



# 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.)**

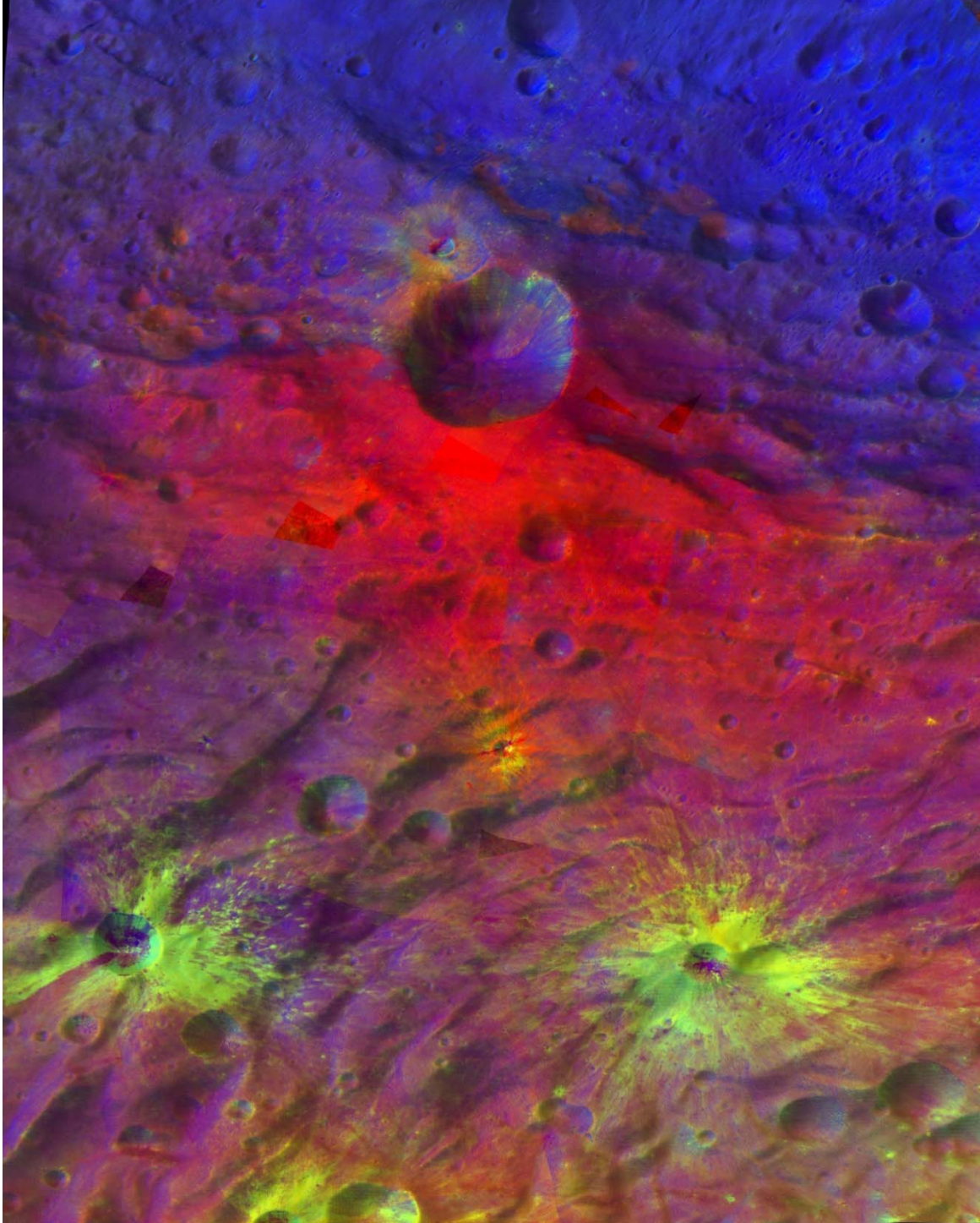


## **The Color of the Moon**

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.

