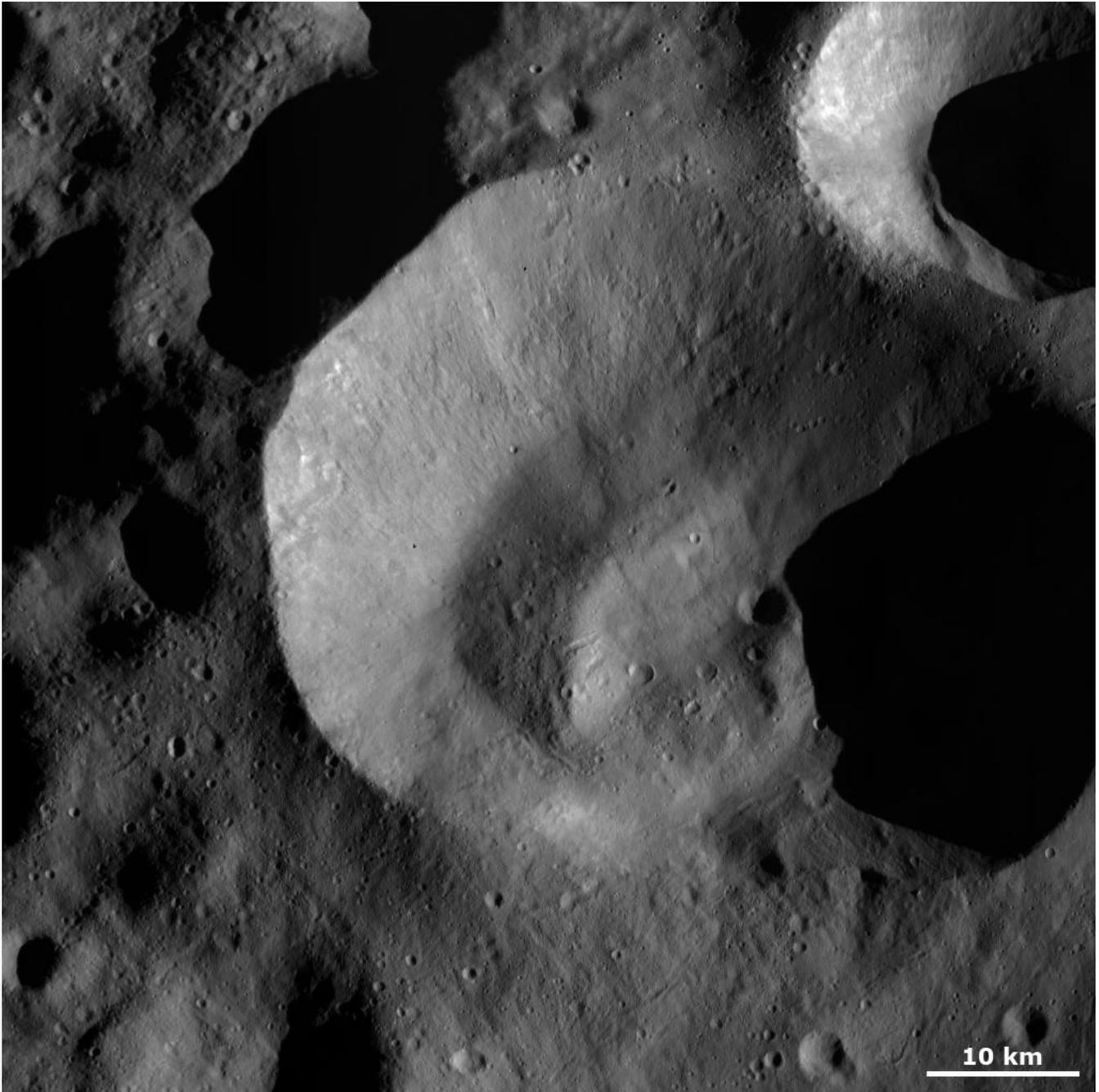
Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



Antonia Crater on Vesta

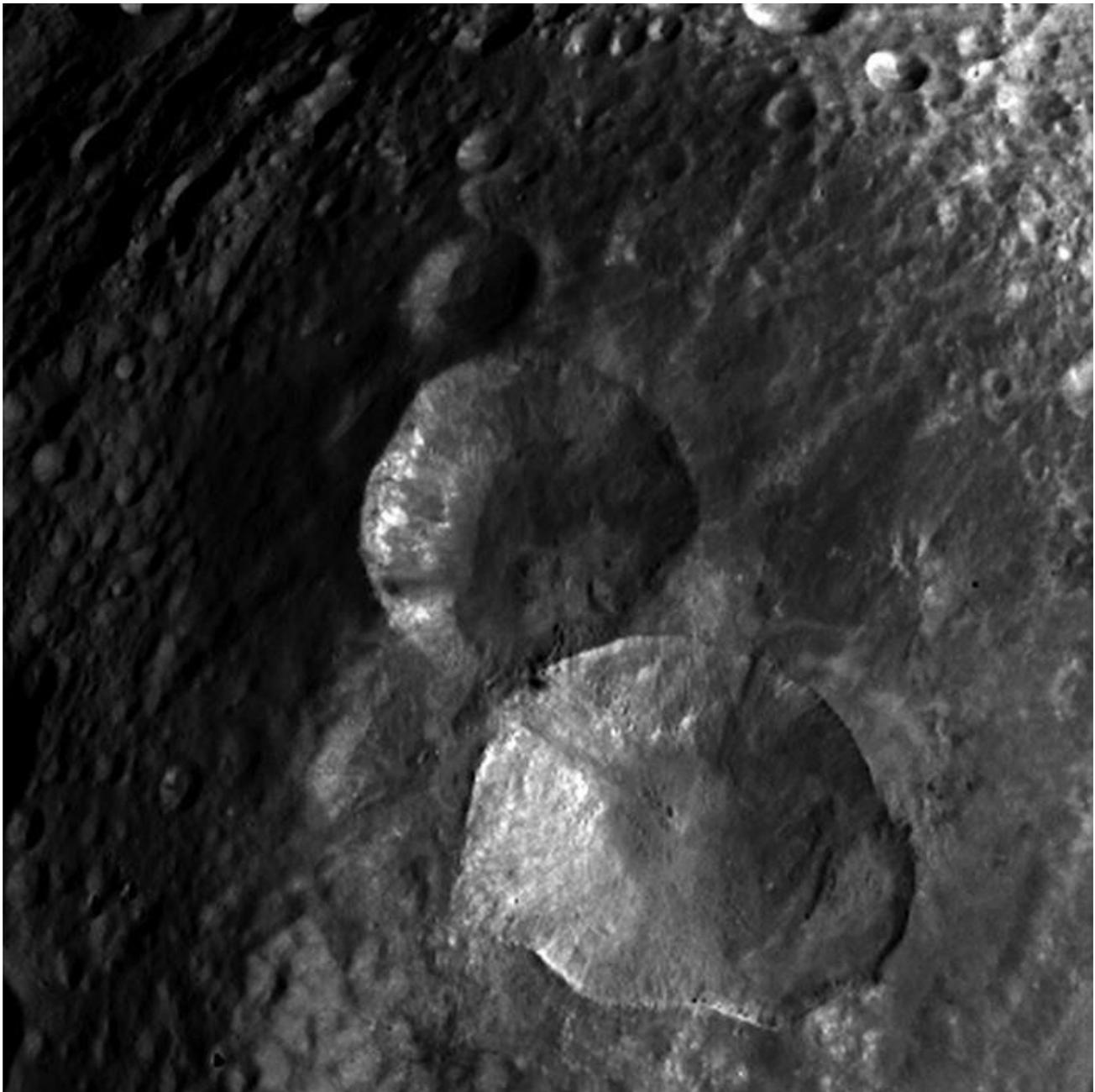
Scientists use color to emphasize variations. This image, taken by the Dawn mission's framing camera, uses red, blue and green filters to show the spectacular spectral diversity of the crater and the area around it.

