

Coordinates: 42.7°S 70.0°E﻿ / ﻿42.7°S 70.0°E﻿ / -42.7; 70.0

Hellas Planitia

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Hellas Planitia, also known as the **Hellas Impact Basin**, is a huge, roughly circular impact basin located in the southern hemisphere of the planet Mars. It is the second or third largest impact crater and the largest visible impact crater known in the Solar System. The basin floor is about **7,152 m (23,465 ft) deep**, 3,000 m (9,800 ft) deeper than the moon's South Pole-Aitken basin, and extends about 2,300 km (1,400 mi) east to west.^{[2][3]} It is centered at **42.7°S 70°E**^[4]

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Description

With a diameter of about 2,300 km (1,400 mi),^[5] it is the largest unambiguous impact structure on the planet, though a distant second if the Borealis Basin proves to be an impact crater. The basin is thought to have been formed during the Late Heavy Bombardment period of the Solar System, approximately 4.1 to 3.8 billion years ago, when a large asteroid hit the surface.^[6]

The altitude difference between the rim and the bottom is 9,000 m (30,000 ft). The depth of the crater (7,152 m (23,465 ft)^[1] (7,000 m (23,000 ft)) below the standard topographic datum of Mars) explains the atmospheric pressure at the bottom: **1,155 Pa**^[1] (11.55 mbar, 0.17 psi, or 0.01 atm). This is 89% higher than the pressure at the topographical datum (610 Pa, or 6.1 mbar or 0.09 psi) and above the triple point of water, suggesting that the liquid phase could be present under certain conditions of temperature, pressure, and dissolved salt content.^[7] It has been theorized that a combination of glacial action and explosive boiling may be responsible for gully features in the crater.

Some of the low elevation outflow channels extend into Hellas from the volcanic Hadriacus Mons complex to the northeast, two of which Mars Orbiter Camera images show contain gullies: Dao Vallis and Reull Vallis. These gullies are also low enough for liquid water to be transient around Martian noon, if the temperature would rise above 0 Celsius.^[8]

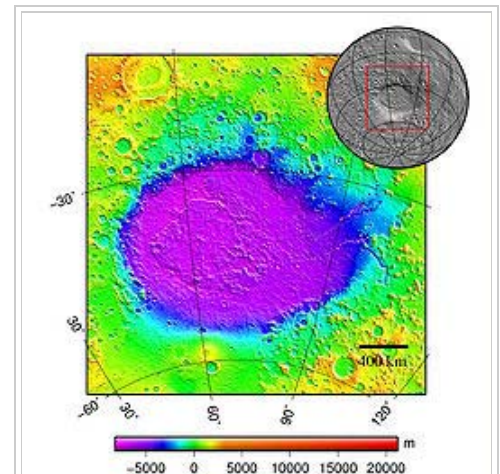
Hellas Planitia is antipodal to Alba Patera.^{[9][10][11]} It and the somewhat smaller Isidis Planitia together are roughly antipodal to the Tharsis Bulge, with its enormous shield volcanoes, while Argyre Planitia is roughly antipodal to Elysium Planitia, the other major uplifted region of shield volcanoes on Mars. Whether the shield volcanoes were actually caused by antipodal impacts like that which produced Hellas, or if it is mere coincidence, is presently unknown.

Hellas

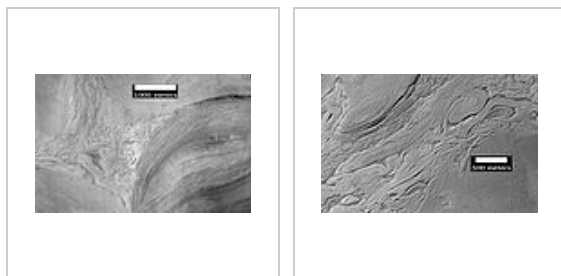


NASA image of Hellas Planitia

Planet	Mars
Region	Hellas quadrangle, south of Iapygia
Coordinates	42.7°S 70.0°E
Diameter	2,300 km (1,400 mi)
Depth	7,152 m (23,465 ft)

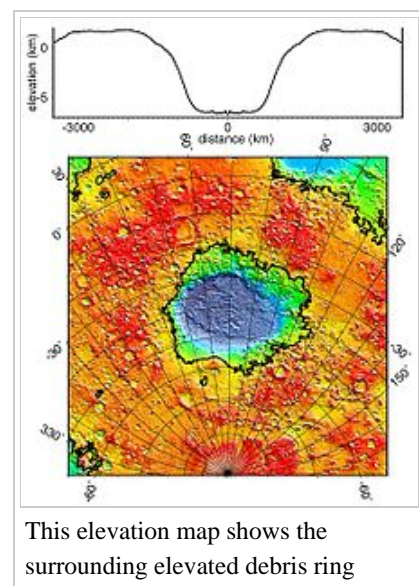


Topographic map locating Hellas Planitia in the southern uplands. The crater depth is 7,152 m (23,465 ft) below the standard topographic datum of Mars.^[1]



Twisted Ground in Hellas, as seen by HiRISE.