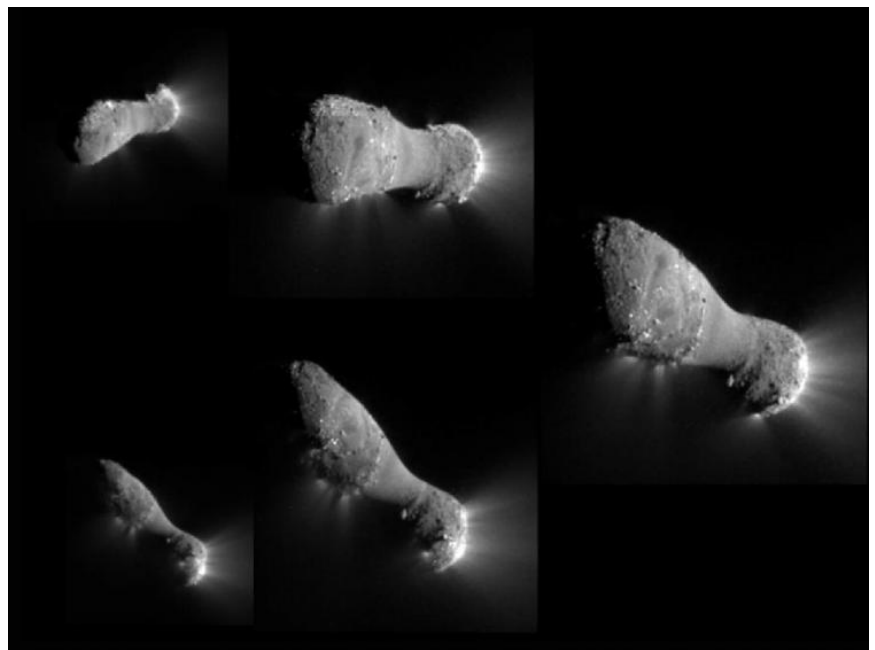
*Credit: NASA/JPL-Caltech/UCLA/MS/IDA*



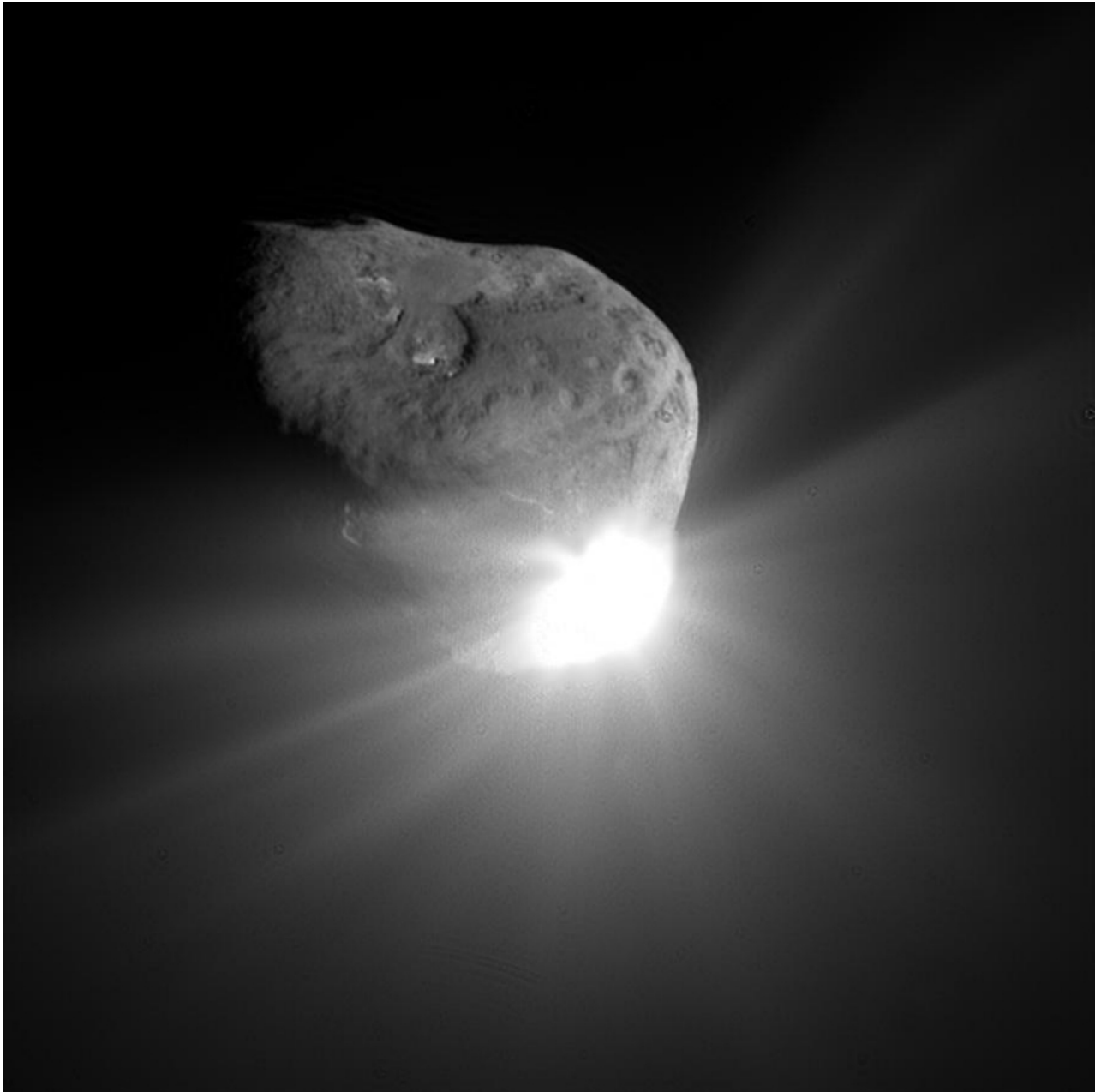
## Comet Hartley

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

*Credit: NASA/JPL-Caltech/UMD*



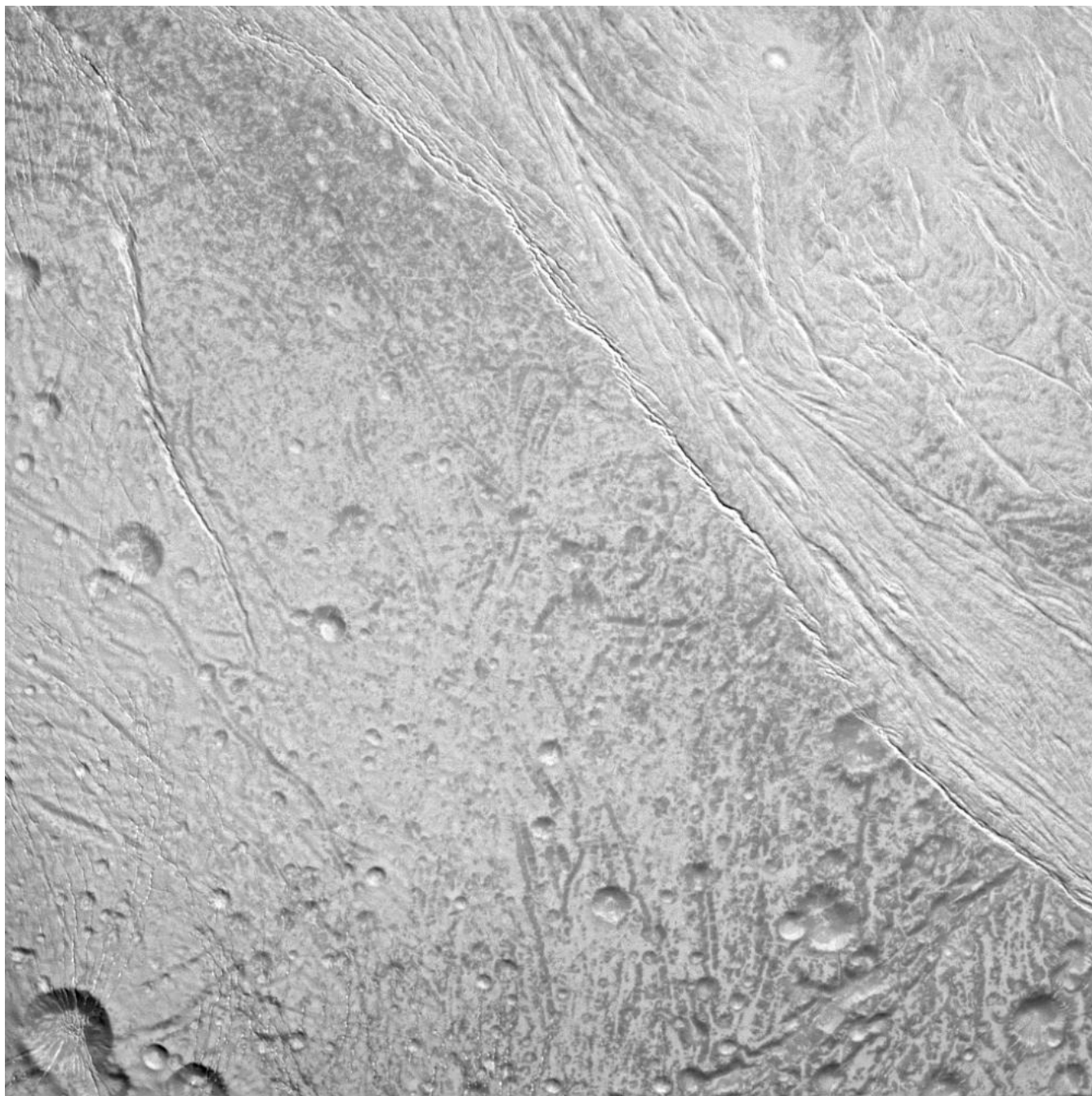




## **Comet Tempel 1**

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

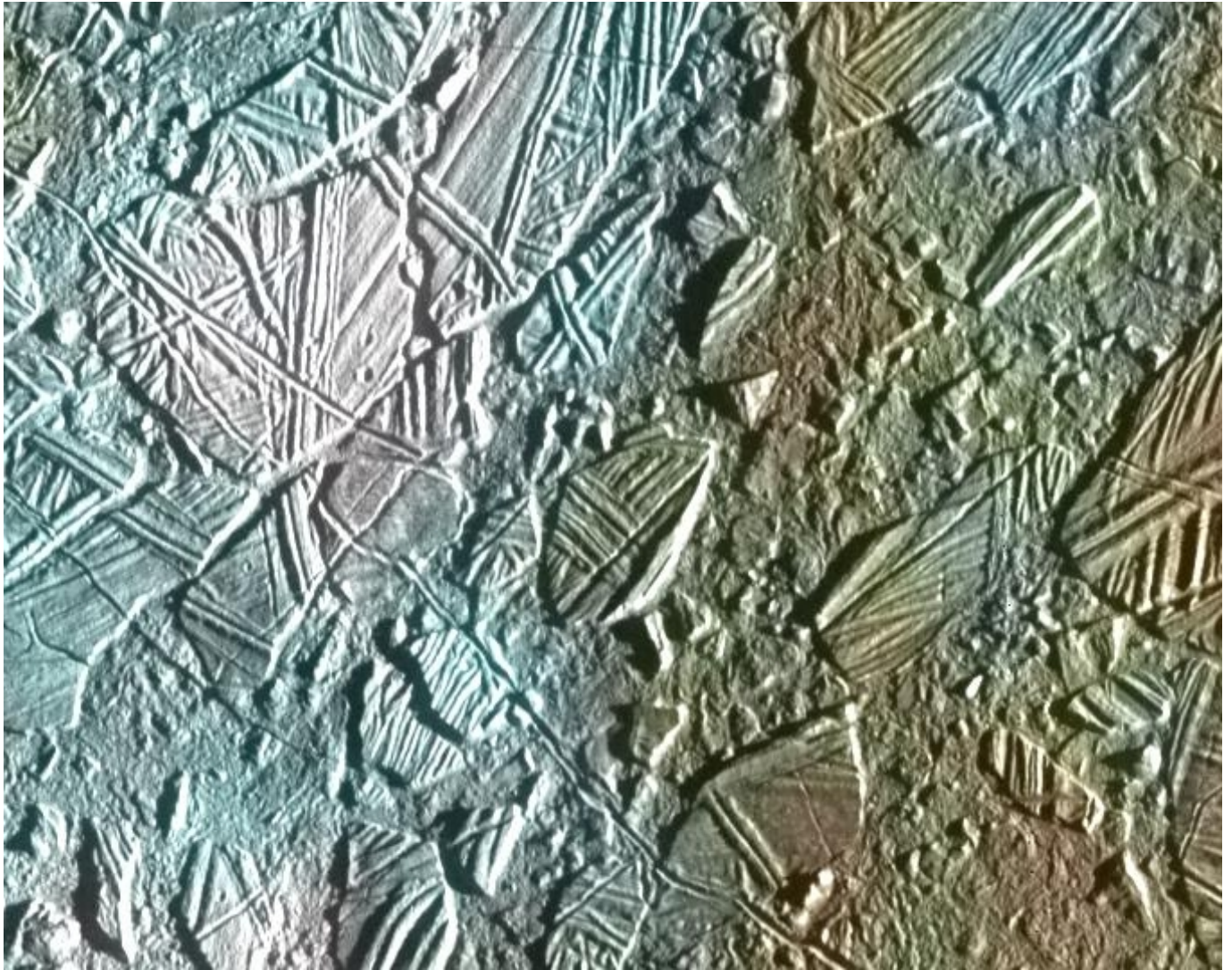
*Credit: NASA/JPL-Caltech/UMD*



## **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*

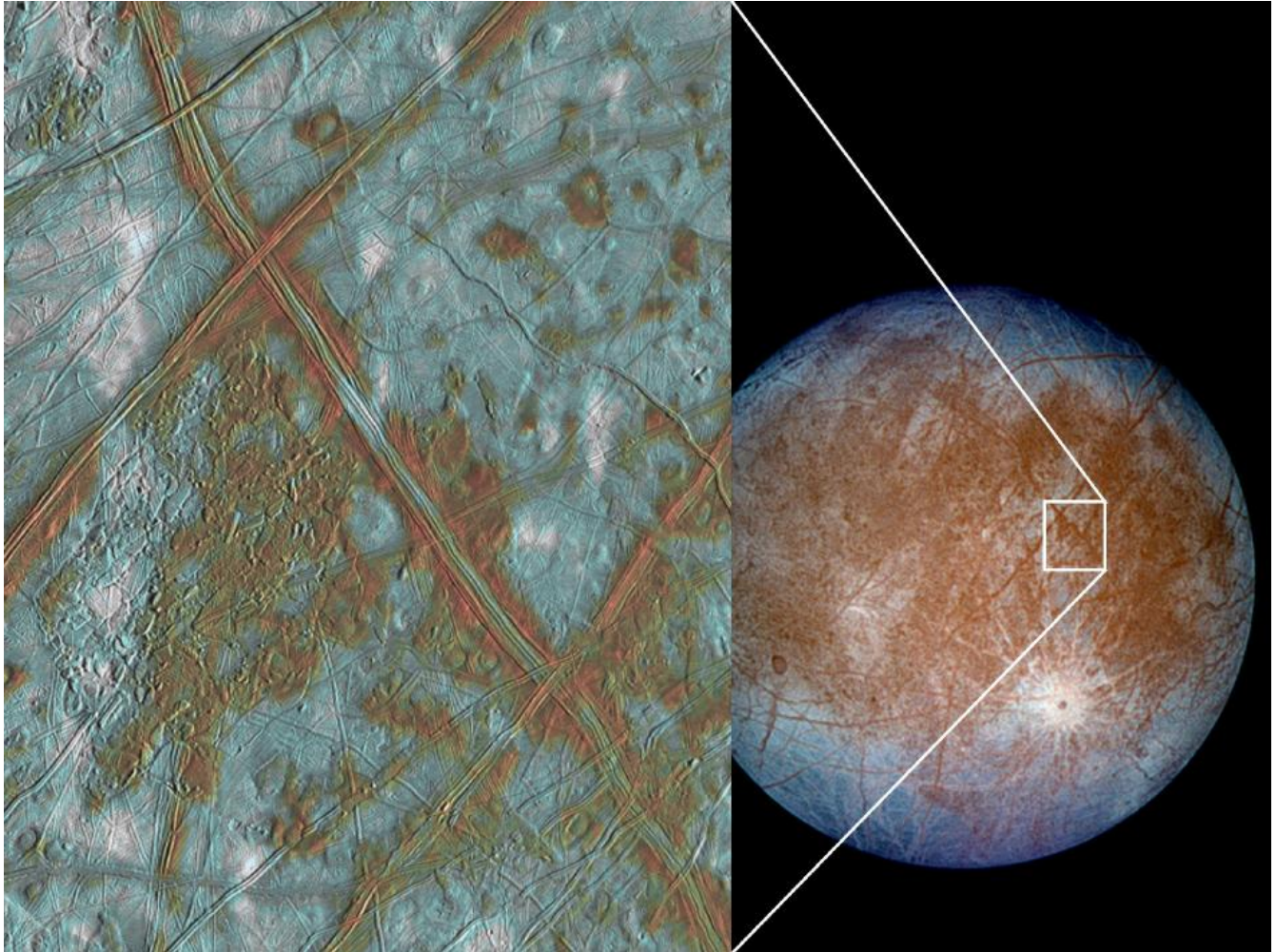


## **Jupiter's Moon Europa: Chaos**

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*



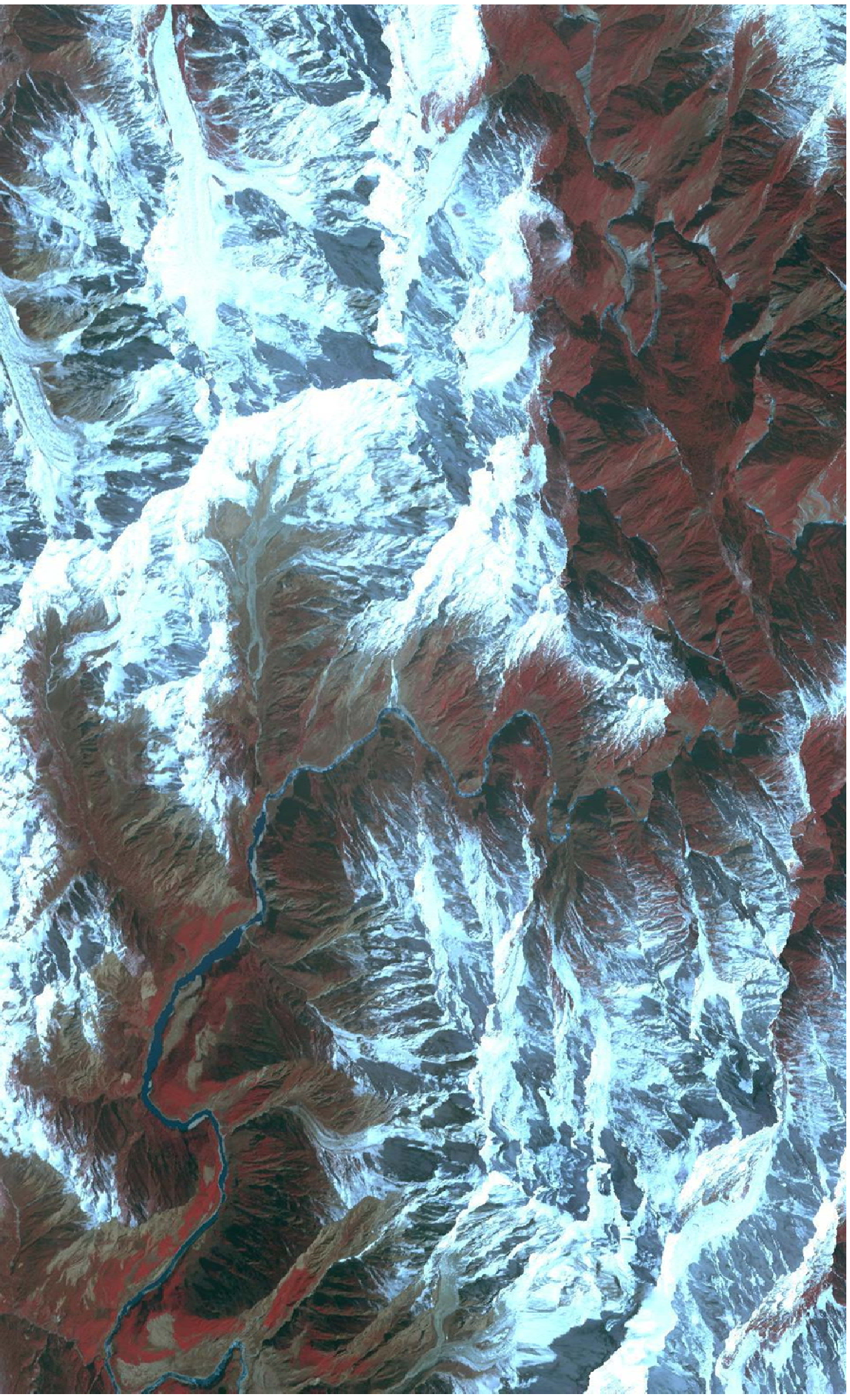


## **Jupiter's Moon, Europa**

Faults in the moon's icy surface.