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



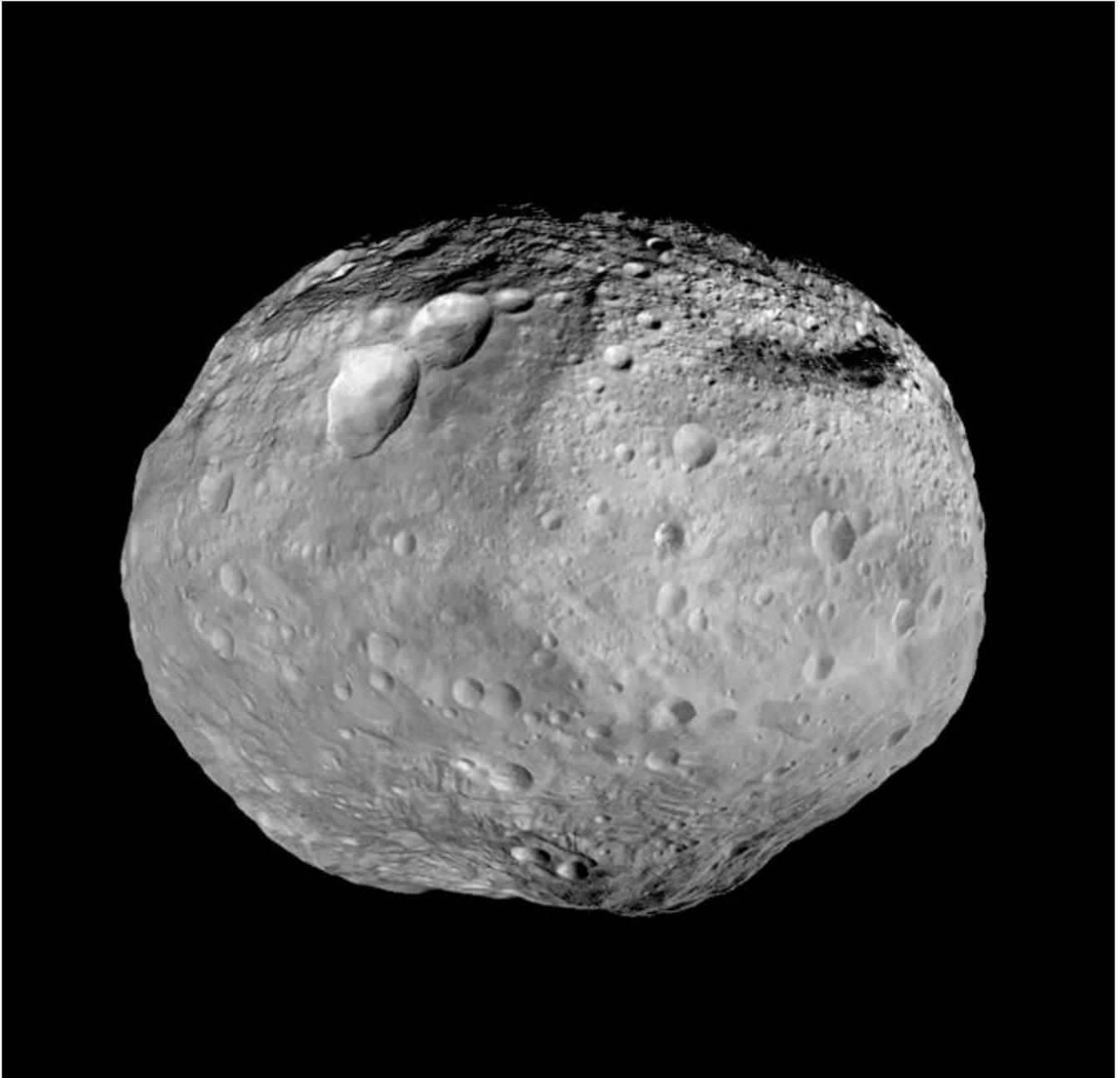
Caparronia Crater on giant asteroid Vesta

