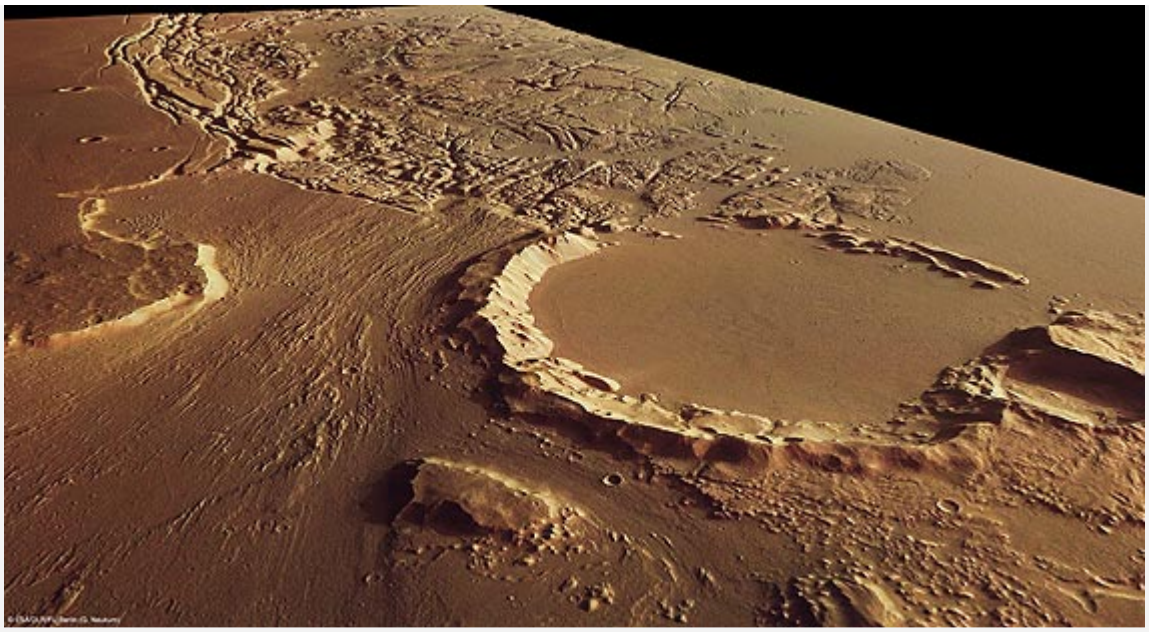
News Archive 2009

Chaotic terrain between Kasei Valles and Sacra Fossae

6 November 2009



Kasei Valles and Sacra Fossae, in perspective view

Kasei Valles and Sacra Fossae. North is to the right in this image.

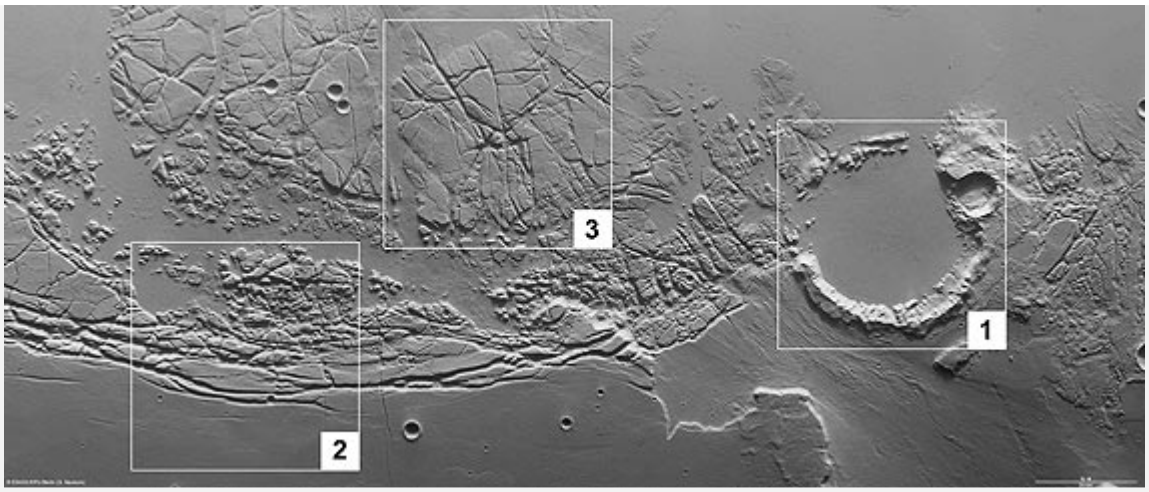
Kasei Valles and Sacra Fossae, in perspective view.