*Credit: NASA/JPL-Caltech*



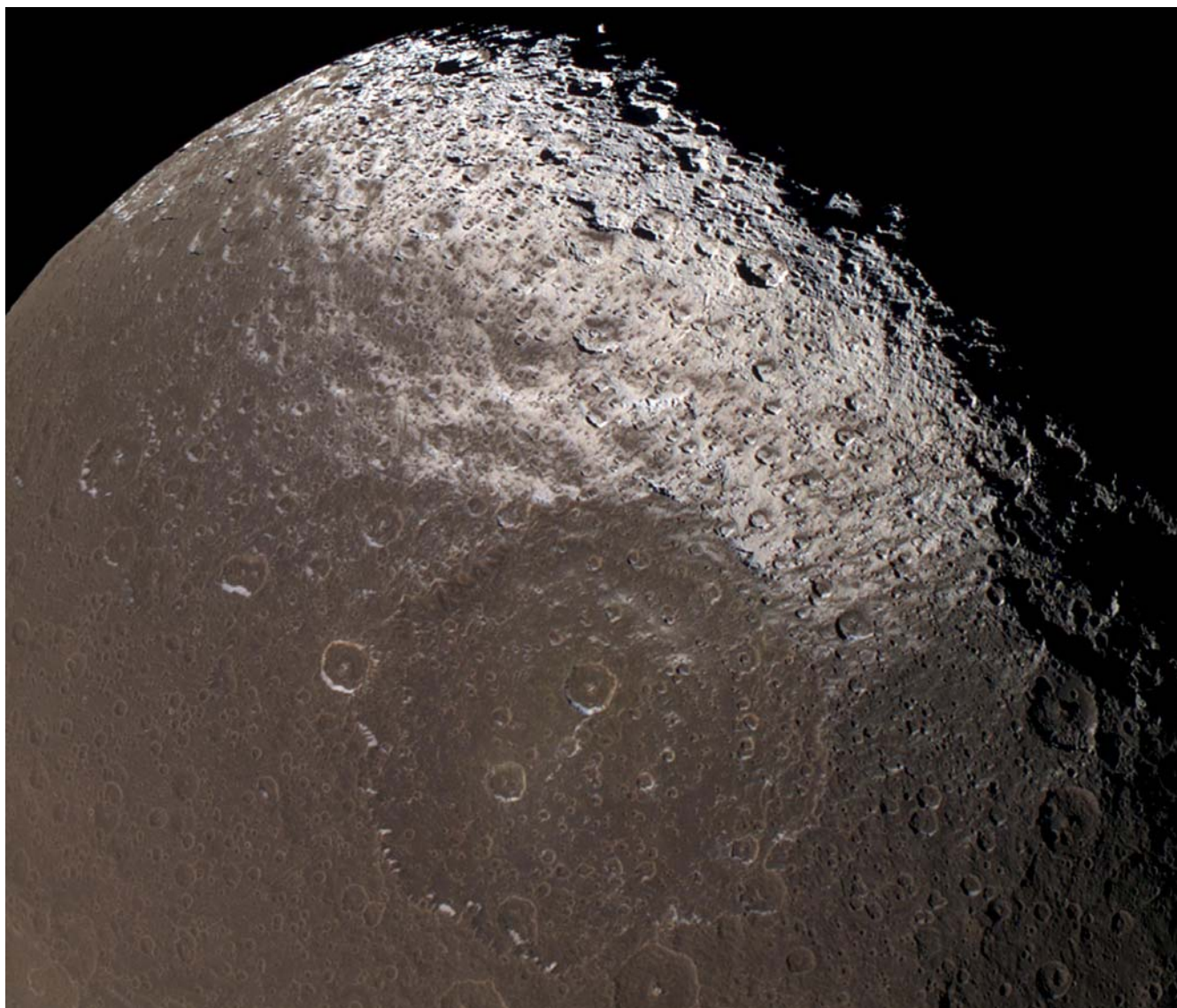


## **Yarlung Zangpo Grand Canyon, Tibet**

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*

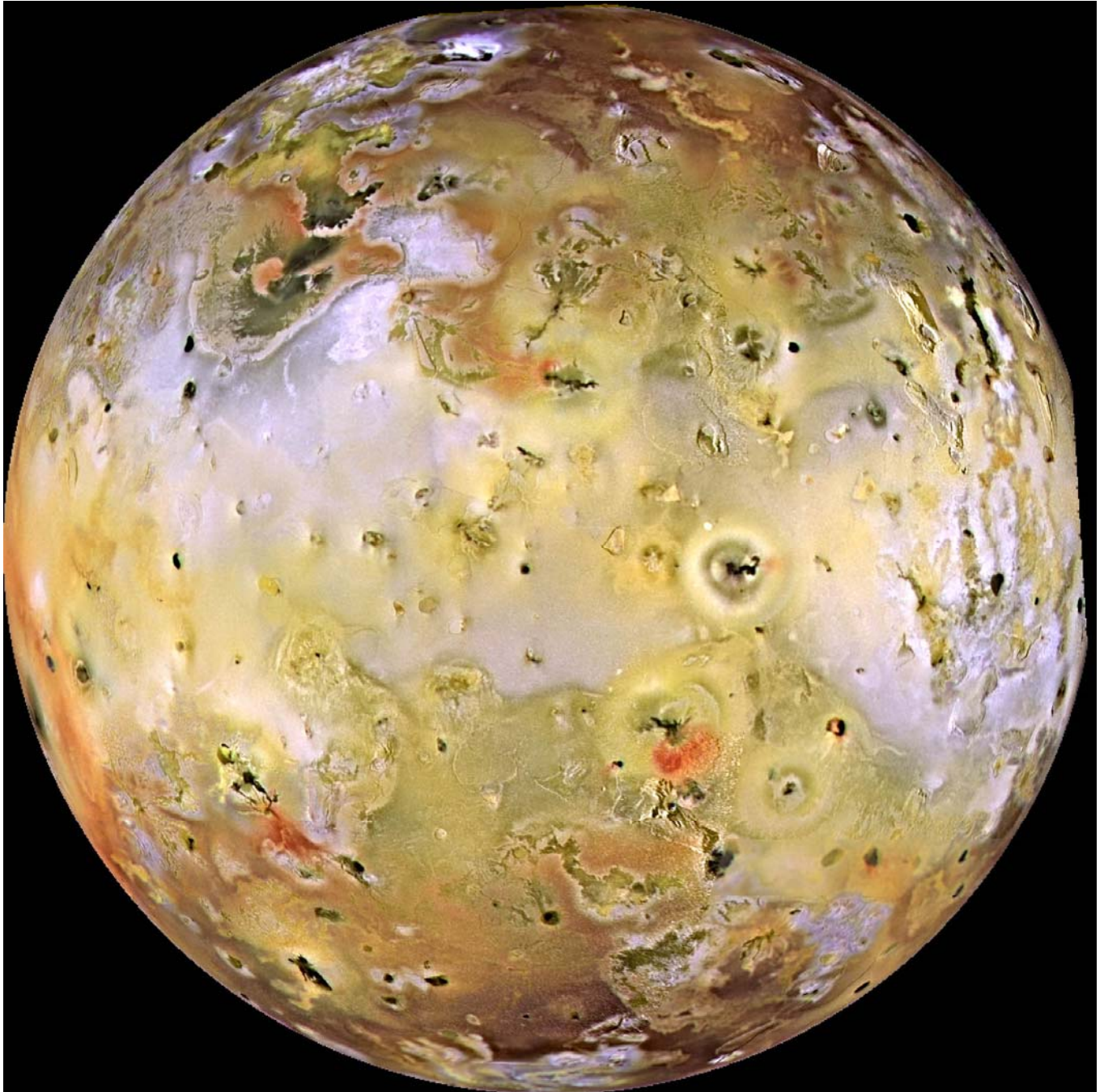




## **Jupiter's moon, Io**

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*

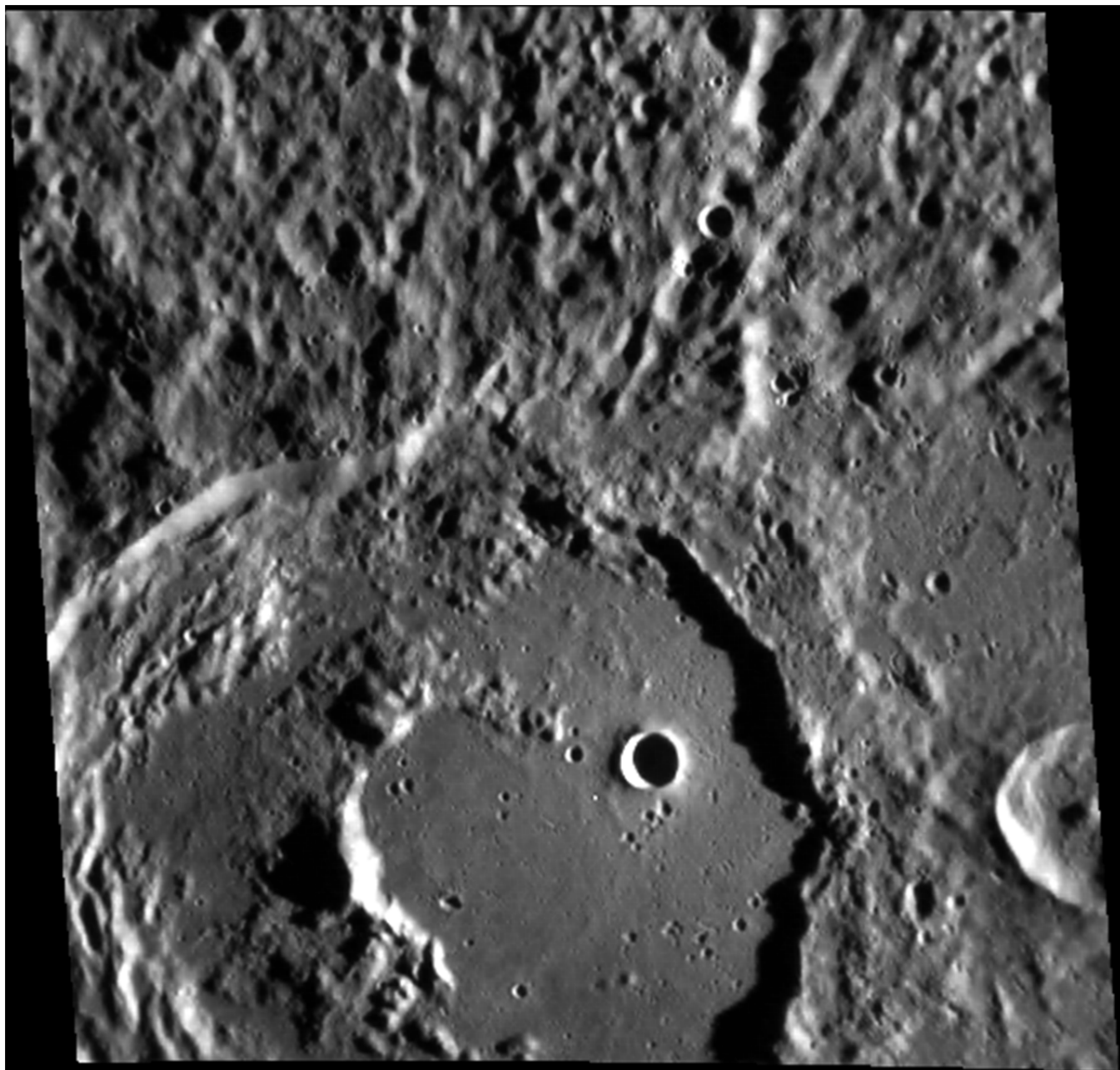


## **Jupiter's Moon, Io**

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*



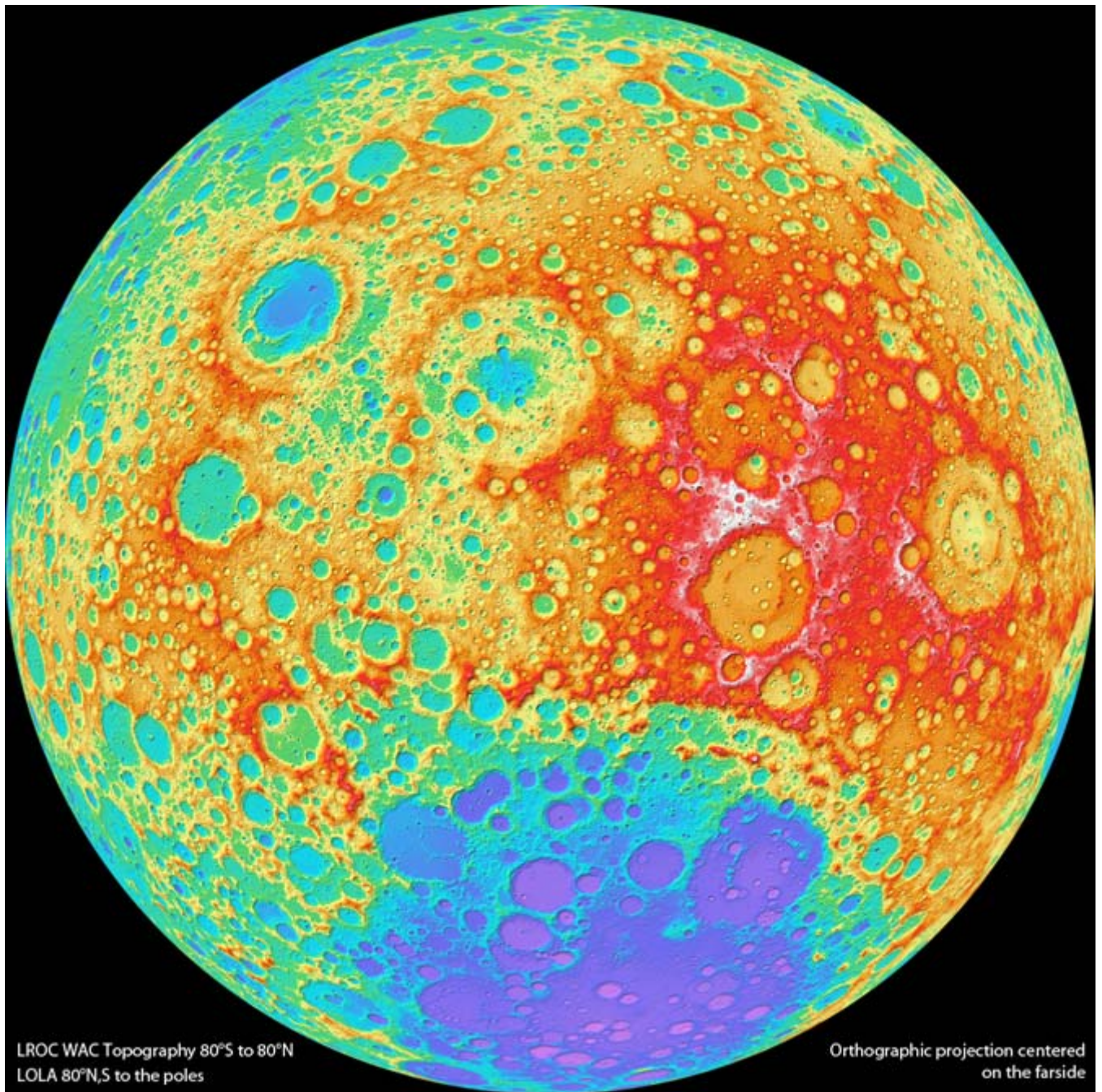


## **Mercury's vast crater, Kalidasa**

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*



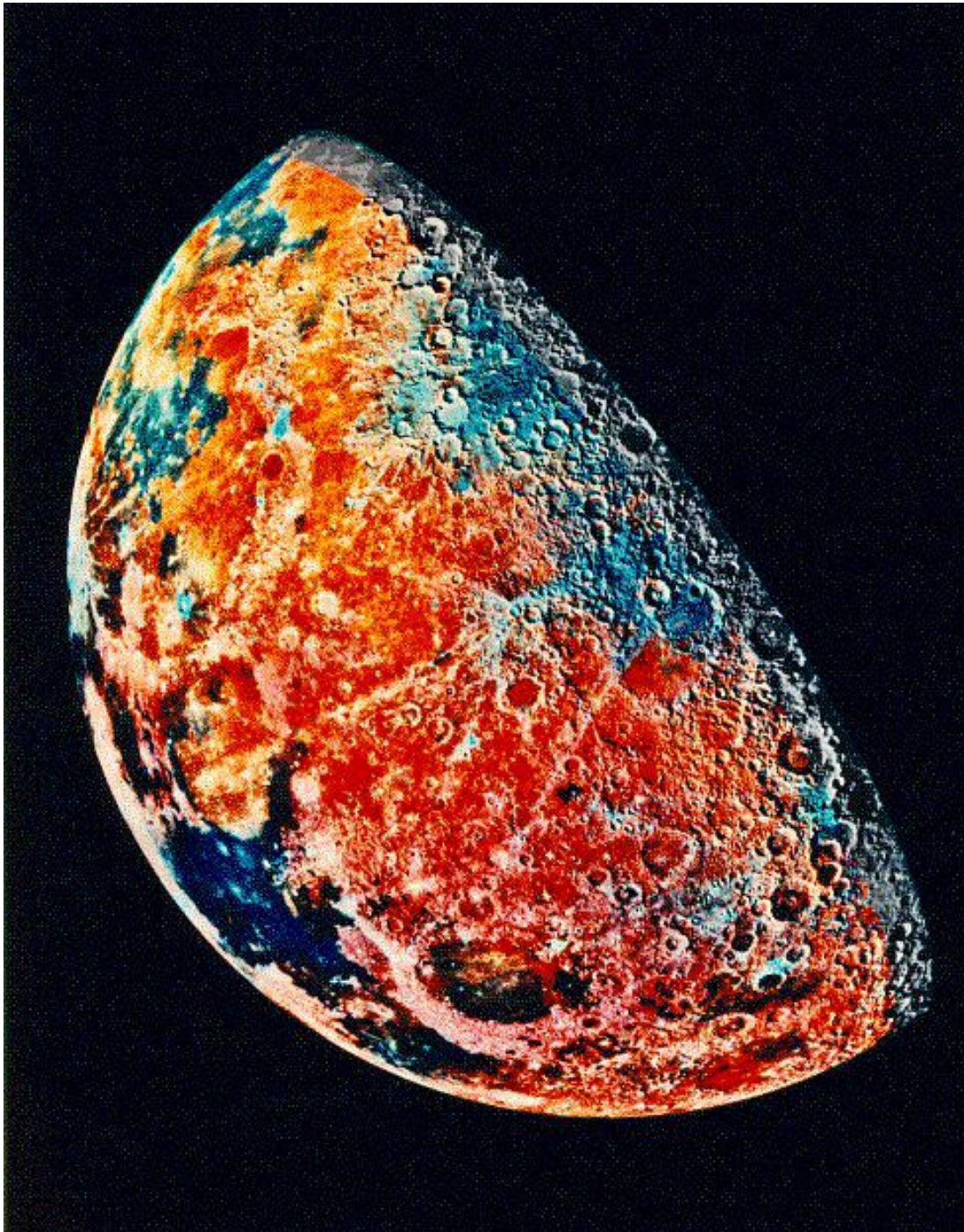


## Far Side of the Moon

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*

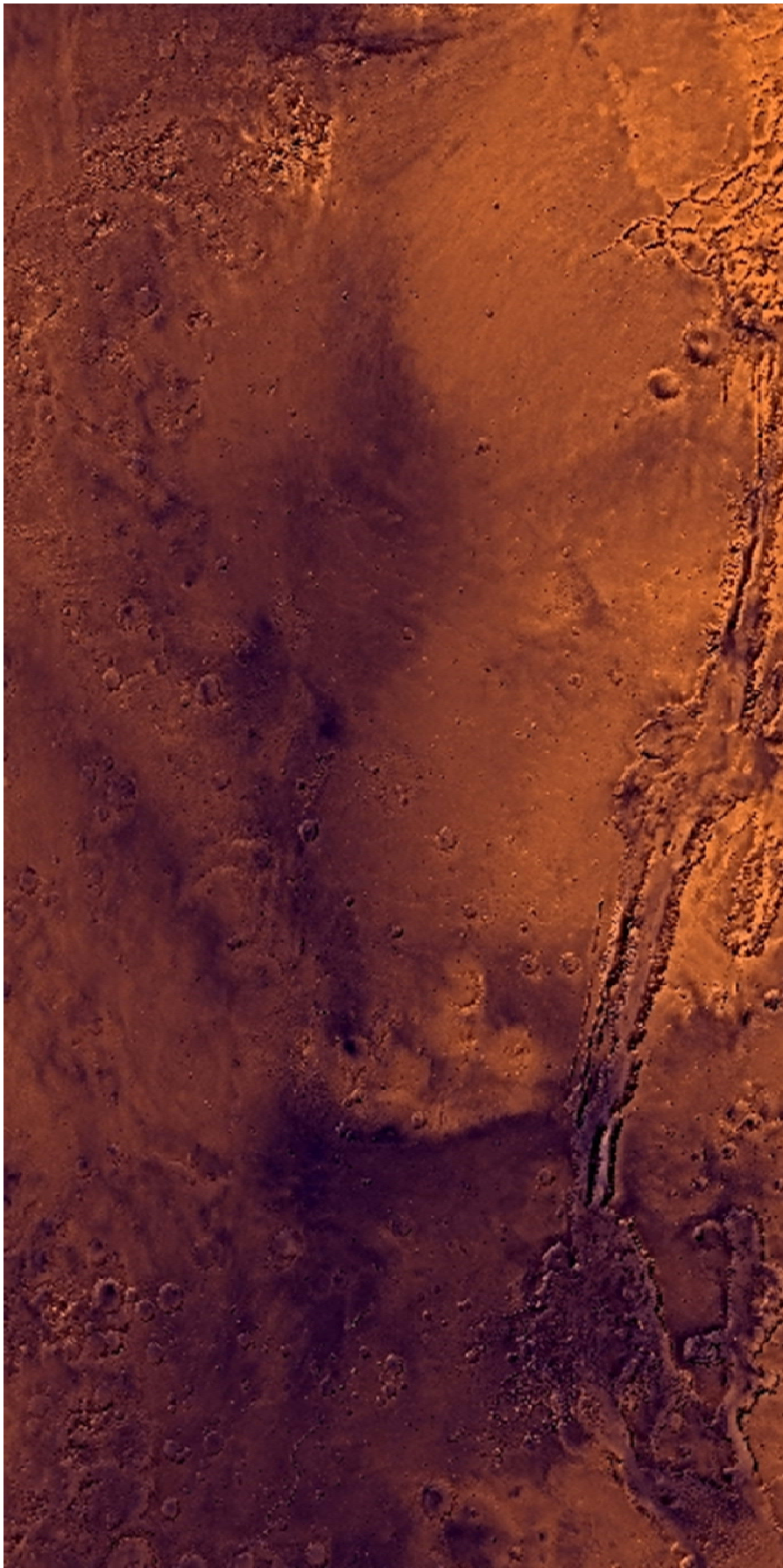


## **Mars**

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. This image was captured by Viking spacecraft using a combination of filters.

