German Aerospace Center

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Chaotic terrain in Ariadnes Colles

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Ariadnes Colles ortho-image

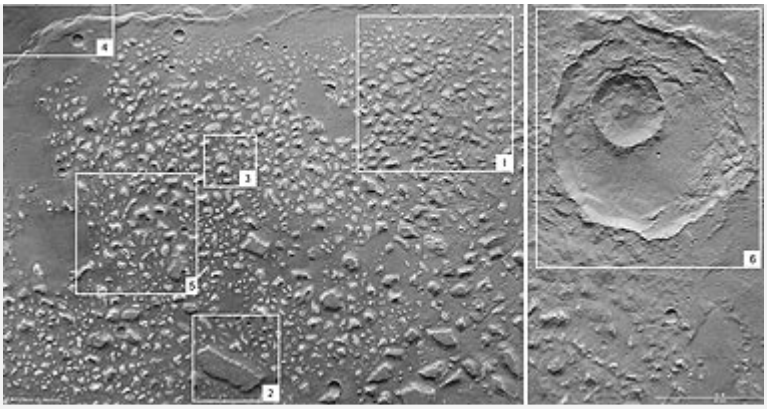
Ariadnes Colles, perspective view

The High Resolution Stereo Camera on board Mars Express, operated by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR), took images which show the region of Ariadnes Colles on the Red Planet.

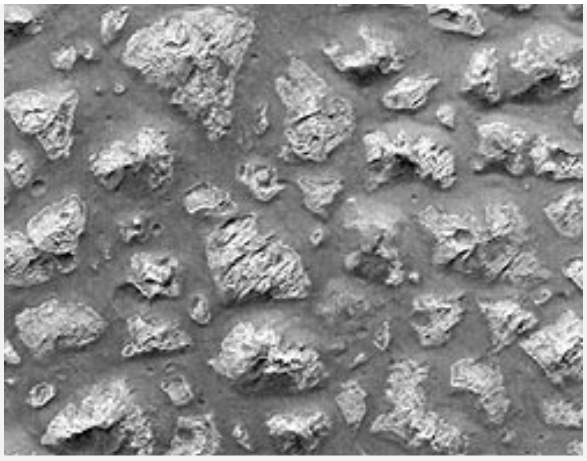
The image data was acquired on 16 April 2007 in the region of Ariadnes Colles that lies at about 34° south and 172° east. The ground resolution is about 13 m/pixel.

Mars exhibits numerous 'chaotic terrains'. These are areas with an apparently inordinate accumulation of rocks of varying sizes and flat-topped features.

Ariadnes Colles is one such chaotic terrain located in the southern highlands of Mars. It covers an area of 180 x 160 sq km, roughly half the size of Estonia. The HRSC images show the northwestern part of the region.



Ariadnes Colles, annotated nadir view



Ariadnes Colles, nadir view

Most of the area pictured is dominated by erratically shaped rocks that are 1-10 km in size (1). These are lighter in colour compared to their surroundings. Some larger blocks appear similar to mesa, a flat-topped natural elevation, and can reach a height of 300 m (7).

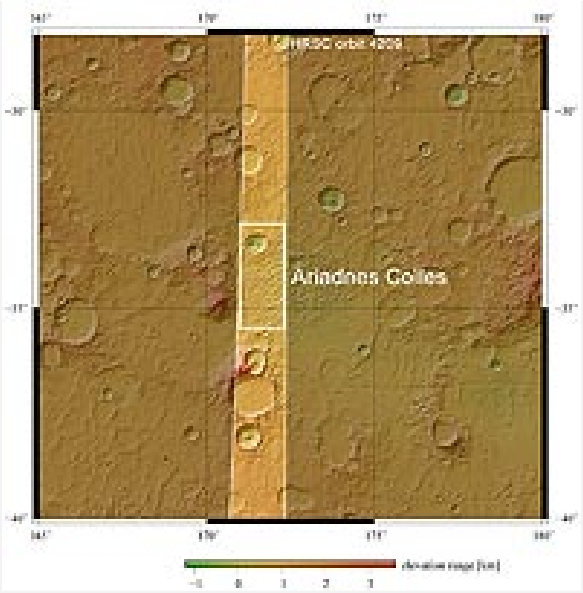
A striking lineation on the surface of the blocks (visible upon zooming in) (2) is oriented in the northwest-southeast direction. The northwestern flanks have been eroded more strongly than the opposing southeastern flanks.

Wrinkle ridges, which form as a result of tectonic compression, are visible in the southwestern part (3). These ridges mark the western boundary of Ariadnes Colles.

In contrast to other chaotic terrains such as Iani Chaos, Adrianes Colles is not a water source region. This is why it is still debated whether Ariadnes Colles formed by the action of water or wind.

Ariadnes Colles in 3D

The darker material in the southern parts is most likely sand or volcanic ash; some slopes of the flat-topped features have been covered by this dark material that was blown up on the slopes (4).



Ariadnes Colles context map

A large impact crater, 1200 m deep, is visible on the right (6). It shows a smaller crater superimposed on it. The larger crater is about 30 km in diameter and covers an area roughly the size of Hamburg. The smaller younger crater lies almost at the centre of the older one, and has a diameter of just 10 km.

The colour scenes have been derived from the three HRSC-colour channels and the nadir channel. The perspective views have been calculated from the digital terrain model derived from the stereo channels. The anaglyph image was calculated from the nadir and one stereo channel. The black and white high-resolution images were derived from the nadir channel which provides the highest detail of all channels.

The High Resolution Stereo Camera (HRSC) experiment on the ESA Mars Express Mission is led by the Principal Investigator (PI) Prof. Dr. Gerhard Neukum who also designed the camera technically. The science team of the experiment consists of 45 Co-Investigators from 32 institutions and 10 nations. The camera was developed at the German Aerospace Center (DLR) under the leadership of the PI G. Neukum and built in cooperation with industrial partners (EADS Astrium, Lewicki Microelectronic GmbH and Jena-Optronik GmbH). The experiment on Mars Express is operated by the DLR Institute of Planetary Research, through ESA/ESOC. The systematic processing of the HRSC image data is carried out at DLR. The scenes shown here were processed by the PI-group at the Institute for Geosciences of the Freie Universitaet Berlin in cooperation with the German Aerospace Center (DLR), Institute of Planetary Research, Berlin.

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