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



“Snowman” craters on giant asteroid Vesta

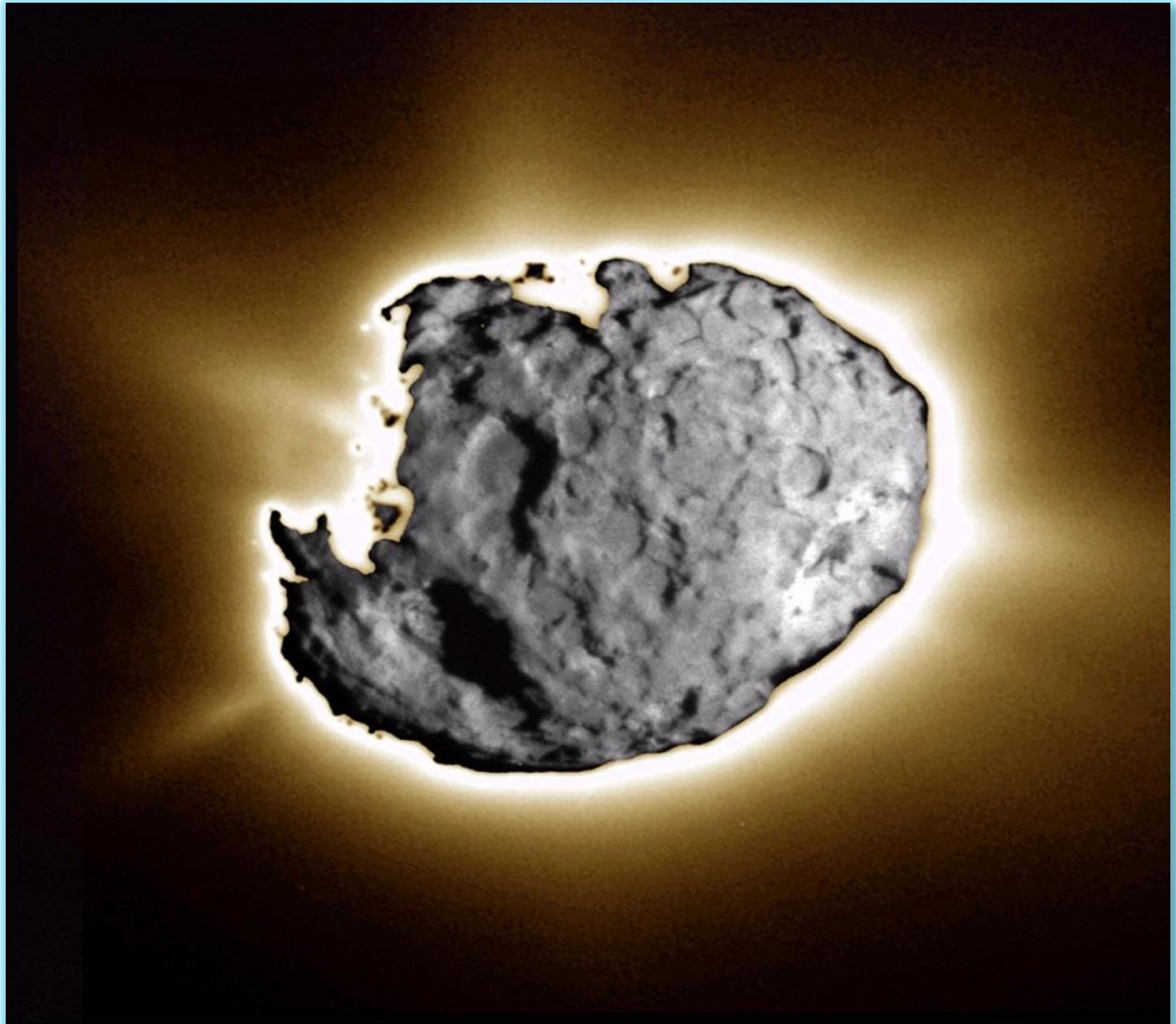
Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



Global View of Vesta

This beautiful mosaic combines some of the best views that the Dawn spacecraft captured of the giant asteroid. The mountain at the south pole is more than twice the height of Mount Everest.

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



Comet Wild 2

Nucleus of comet Wild 2 imaged during the Stardust mission flyby to collect samples of comet dust and return them to Earth.

Credit: NASA/JPL-Caltech/University of Washington



Yukon Delta, Alaska

Astronomers and geologists look at topographical features (craters, volcanoes, mountains, patterns left by water, etc.) on Earth to help them understand patterns on distant planets, comets, asteroids.

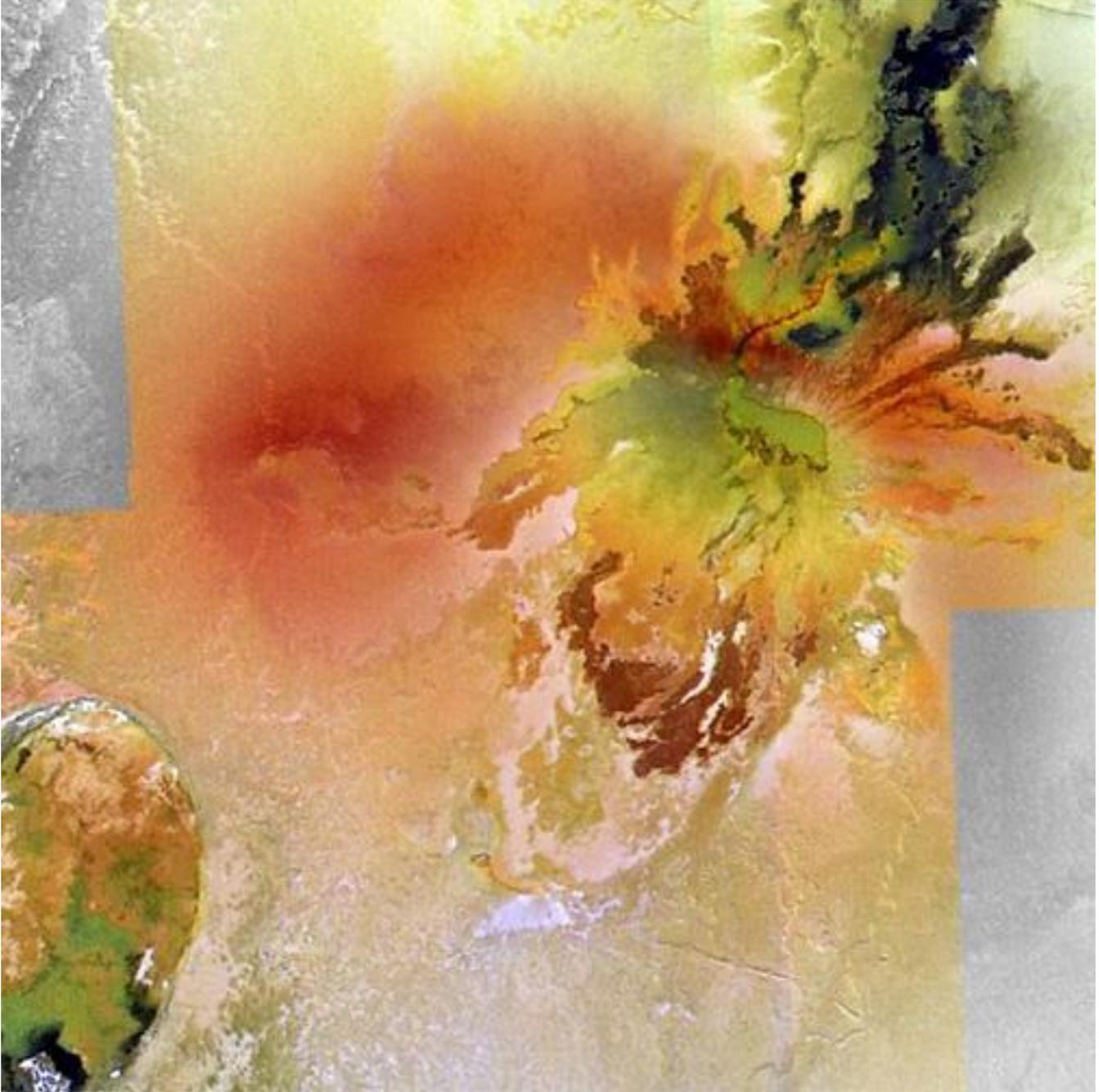
Credit: NASA



Jupiter's moon, Ganymede

This Galileo image reveals frosty polar caps in addition to the two predominant terrains on Ganymede: bright, grooved terrain and older, dark furrowed areas. Many large craters are visible as well.