*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)*



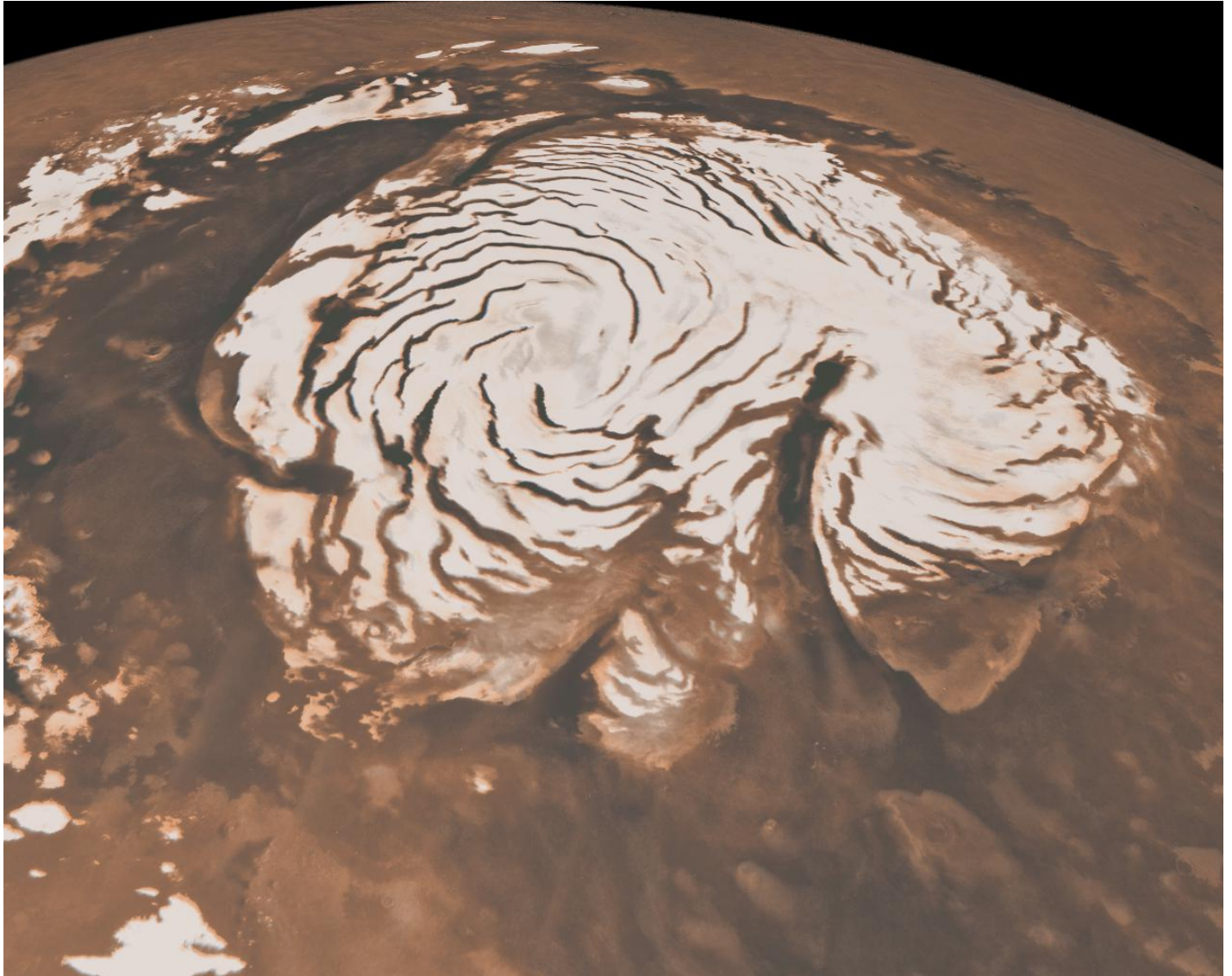


## **Mars' Moon, Phobos**

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

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

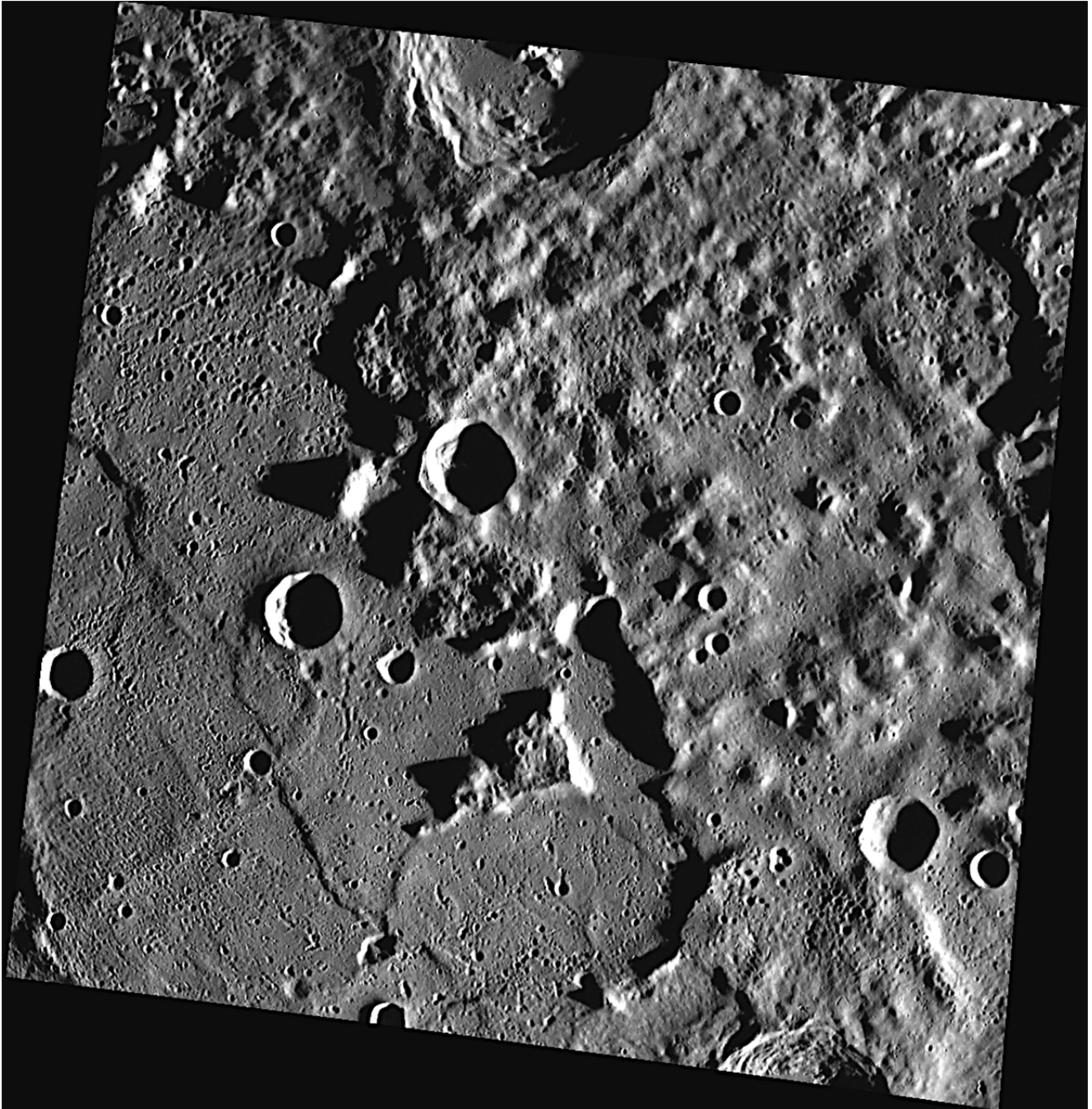




## **Mars' North Pole**

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*

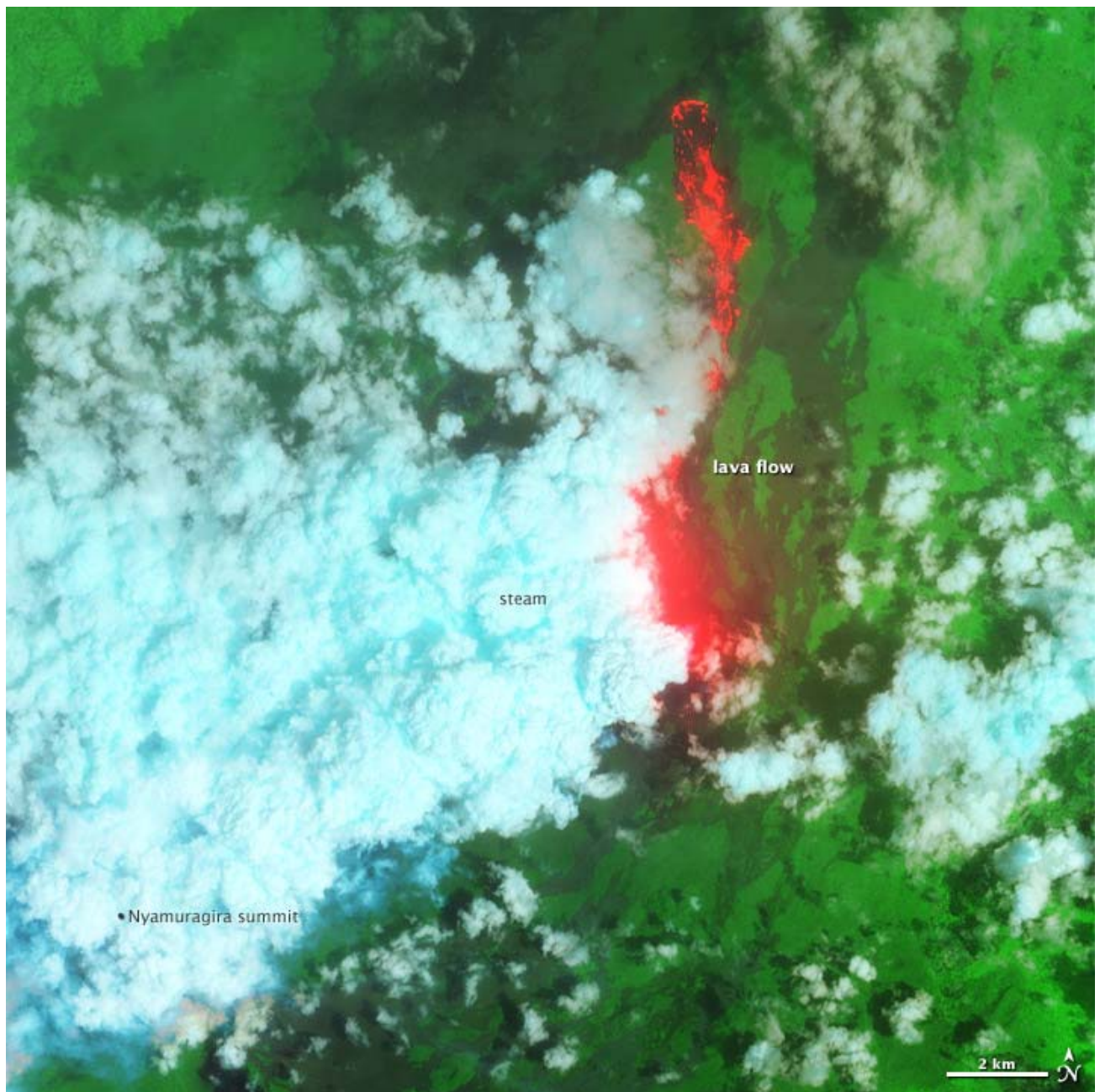


## **Mercury Crater Trails**

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*

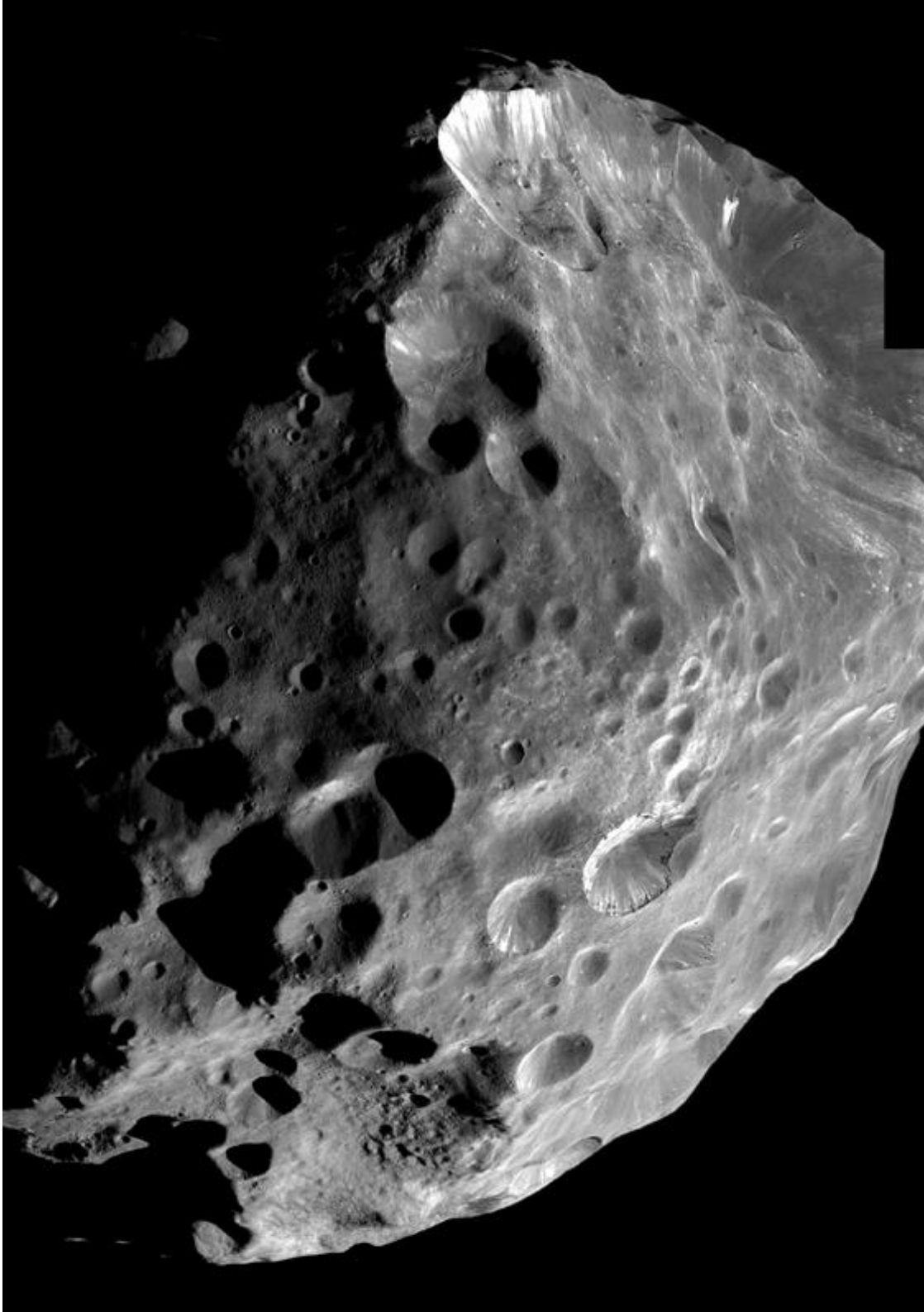




## Nyamuragira Eruption, Africa

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*



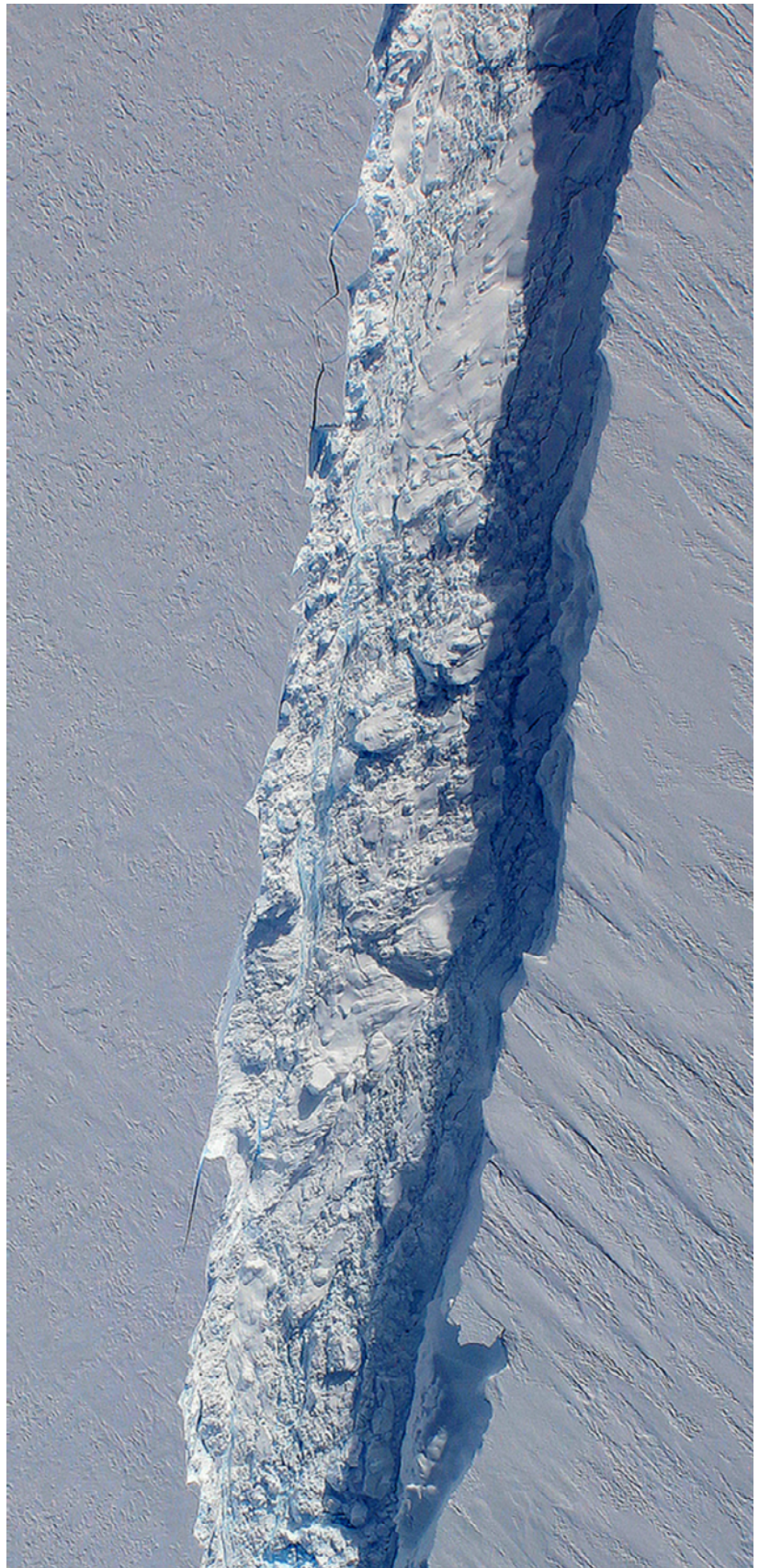
## **Pine Island Glacier:**

huge ice stream flowing into  
Hudson Bay in northern  
Canada.

Astronomers and 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.

*This section of the 260 km  
glacier is about 80 m (260 ft)  
wide and 29 km (18 miles) long*