Mars Express flew over the boundary between Kasei Valles and Sacra Fossae and the High-Resolution Stereo Camera (HRSC) operated by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) imaged the region, acquiring spectacular views of the chaotic terrain in the area.

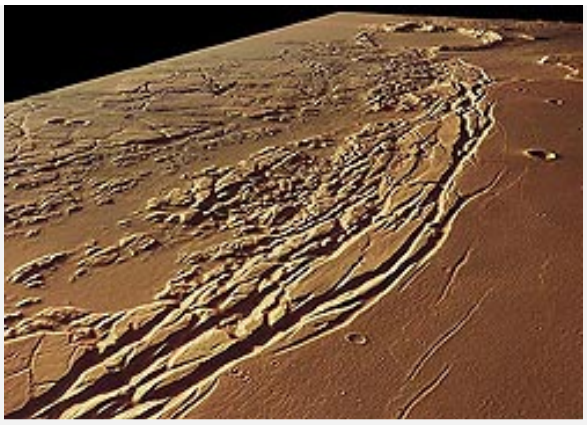
The images are centred at 12°N, 285°E and have a ground resolution of about 21 metres per pixel. They cover 225 kilometres by 95 kilometres or 21,375 square kilometres, an area roughly half the size of the Netherlands.

The upper portion of the image swath shows the eastern margin of Kasei Valles and the western margin of the Lunae Planum plateau and the adjoining Sacra Fossae. Kasei Valles is one of the largest outflow channels on Mars, spanning 3000 kilometres, from the Chryse Planitia basin in the north to Echus Chasma to the south.

Sacra Fossae is a fault system that extends for more than 1000 kilometres. It is several hundred metres deep and separates Kasei Valles to the south and west from Lunae Planum. It was named after Isola Sacra, an island at the estuary of the river Tiber in Italy.



Kasei Valles and Sacra Fossae, annotated nadir view.



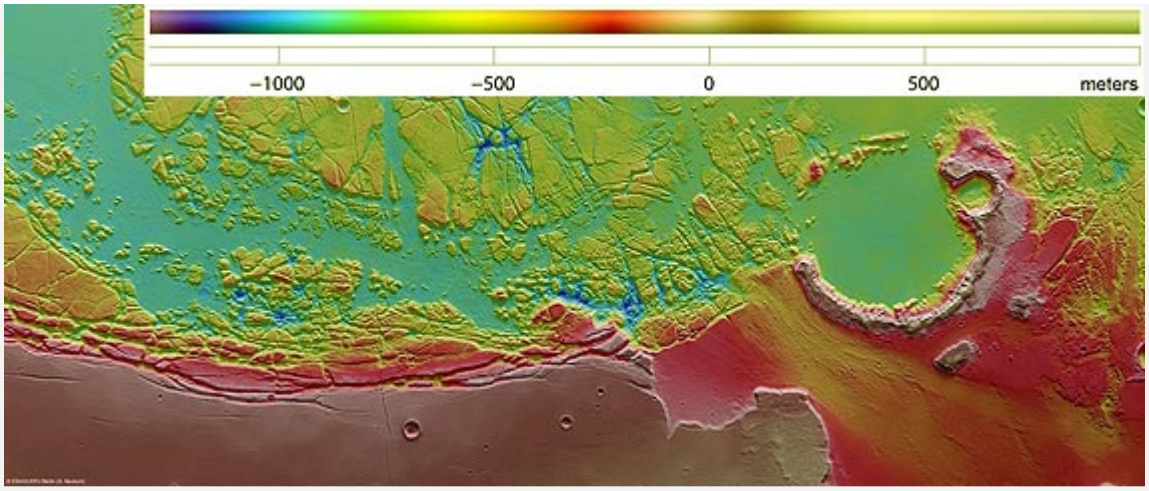
Kasei Valles and Sacra Fossae, in perspective view.

The images show an old 35-kilometre diameter impact crater in the north. The crater's southwestern rim is heavily eroded. The erosion was caused primarily by flowing water. The source of the water was located in Echus Chasma, which lies roughly 850 kilometres to the southwest.