Credit: NASA/JPL-sDLR



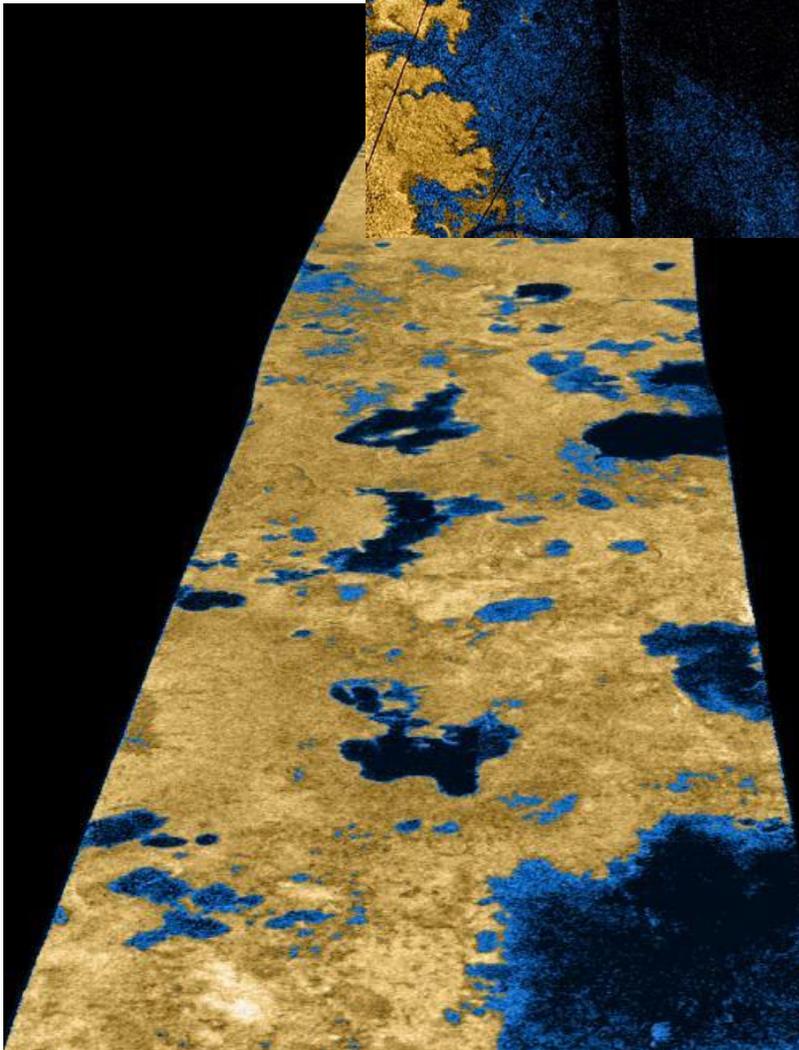
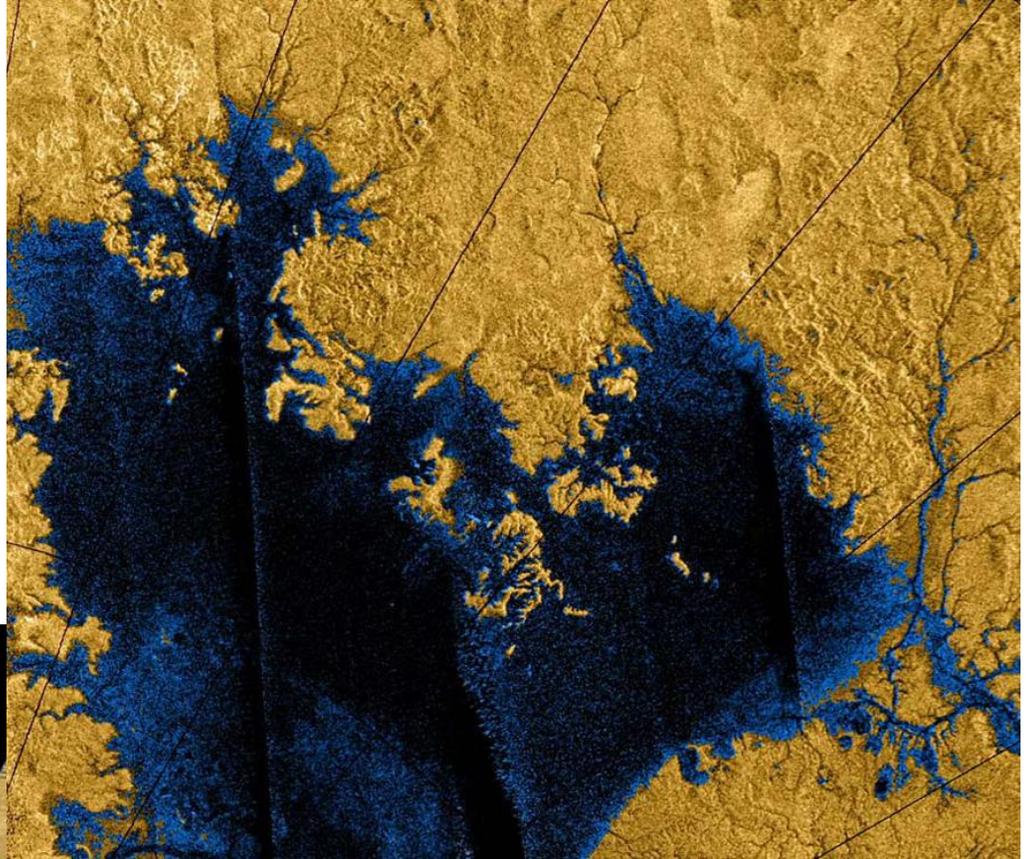
Close-up: Active Volcano Culann Patera on Jupiter's moon, Io