*Credit: NASA*

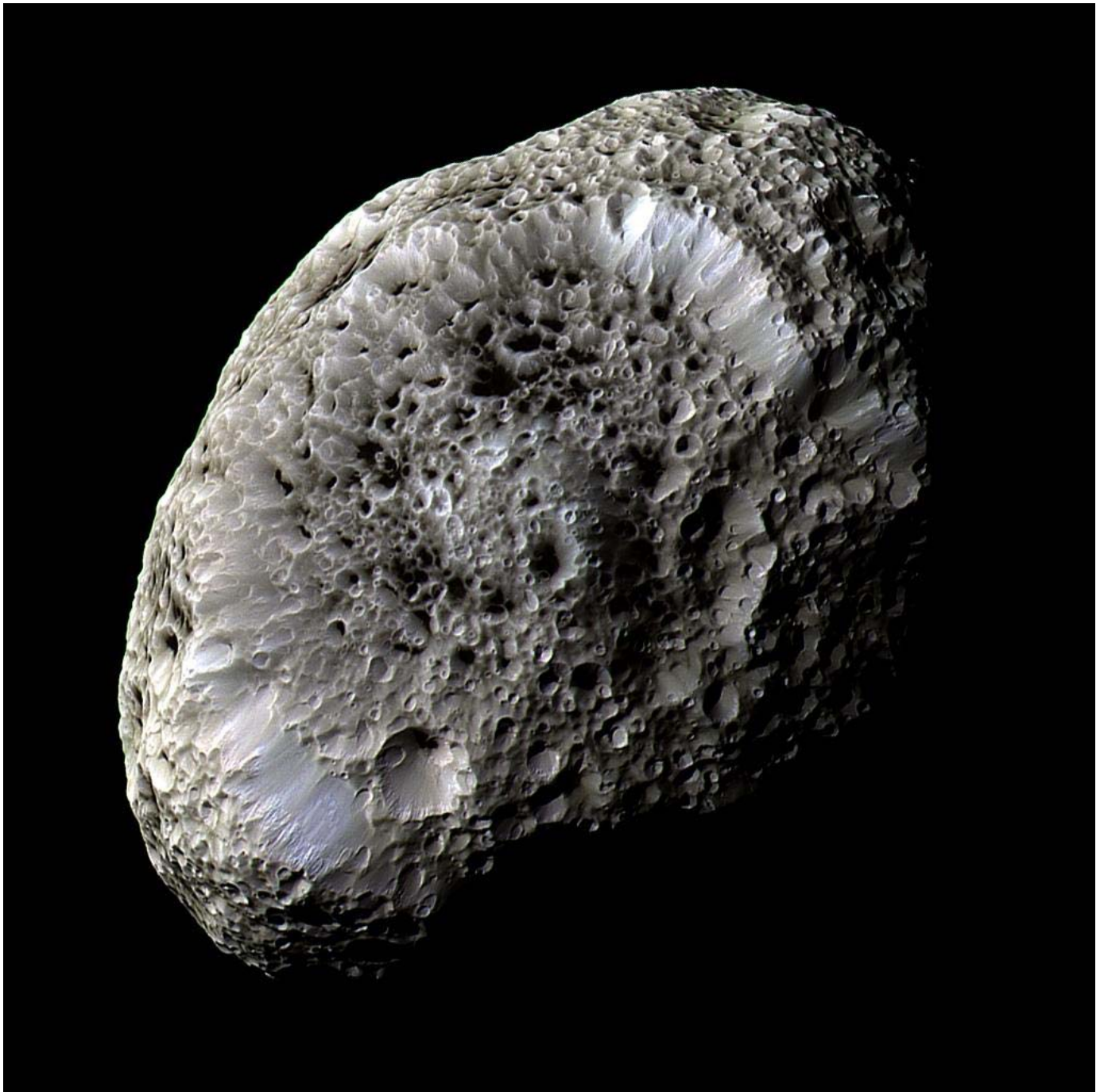




## Saturn's Odd Moon, Hyperion

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*



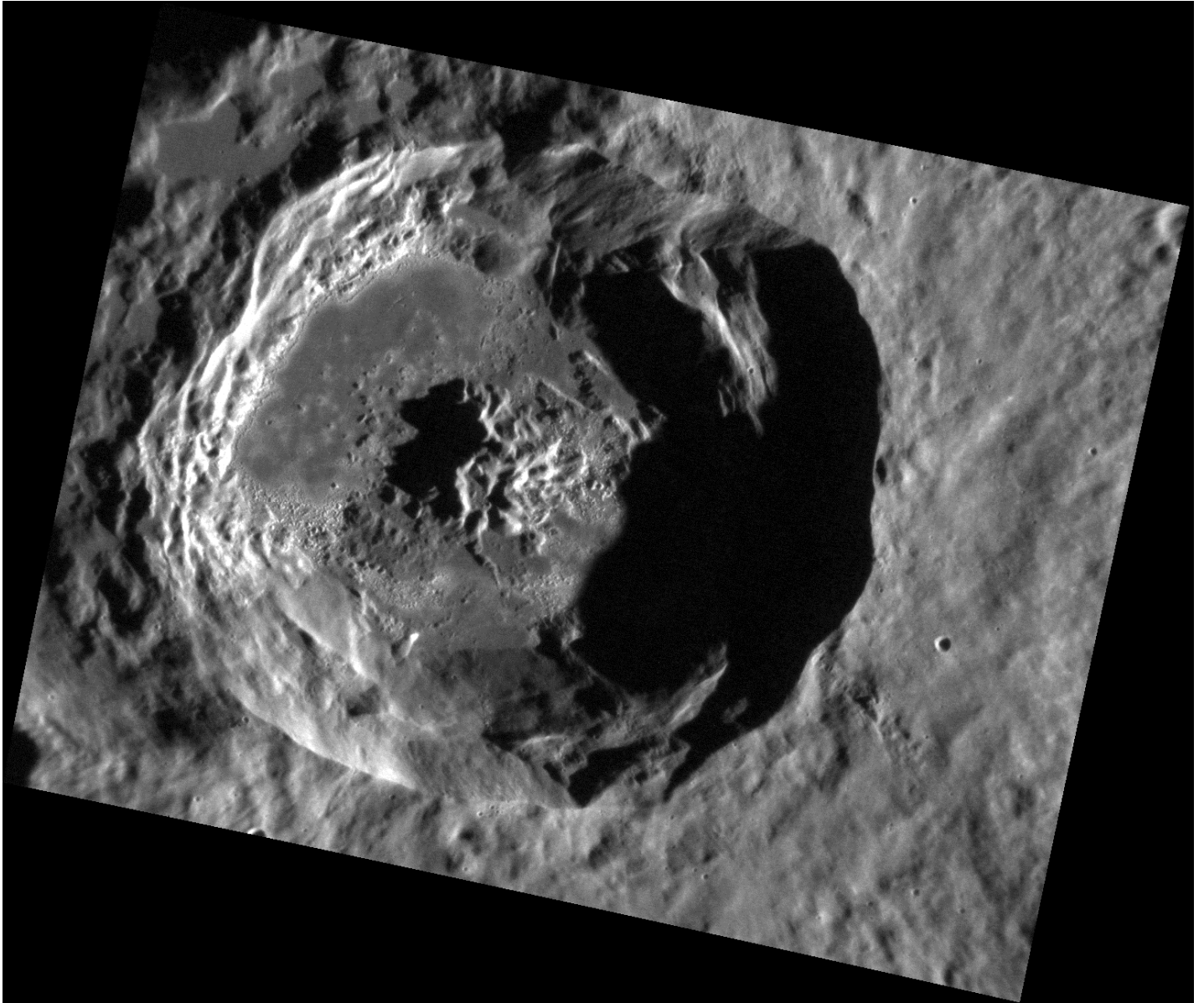


## **Storms over the Gulf of Mexico and the Atlantic, 11/22/11**

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*



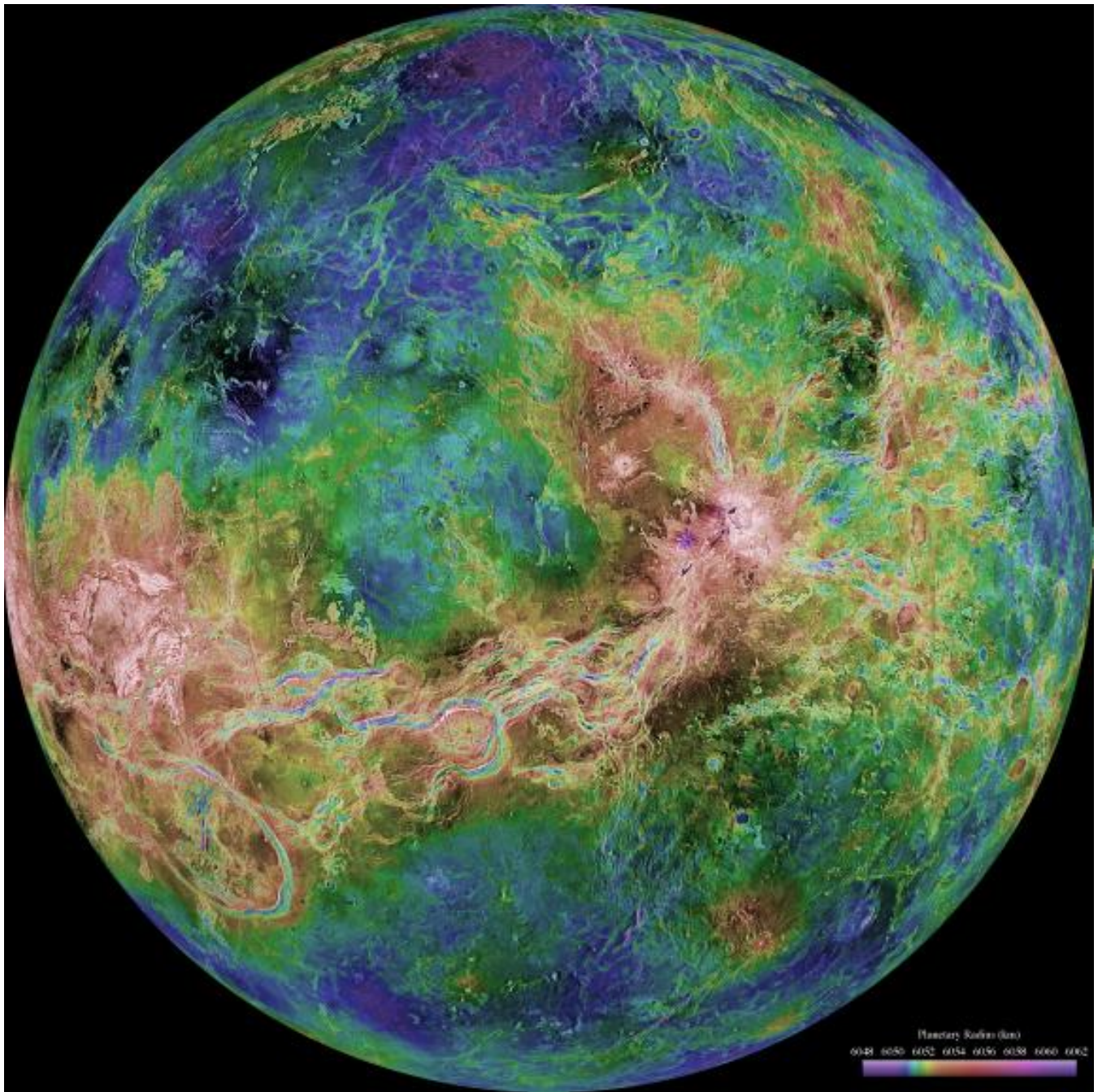


## **Mercury: Unnamed Hollows**

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*

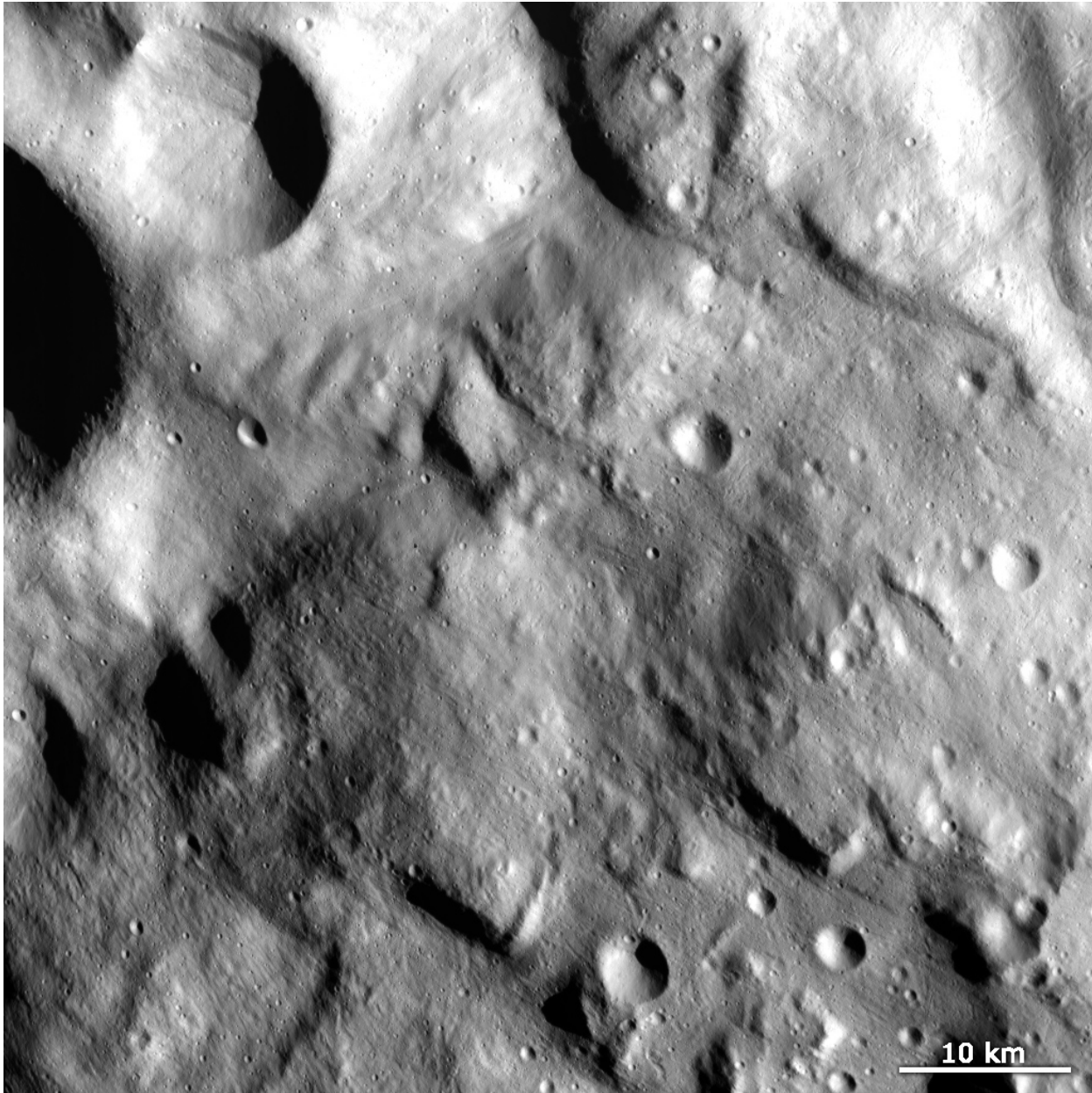




## Venus Colorized

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

*Credit: NASA/JPL-Caltech*

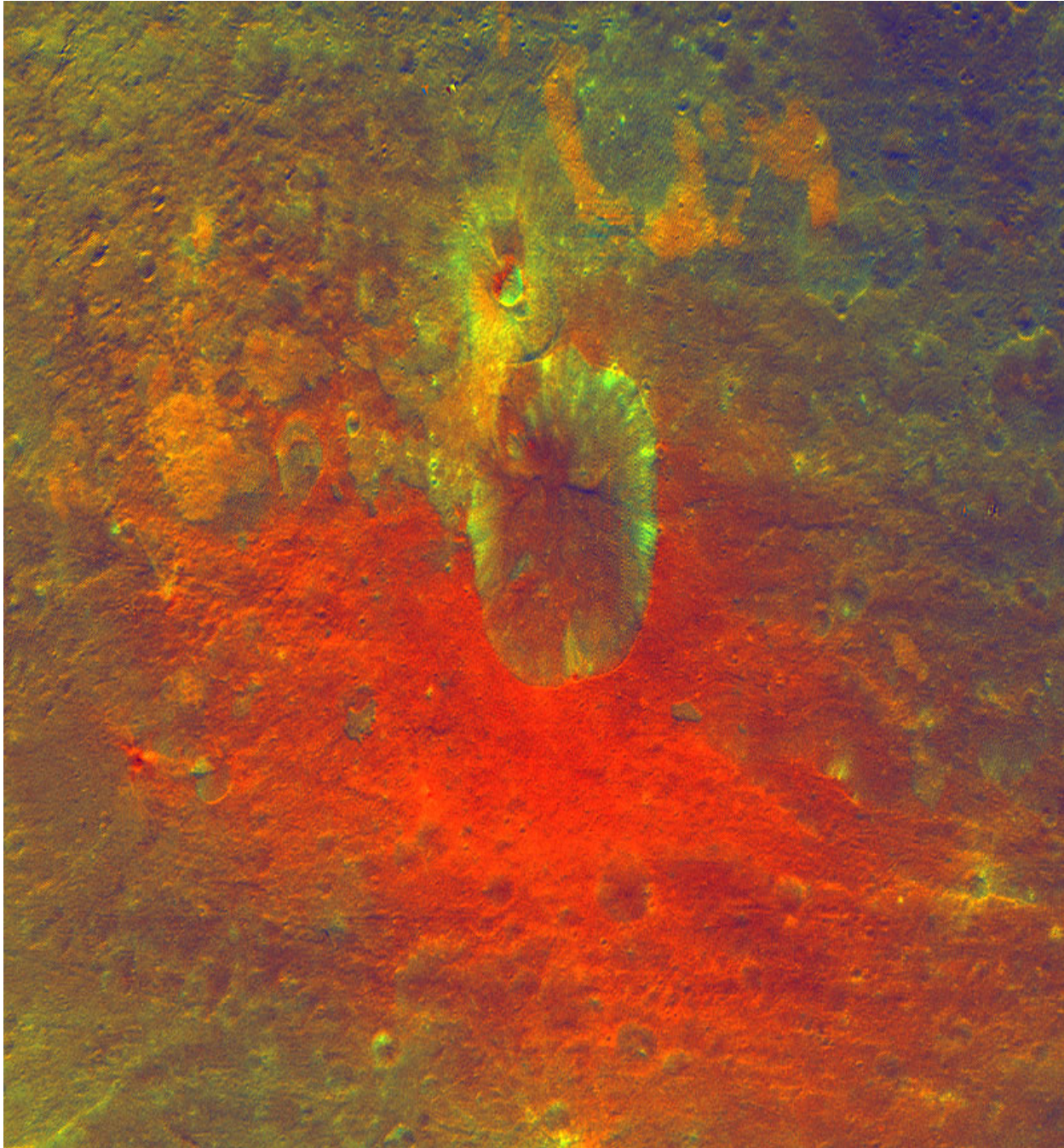