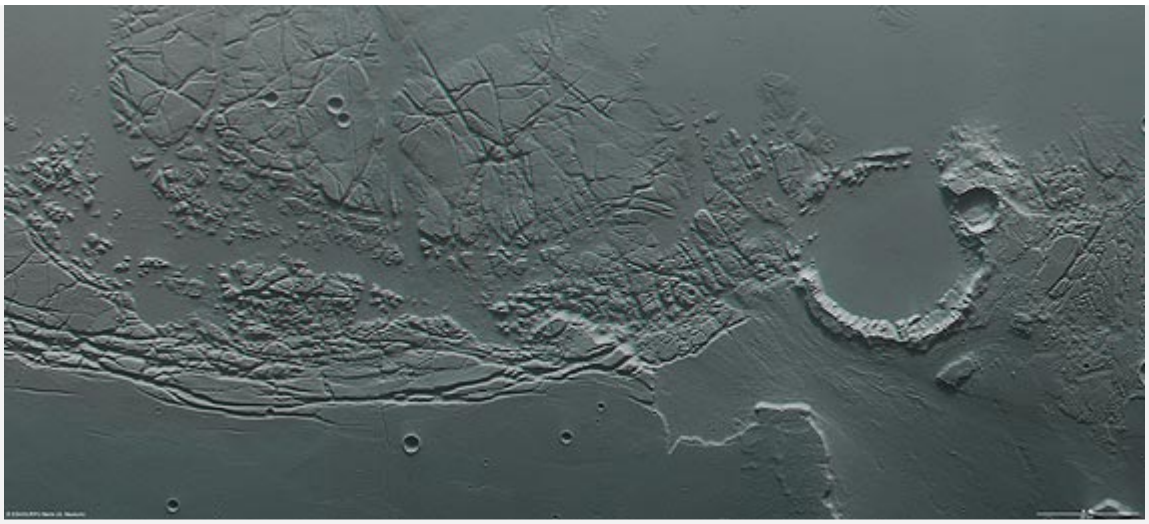
The crater floor and the northwestern part of the imaged region are remarkably flat and have been formed by sediments and basaltic lava flows originating from the Tharsis volcanic region.

The lower part of the image clearly shows the boundary between the heavily cratered plain, and the area with numerous fracture zones. Most of the fractures along the boundary are parallel to the edge of the Lunae Planum.

It is likely that the entire region experienced tectonic stresses as well as 'subrosion' – a process where subsurface rocks are dissolved and removed by water – causing overlying strata to partially collapse and form 'chaotic terrain'.

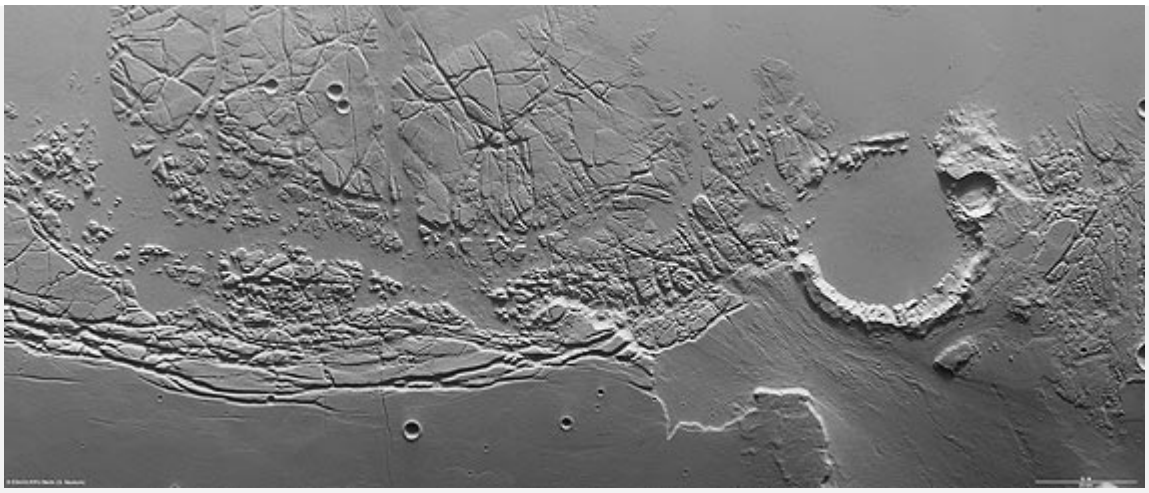


Kasei Valles and Sacra Fossae ortho-image. North is to the right in this image.