Credit: NASA/JPL/University of Arizona



Active Volcano Culann Patera on Jupiter's moon, Io

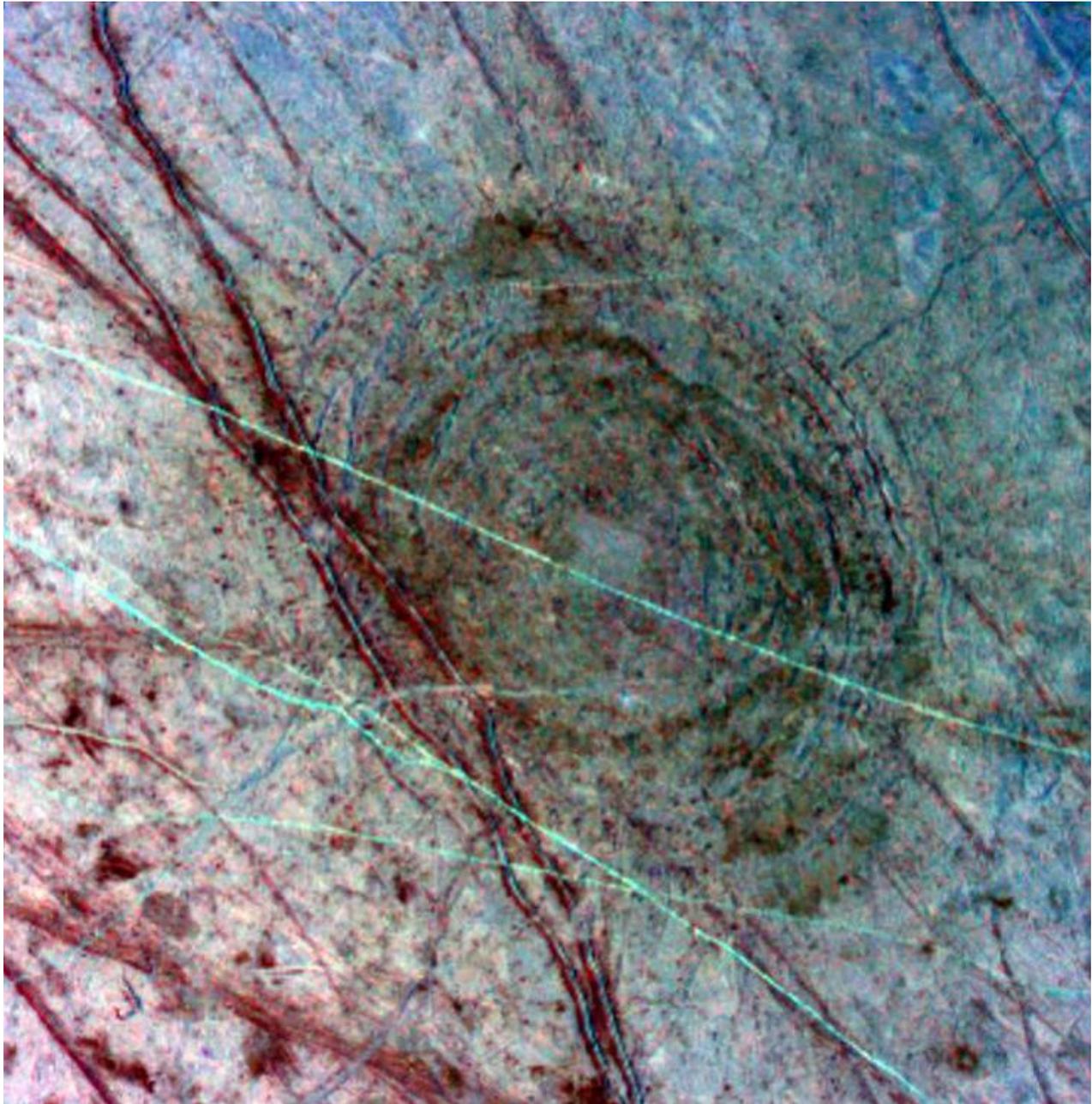
Credit: NASA/JPL/University of Arizona



Saturn's largest moon, Titan

Titan's oceans are not
made out of water,
but of liquid methane!

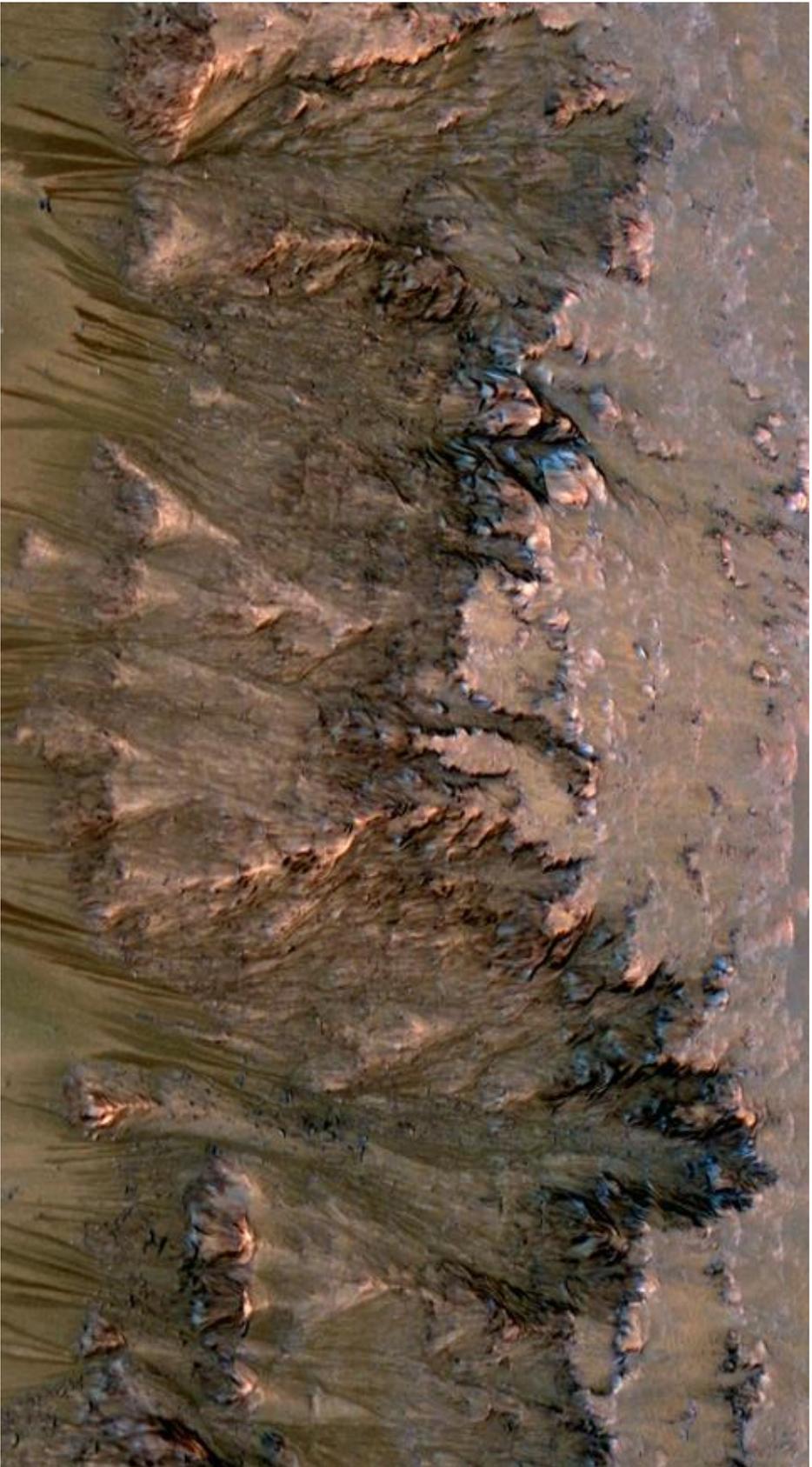
Credit: NASA/JPL-Caltech/USGS



Europa, moon of Jupiter

This is an impact feature called Tyre Macula on Europa's icy surface.

Credit: NASA/JPL/University of Arizona



Mars

Might there be seasonal water flowing on Mars today? These features that extend down the slope during warm seasons are called recurring slope lineae. They appear and grow on steep slopes during warm seasons and fade in cold seasons.