## **Vesta Close Up**

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

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



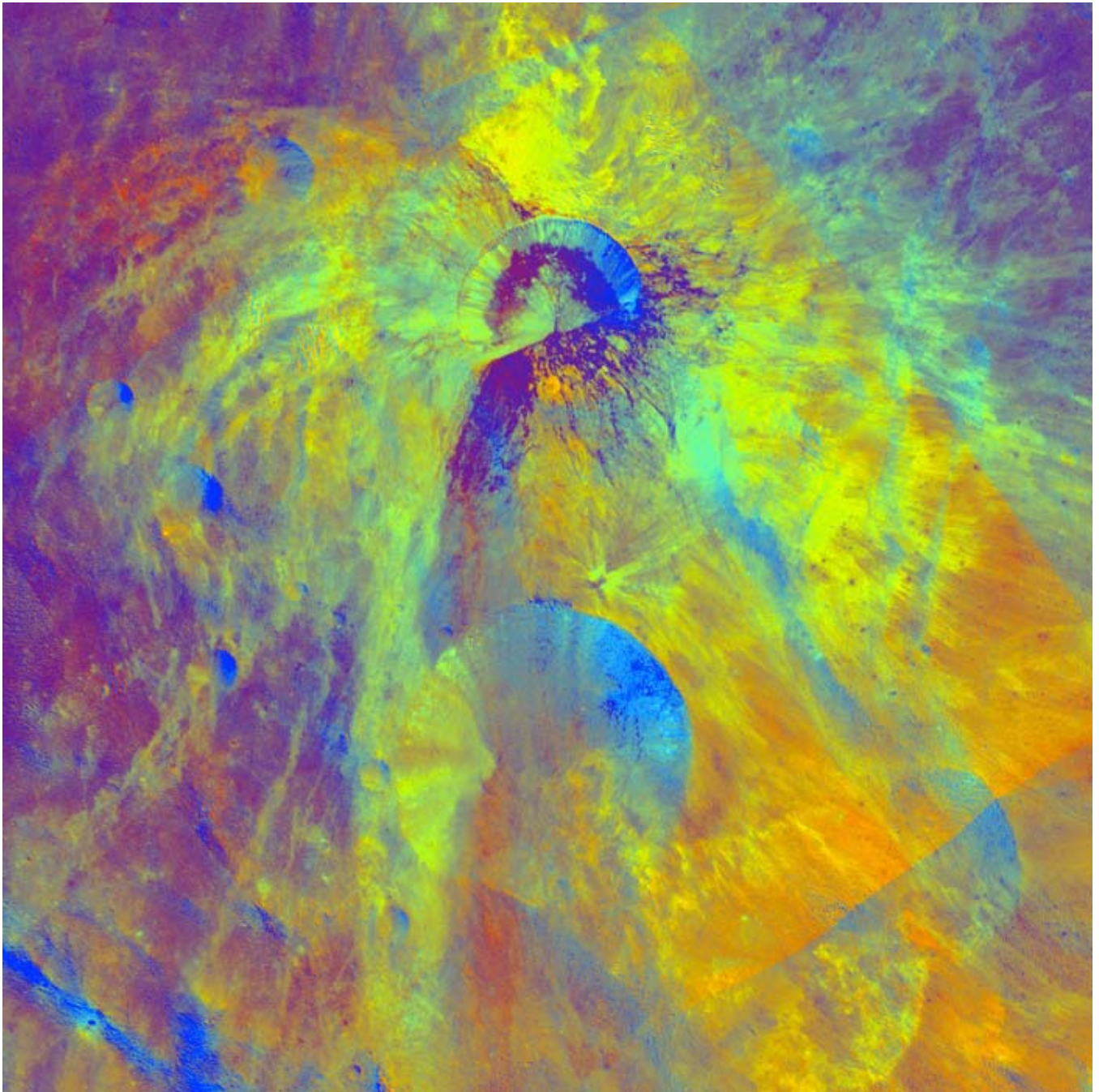


## **Vesta: False Color Crater**

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*



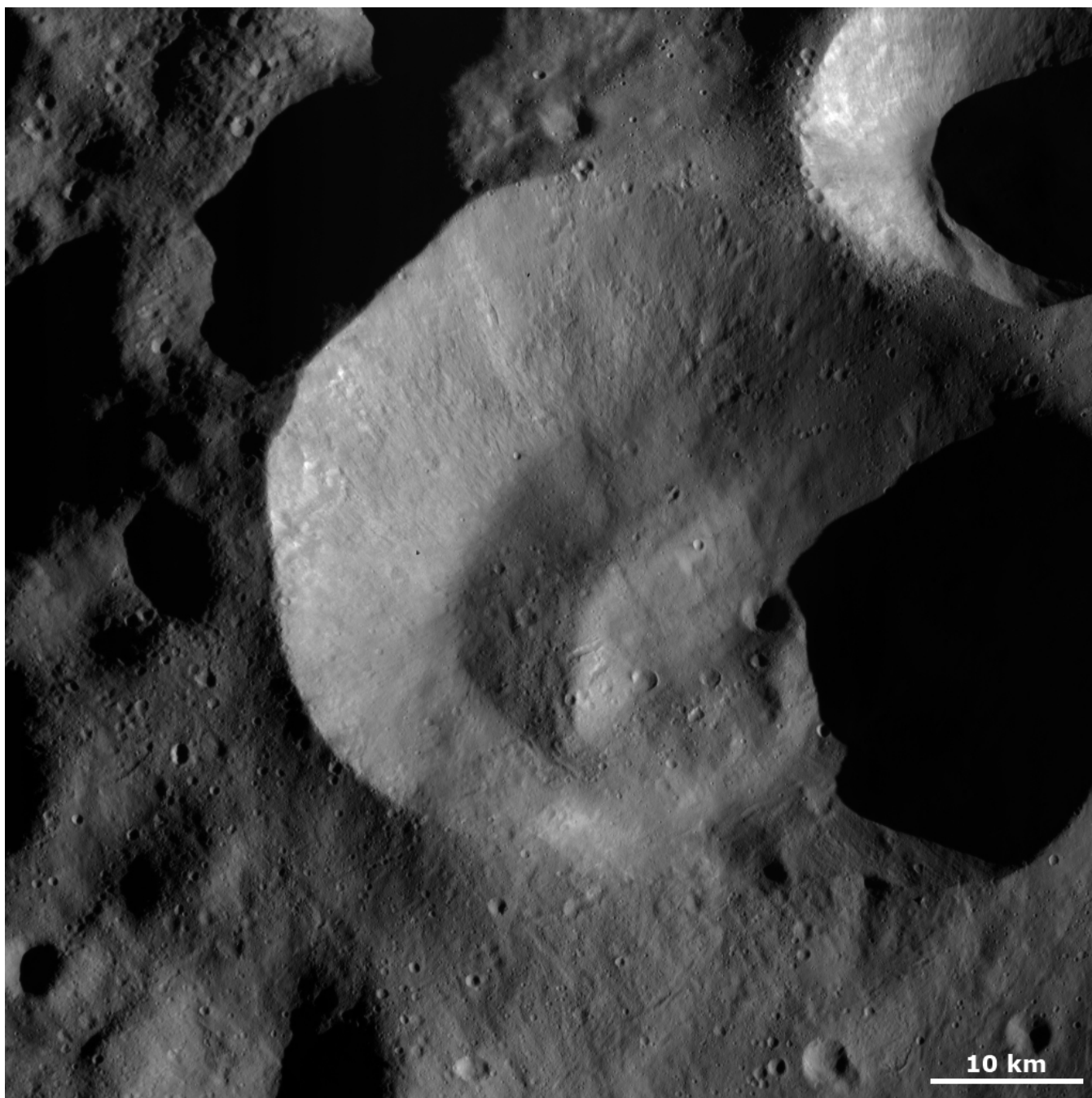


## **Antonia Crater on Vesta**

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.

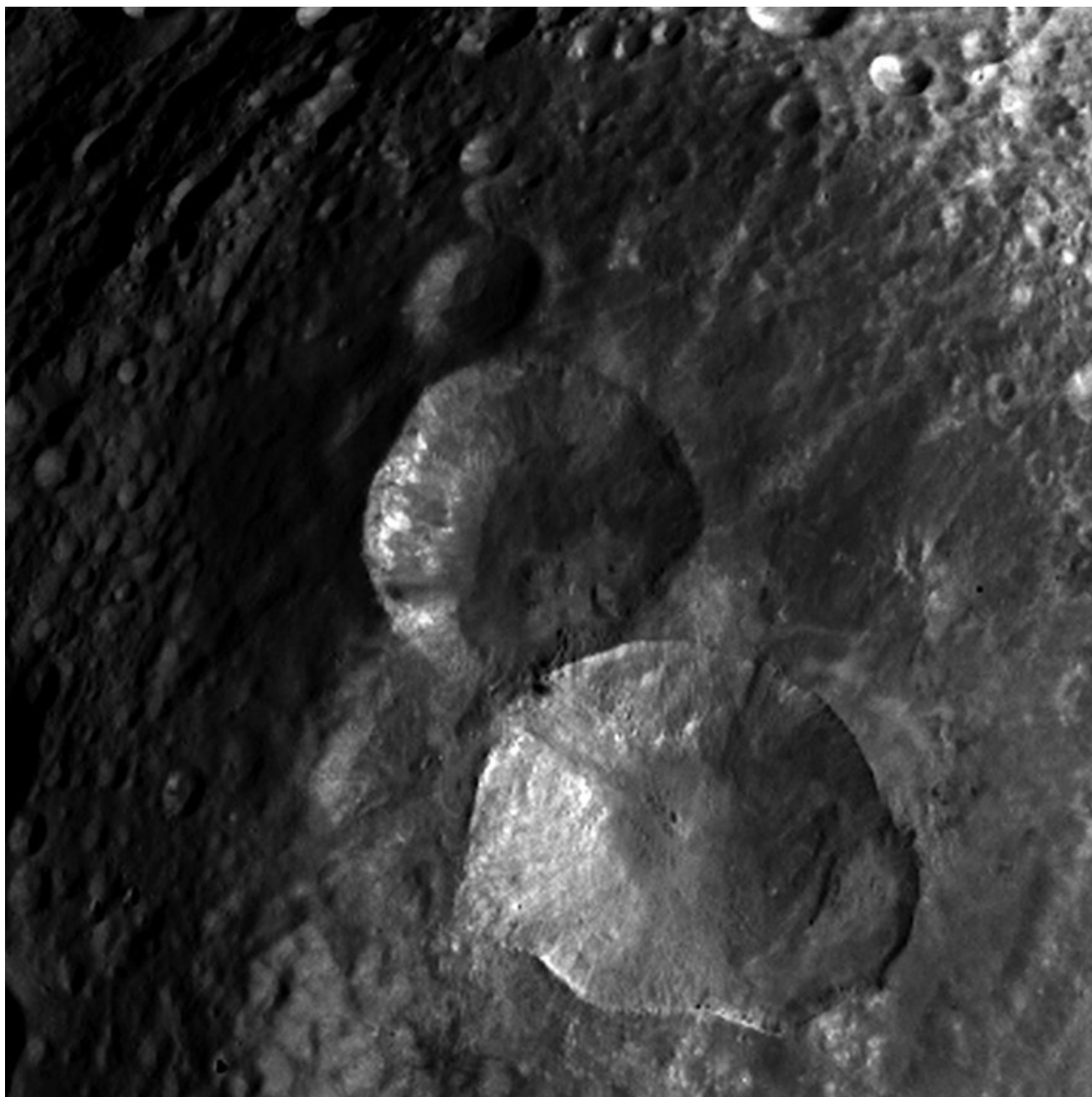
*Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA*





## Caparronia Crater on giant asteroid Vesta

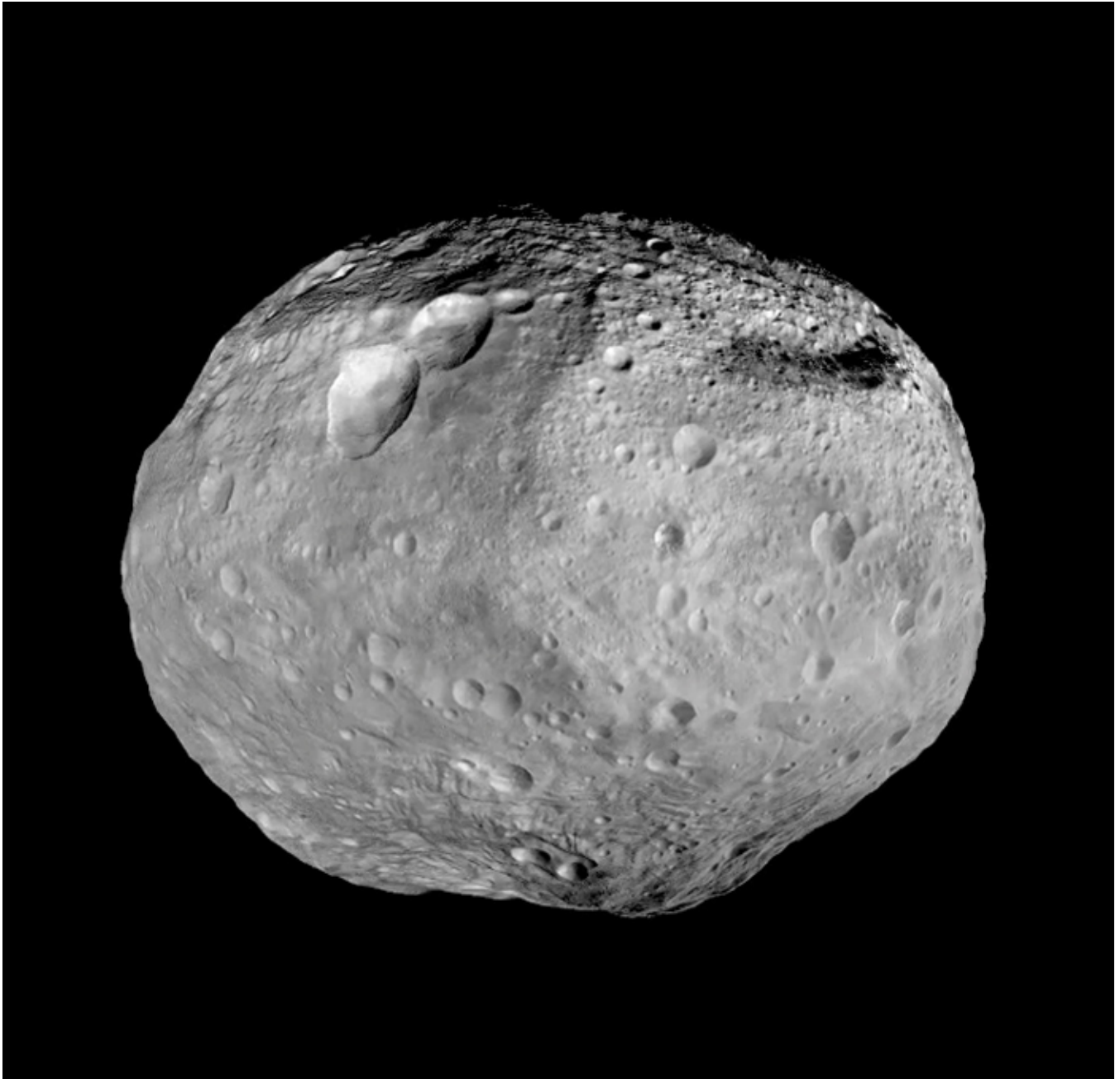
*Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA*