Twisted Terrain in Hellas Planitia, but actually located in Noachis quadrangle.

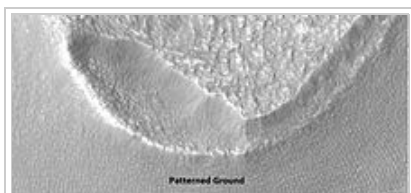


This elevation map shows the surrounding elevated debris ring

Discovery and naming

Due to its size and its light coloring, which contrasts with the rest of the planet, Hellas Planitia was one of the first Martian features discovered from Earth by telescope. Before Giovanni Schiaparelli gave it the name Hellas (which in Greek means 'Greece'), it was known as 'Lockyer Land', having been named by Richard Anthony Proctor in 1867 in honor of Sir Joseph Norman Lockyer, an English astronomer who, using a 16 cm (6.3 in) refractor, produced "the first really truthful representation of the planet" (in the estimation of E. M. Antoniadi).^[12]

Possible glaciers



Close-up of glacier with a resolution of about 1 meter. The patterned ground is believed to be caused by the presence of ice.

Radar images by the Mars Reconnaissance Orbiter (MRO) spacecraft's SHARAD radar sounder suggest that features called lobate debris aprons in three craters in the eastern region of Hellas Planitia are actually glaciers of water ice lying buried beneath layers of dirt and rock.^[13] The buried ice in these craters as measured by SHARAD is about 250 m (820 ft) thick on the upper crater and about 300 m (980 ft) and 450 m (1,480 ft) on the middle and lower levels respectively.

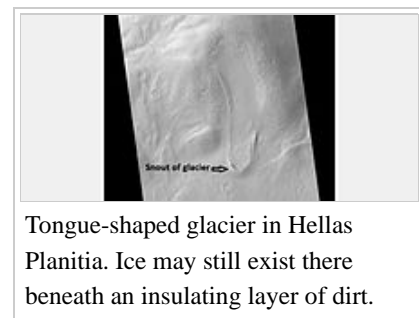
Scientists believe that snow and ice accumulated on higher topography, flowed downhill, and is now protected from sublimation by a layer of rock debris and dust. Furrows and ridges on the surface were caused by deforming ice.

Also, the shapes of many features in Hellas Planitia and other parts of Mars are strongly suggestive of glaciers, as the surface looks as if movement has taken place.

See also

- Argyre Planitia
- Gale crater
- Geography of Mars
- Glaciers
- List of plains on Mars
- Water on Mars

Notes



Tongue-shaped glacier in Hellas Planitia. Ice may still exist there beneath an insulating layer of dirt.

- ^{a b c} Martian Weather Observation (<http://www-star.stanford.edu/projects/mgs/sum/s0403210230.html>) MGS radio science measured 11.50 mbar at 34.4° S 59.6° E -7152 meters
- [^] The part below zero datum, see Geography of Mars#Zero elevation
- [^] Remote Sensing Tutorial Page 19-12 (http://rst.gsfc.nasa.gov/Sect19/Sect19_12.html) , NASA
- [^] Blue, Jennifer. "Hellas Planitia" (<http://planetarynames.wr.usgs.gov/Feature/62601>) . *Gazetteer of Planetary Nomenclature*. USGS Astrogeology Research Program.
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- [^] Making a Splash on Mars (http://science.nasa.gov/science-news/science-at-nasa/2000/ast29jun_1m/) , NASA, 29 June 2000
- [^] Heldmann, Jennifer L.; *et al.* (2005). "Formation of Martian gullies by the action of liquid water flowing under current Martian environmental conditions". *Journal of Geophysical Research* **110**: E05004. Bibcode 2005JGRE..11005004H (<http://adsabs.harvard.edu/abs/2005JGRE..11005004H>) . doi:10.1029/2004JE002261 (<http://dx.doi.org/10.1029%2F2004JE002261>) . para 3 page 2 Martian Gullies Mars#References
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- E. M. Antoniadi, *The Hourglass Sea on Mars*, Knowledge, July 1, 1897, pp. 169–172.

External links

- The Hellas Of Catastroph (<http://www.spacedaily.com/news/mars-water-science-00i8.html>) , Peter Ravenscroft, 2000-08-16, Space Daily
- Google Mars scrollable map (<http://www.google.com/mars/#lat=-42.7&lon=70>) - centered on Hellas

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Categories: Hellas quadrangle | Impact craters on Mars | Plains on Mars

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