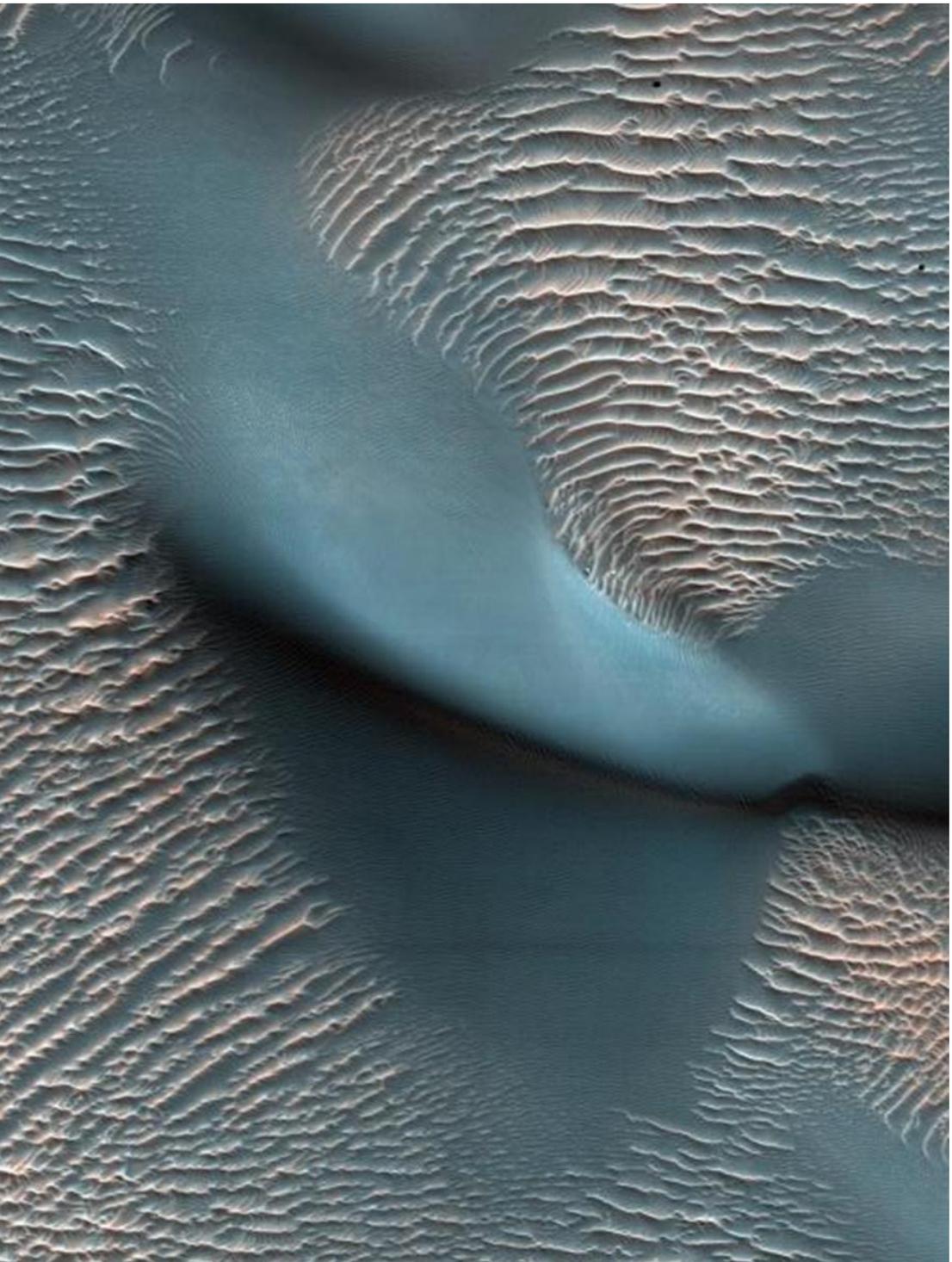
Credit: NASA/JPL-Caltech/University of Arizona



Gullies on Mars

These gully landforms are found in many craters in the mid-latitudes of Mars. Current gully activity appears to take place in winter and early spring, and may be caused by the seasonal carbon dioxide frost that is visible in gully alcoves in the winter.

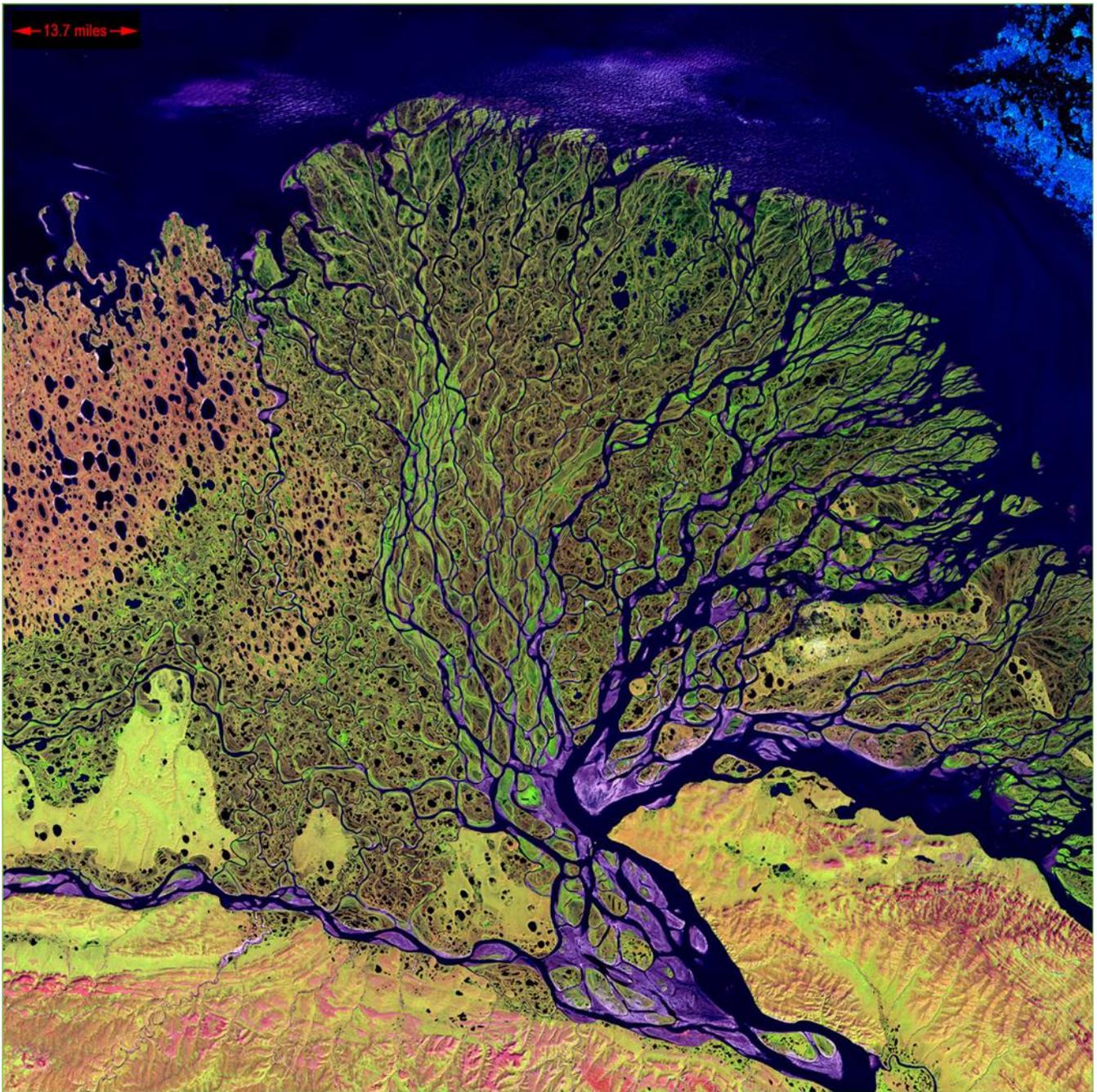
Credit: NASA/JPL-Caltech/University of Arizona