## **“Snowman” craters on giant asteroid Vesta**

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

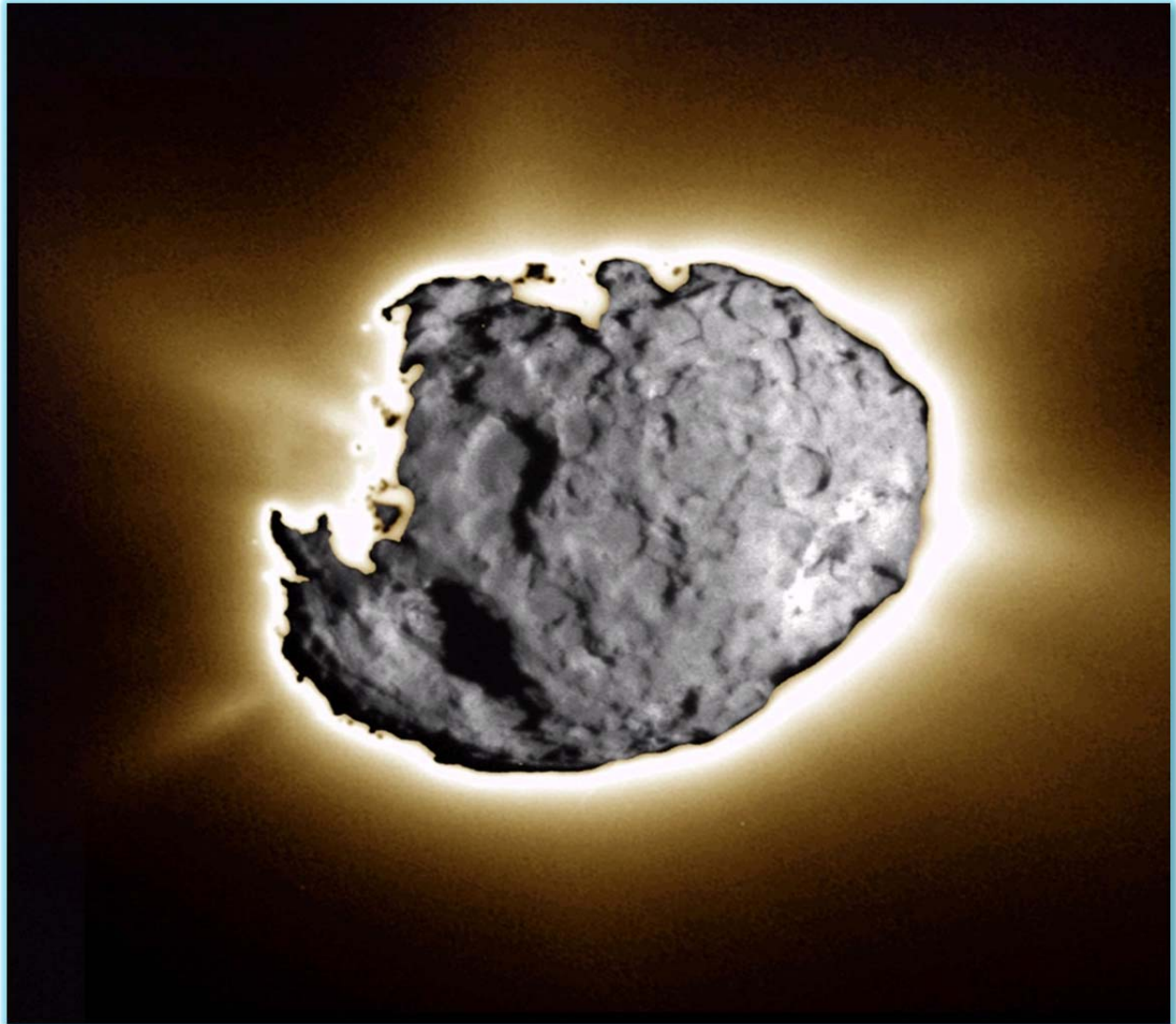




## **Global View of Vesta**

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*

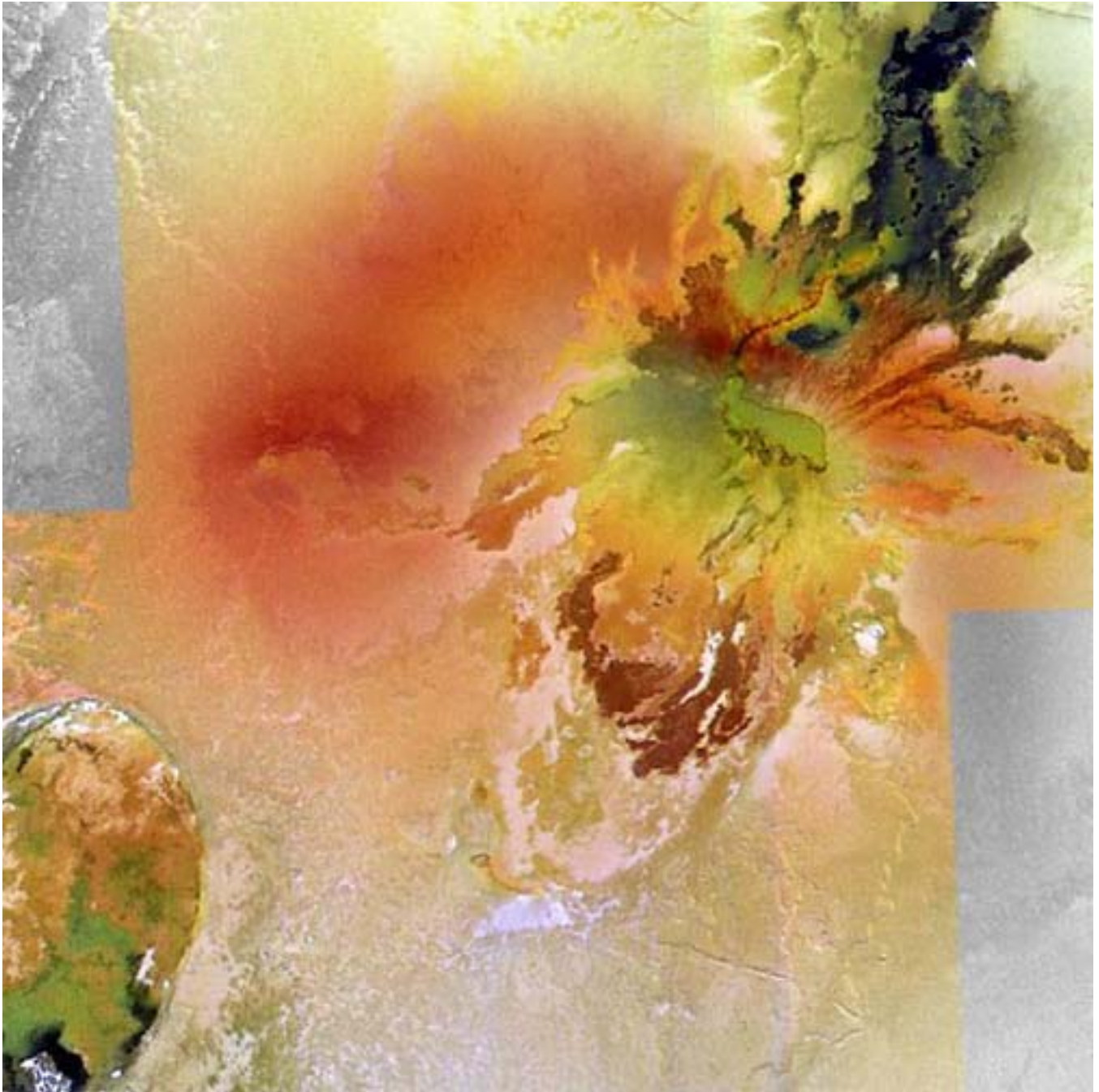


## **Jupiter's moon, Ganymede**

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**

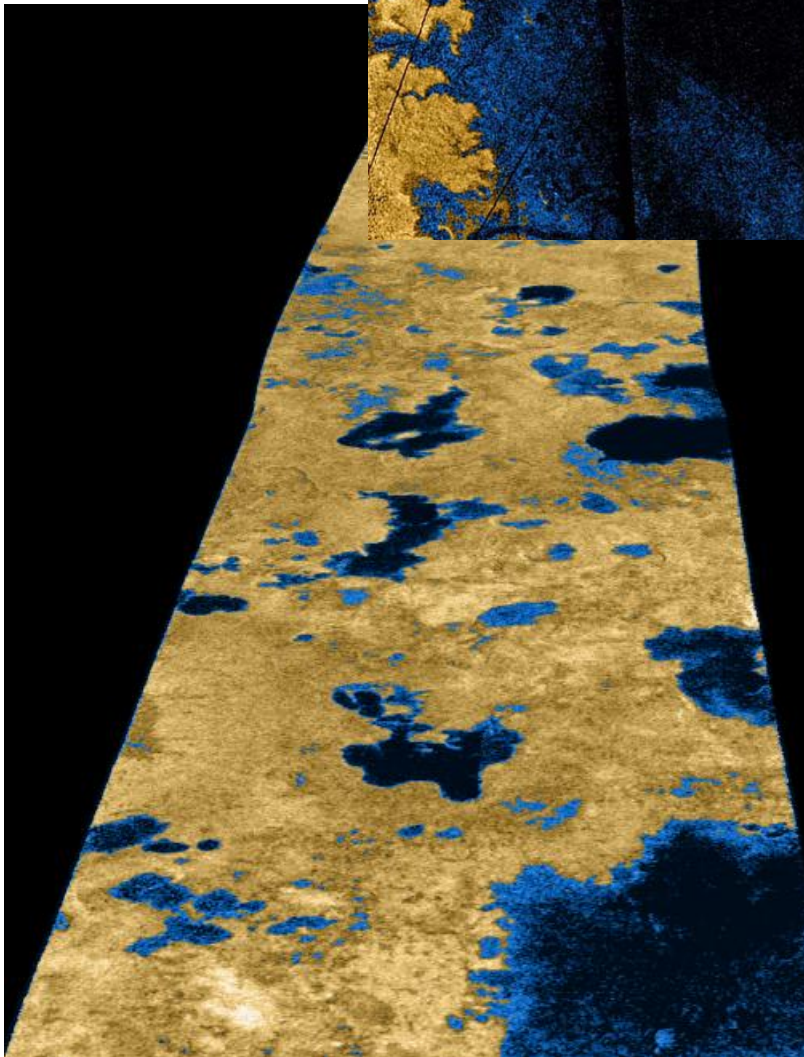
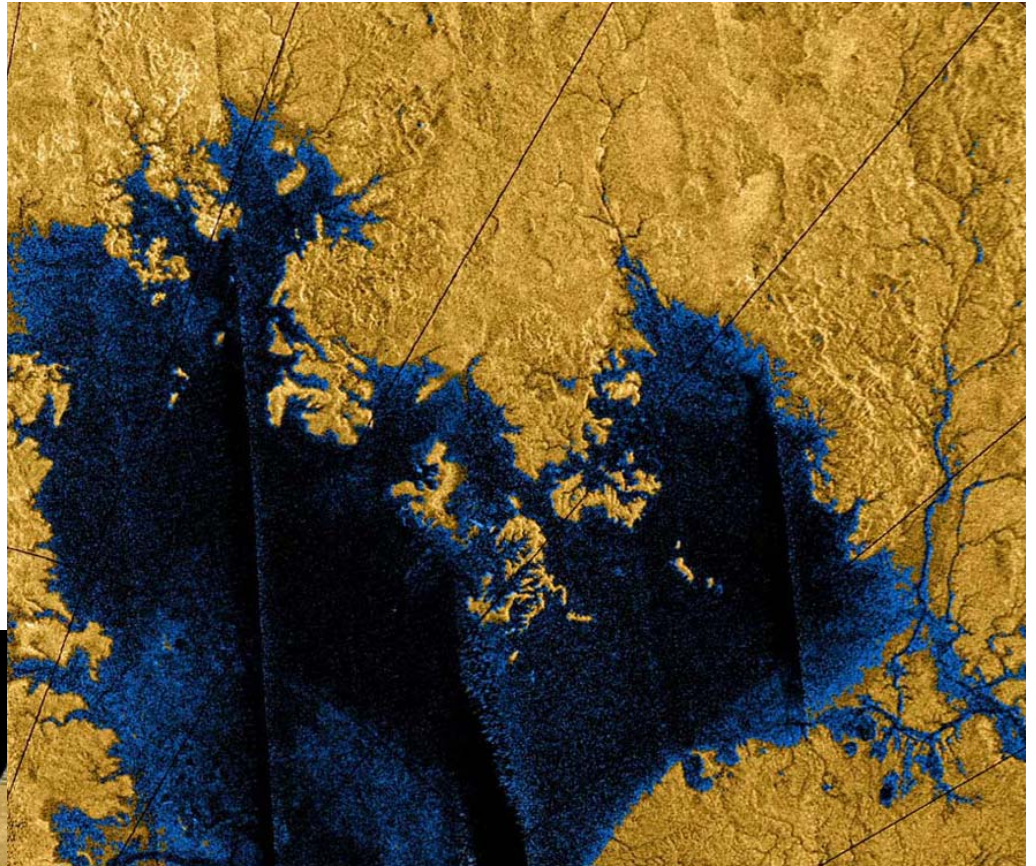
*Credit: NASA/JPL/University of Arizona*