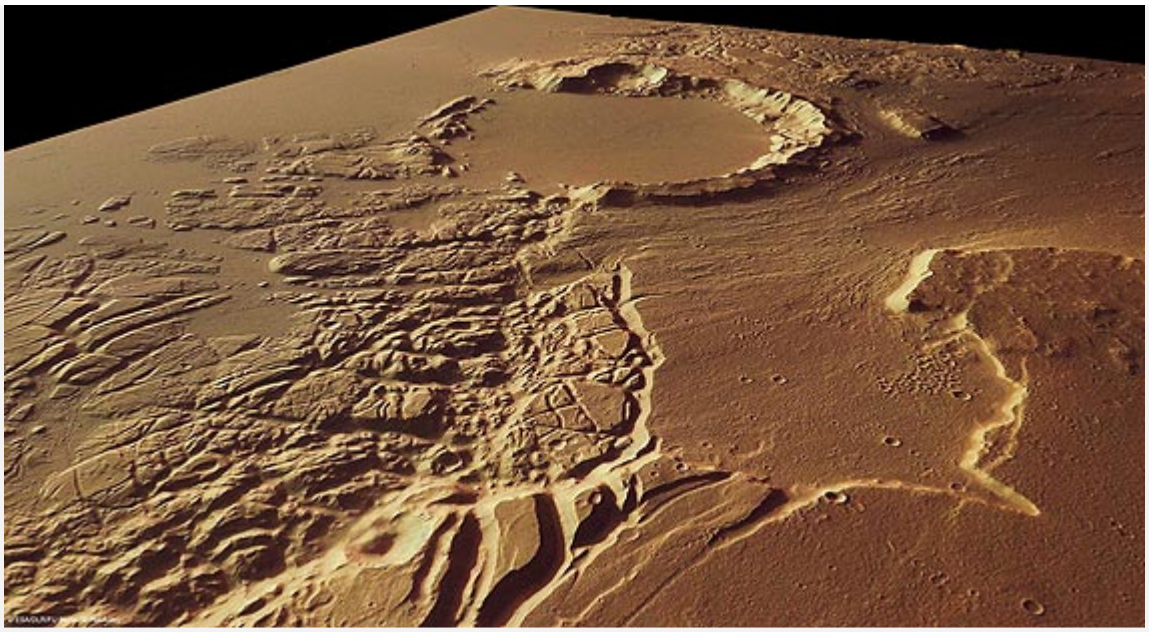


Kasei Valles and Sacra Fossae in 3D

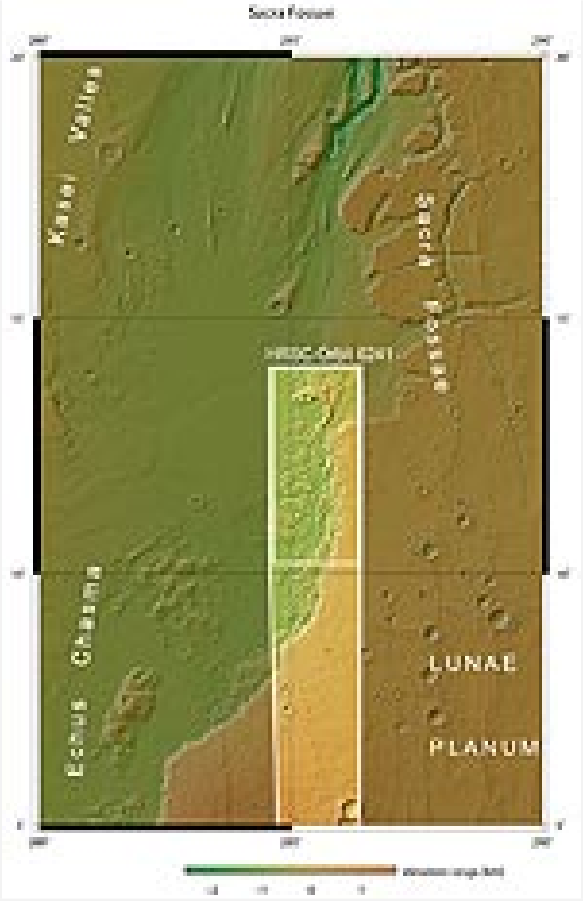
Several fracture zones are also visible in the western part of the image. Areas up to 10-kilometre across that experienced 'subsidence' (gradual compaction and sinking due to the weight of the layers) are still intact.



Nadir view of Kasei Valles and Sacra Fossae. North is to the right in this image.



Kasei Valles and Sacra Fossae



Kasei Valles and Sacra Fossae context map

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 derived from the nadir and one stereo channel. The black and white high-resolution images were derived form the nadir channel, which provides the highest detail of all channels.

The High Resolution Stereo Camera (HRSC) experiment on the European Space Agency's Mars Express mission is led by the Principal Investigator (PI) Prof. Dr Gerhard Neukum, who was also responsible for the technical design of the camera. 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 Universität Berlin in cooperation with the DLR Institute of Planetary Research, Berlin.

Contact

Henning Krause
German Aerospace Center
Corporate Communications
Tel: +49 2203 601-2502
Fax: +49 2203 601-3249
E-Mail: henning.krause@dlr.de

Prof.Dr. Ralf Jaumann
German Aerospace Center
Institute of Planetary Research, Planetary Geology
Tel: +49 30 67055-400
Fax: +49 30 67055-402
E-Mail: Ralf.Jaumann@dlr.de