Sand Dunes on Mars

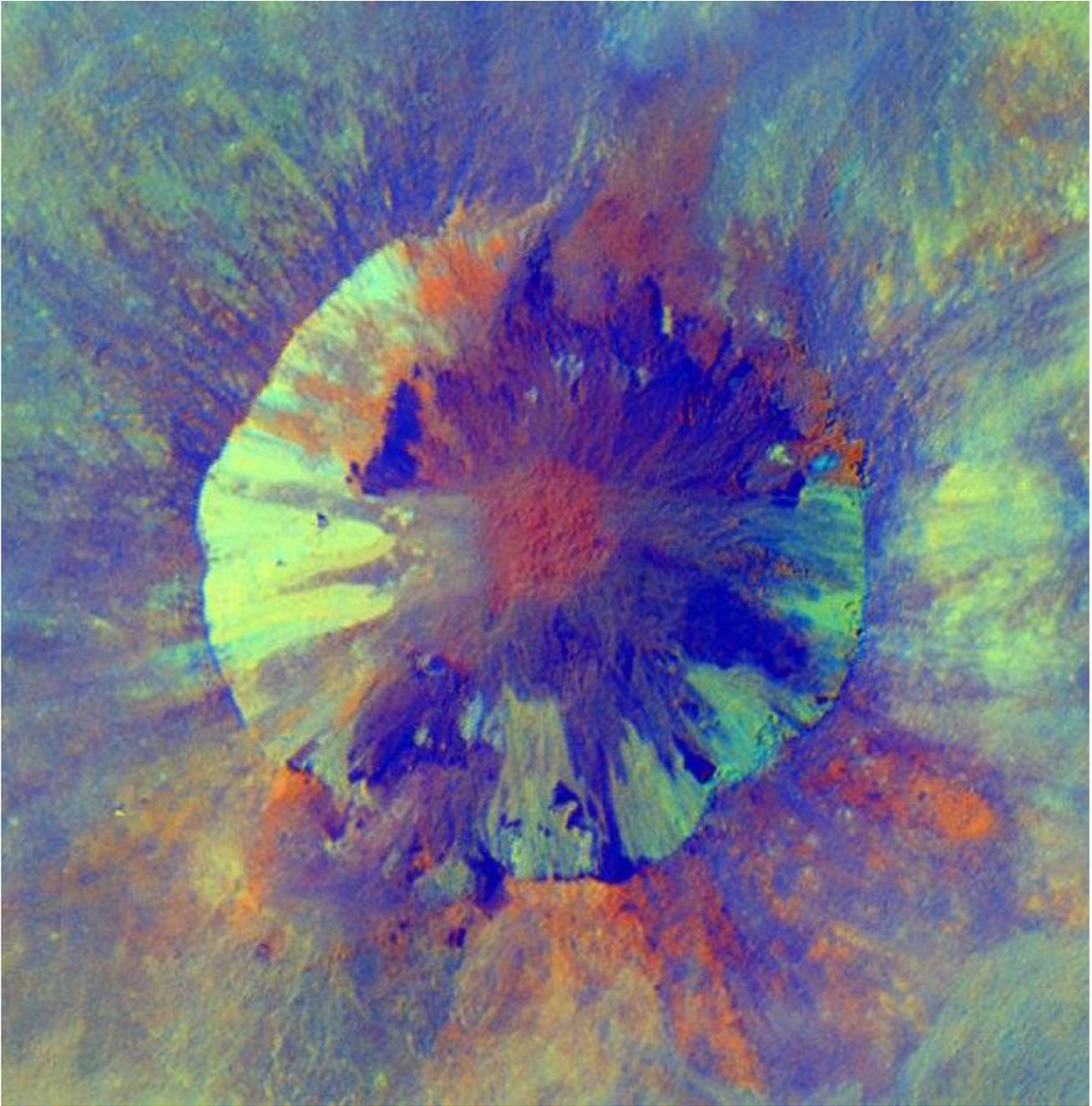
These bright, small ridges are ripples, composed of fine sand coated with coarser sand and granules.