## **Active Volcano Culann Patera on Jupiter's moon, Io**

*Credit: NASA/JPL/University of Arizona*



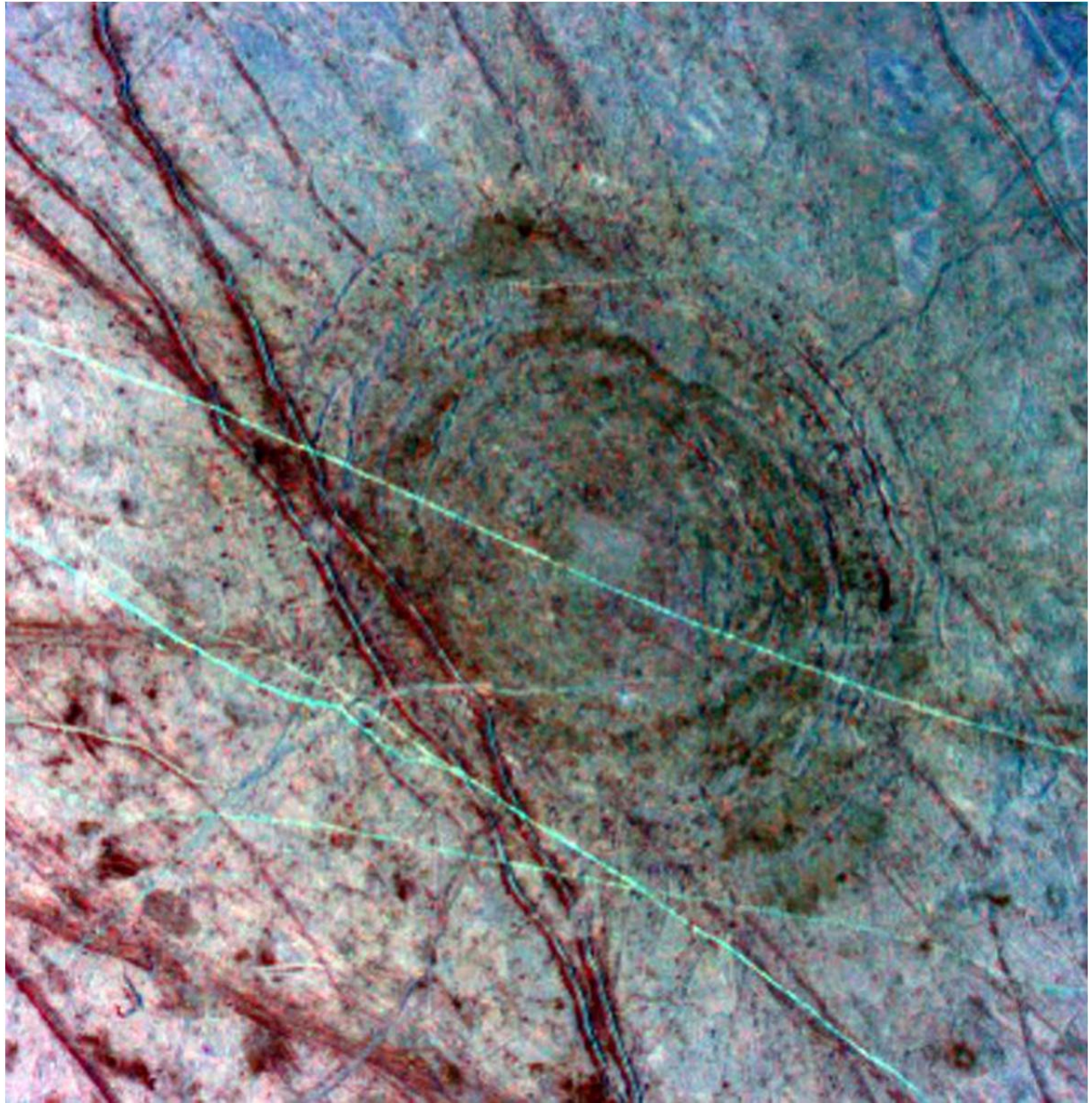


## **Saturn's largest moon, Titan**

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

*Credit: NASA/JPL-Caltech/USGS*



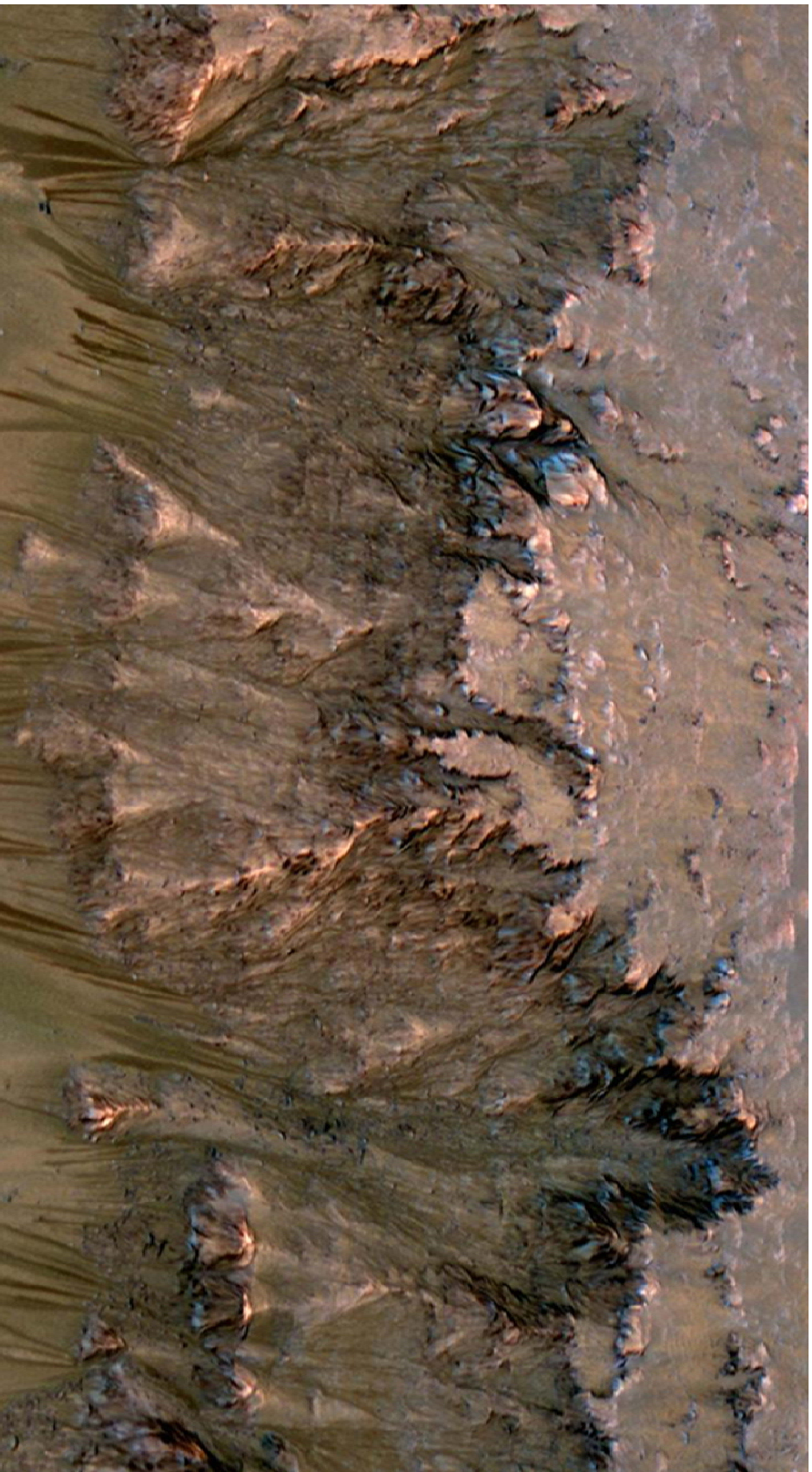


## **Europa, moon of Jupiter**

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*



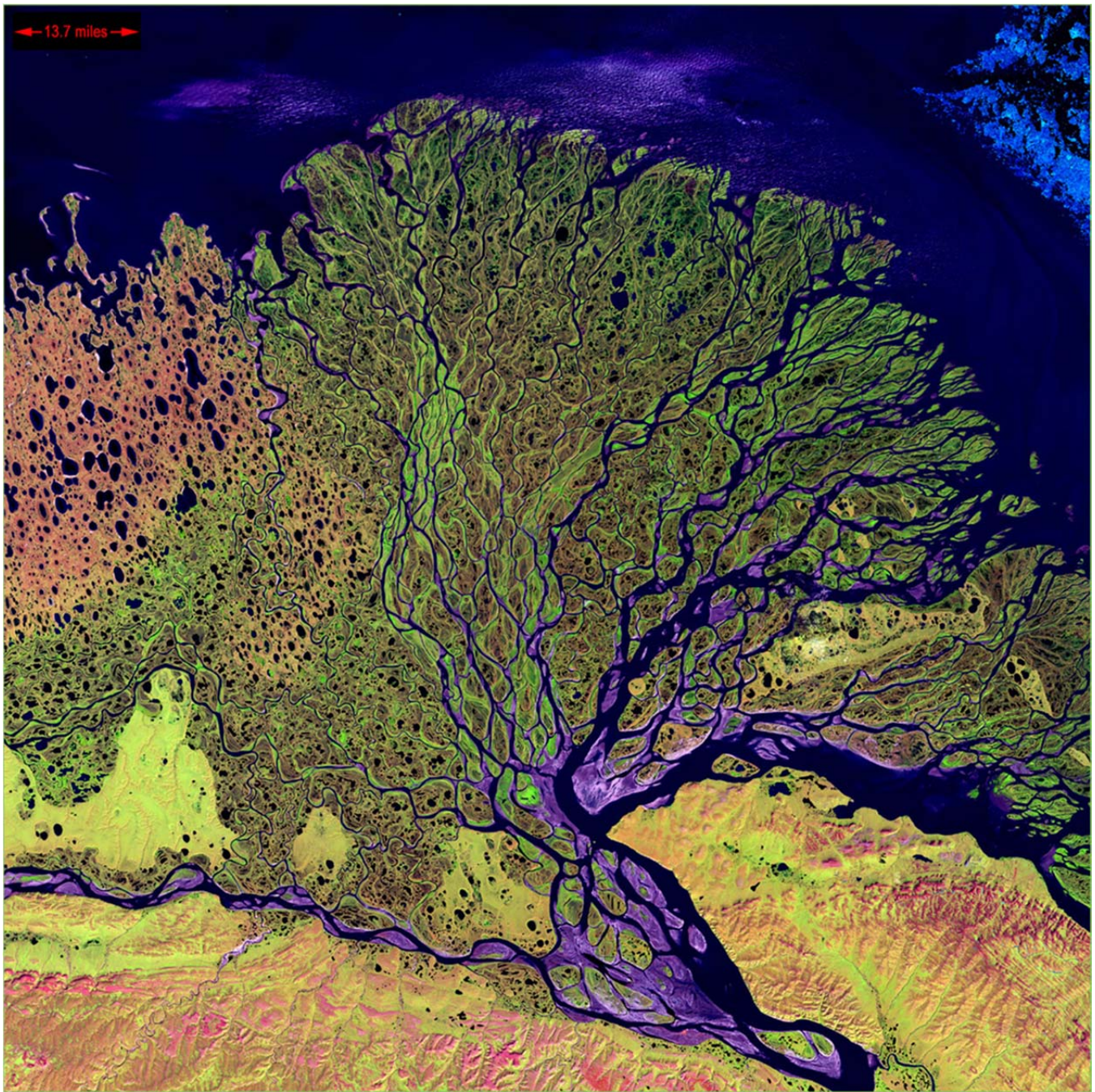


## **Sand Dunes on Mars**

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

*Credit: NASA/JPL-Caltech/University of Arizona*

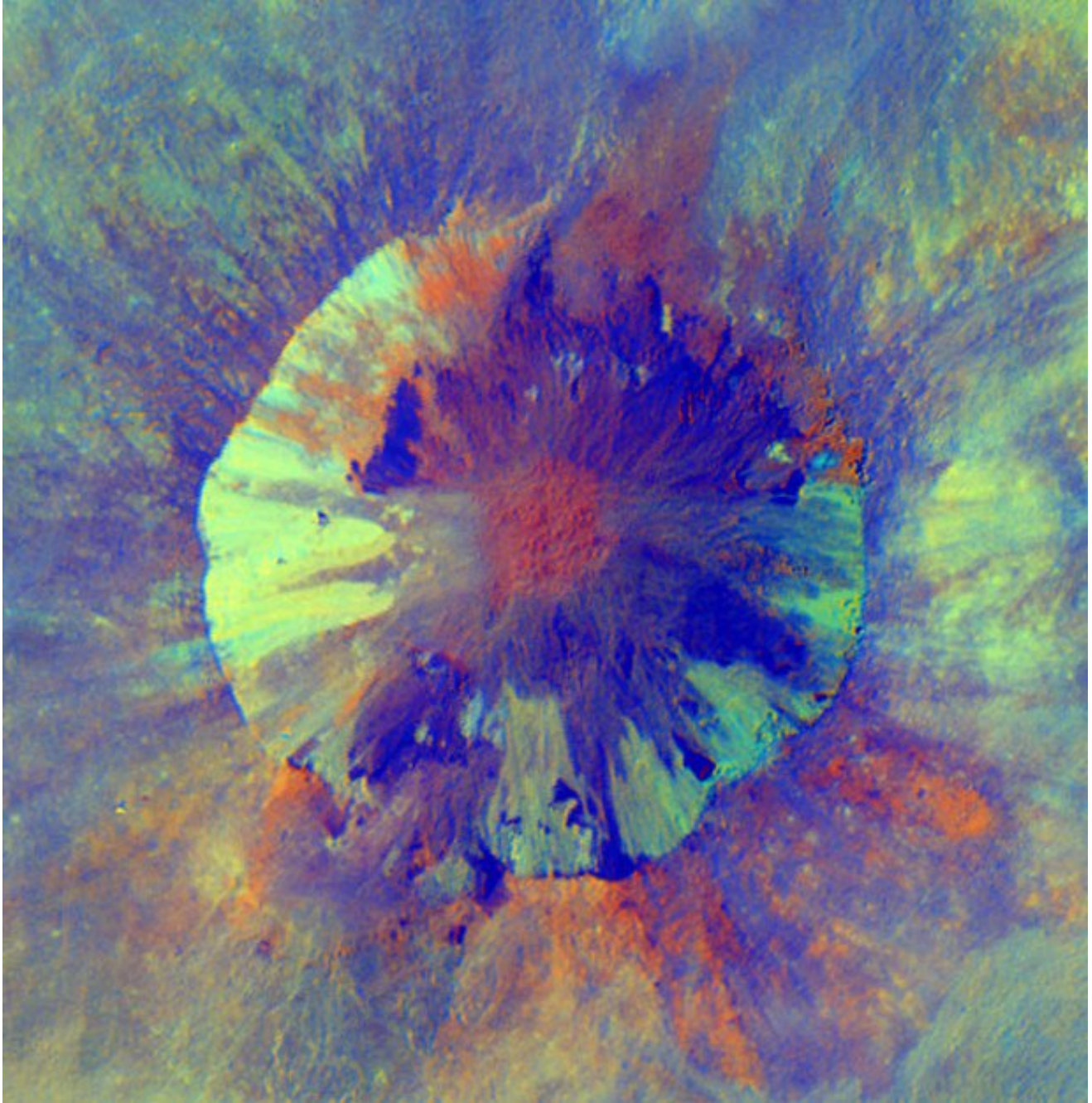




## Lena River Delta, Russia

*Credit: NASA Earth Observatory*



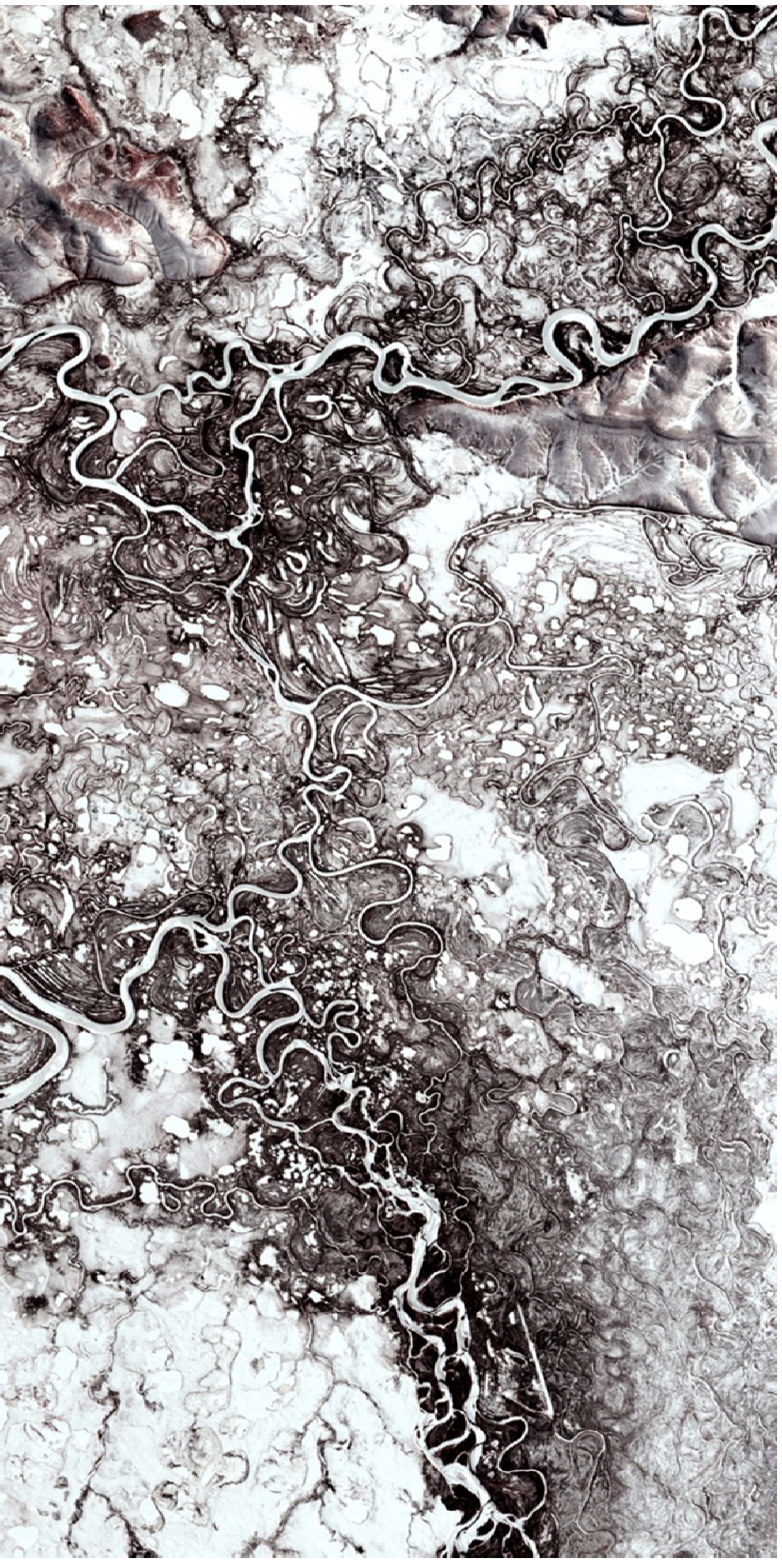


## **Giant Asteroid Vesta**

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*

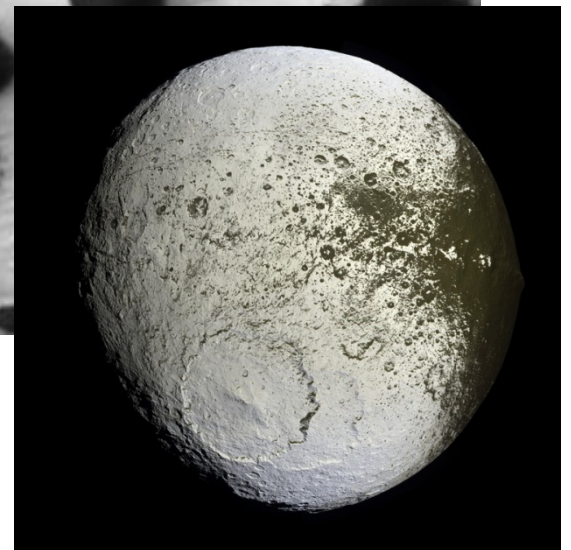
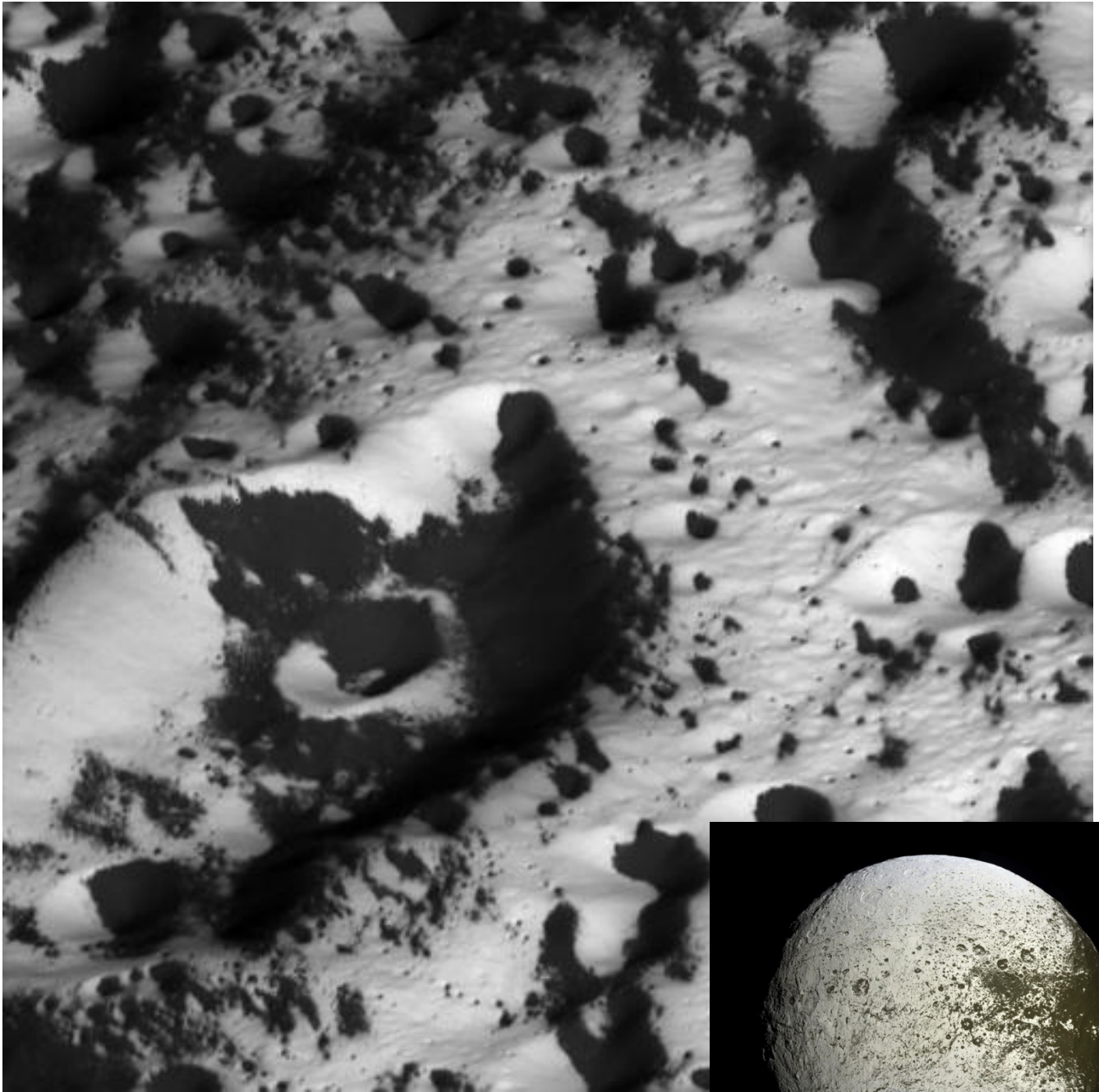




**Mayn River, Siberia, Earth**

*Credit: NASA/Landsat7*

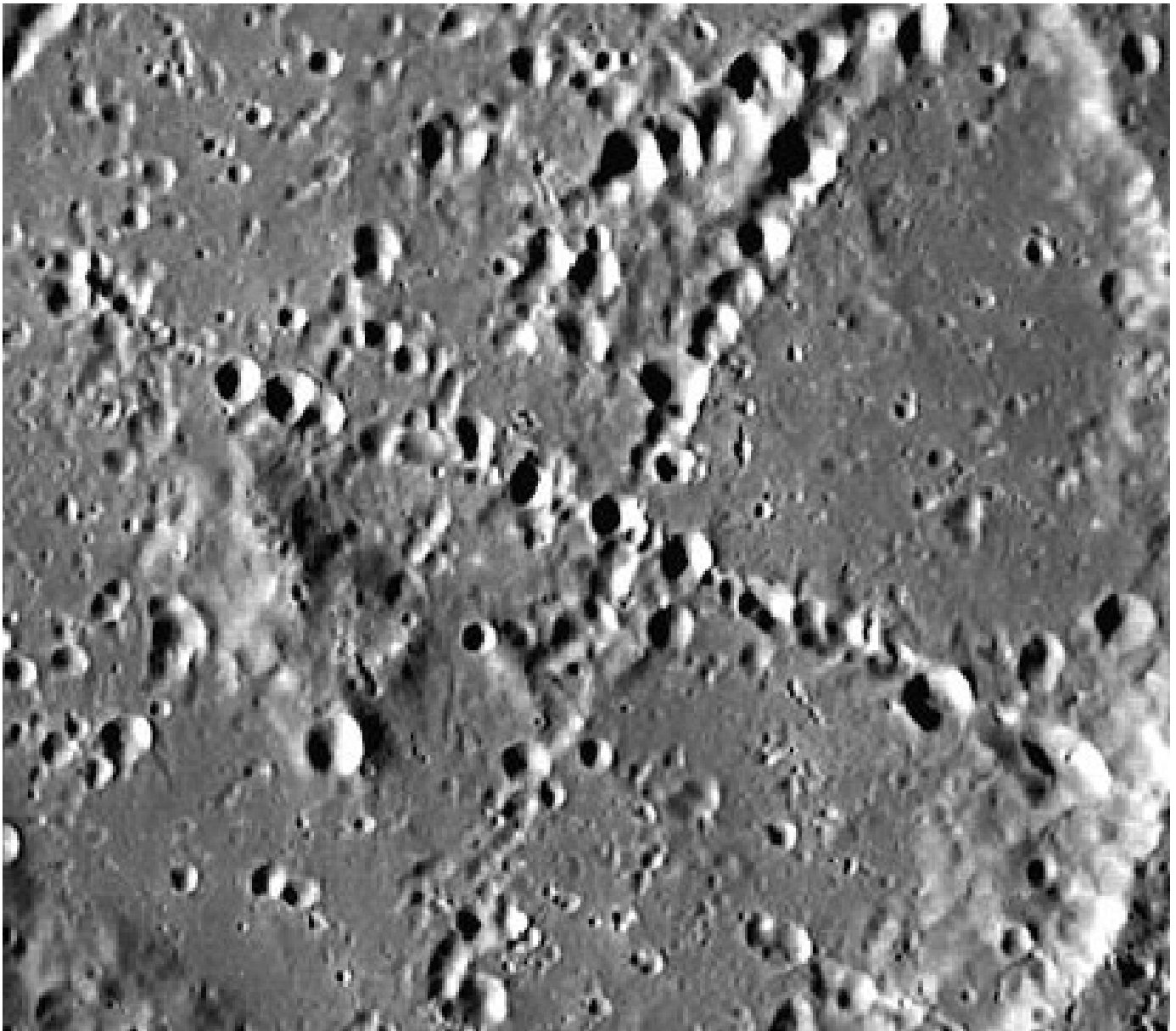




## **Light and Dark on Iapetus, Moon of Saturn**

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 from space:** 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. This image is in true color.



## 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*