Credit: NASA/JPL-Caltech/University of Arizona



Lena River Delta, Russia

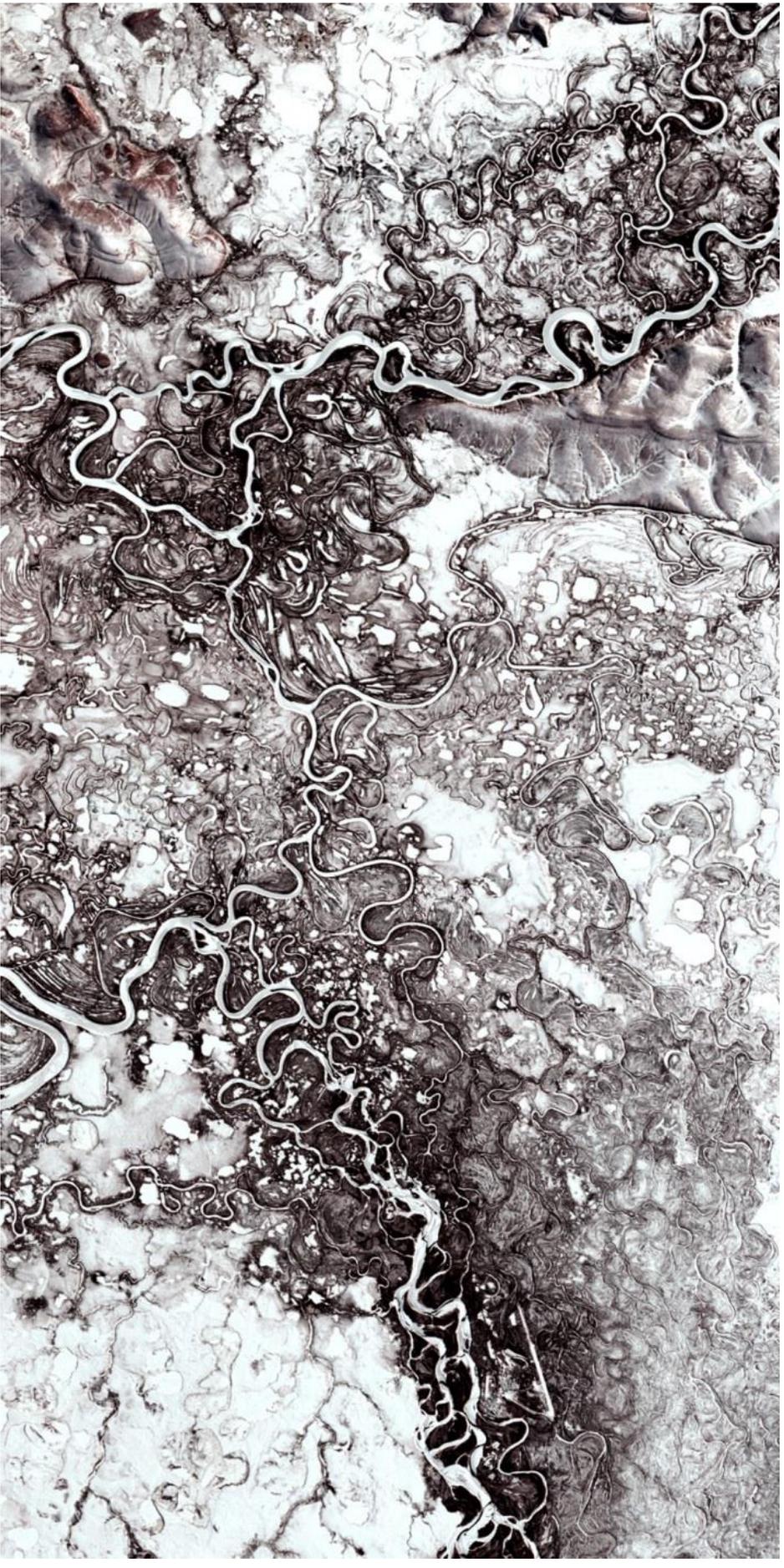
Credit: NASA Earth Observatory



Giant Asteroid Vesta

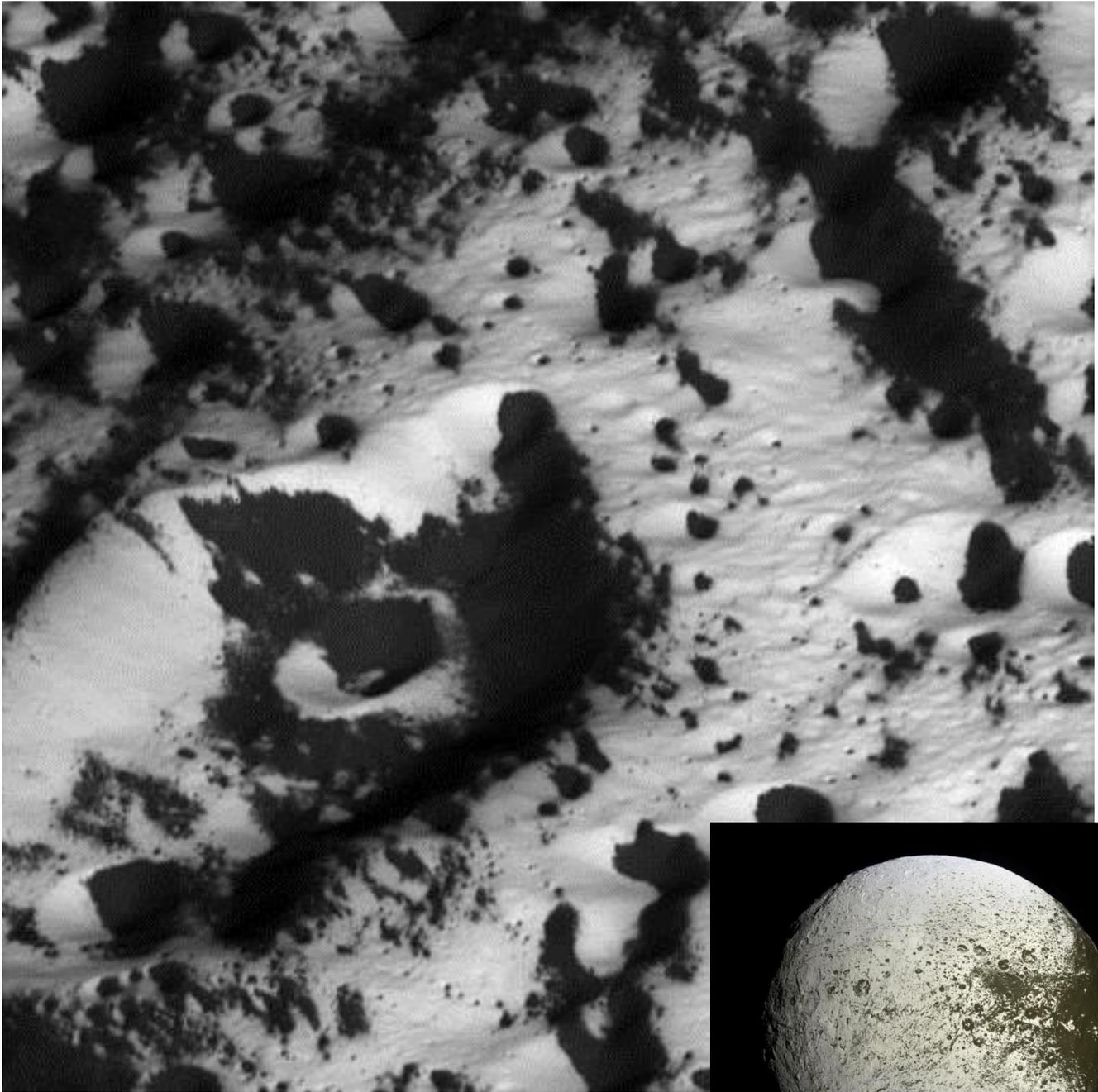
This enhanced-color view from NASA's Dawn mission shows an unusual "pitted terrain" on the floor of Cornelia crater.

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA



Mayn River, Siberia, Earth

Credit: NASA/Landsat7



Light and Dark on Iapetus, Moon of Saturn

The most dramatic value extremes observed so far in the solar system are on Iapetus.

Credit: NASA/JPL/Space Science Institute



Crater Chains on Mercury

Taken by NASA's MESSENGER mission, what do you think happened here?

Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington



Earth's Moon

The colors added to this lunar image reveal the surface soil composition. Red areas generally correspond to the lunar highlands, while blue to orange shades indicate the ancient volcanic lava flow of a lunar sea. Blue areas contain more titanium. Small purple areas found near the center are deposits from volcanic eruptions.

Credit: NASA/JPL-Caltech