

Mystery solved regarding largest volcano in the solar system

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Scientists from the Division of Planetary Sciences and Remote Sensing in the Institute of Geological Sciences at Freie Universität Berlin have succeeded in creating a model simulating the formation of mysterious structures on the surface of the Mars volcano, Olympus Mons. The study was conducted in collaboration with the German Research Centre for Geosciences in Potsdam and Arizona State University. The findings were published in the latest issue of the international scientific journal, *Journal of Geophysical Research—Planets*.

The research project is based on image data of the High Resolution Stereo Camera (HRSC) that is installed on the European Mars Express spacecraft, which has been orbiting the red planet since December 2003. Using the camera images, the scientists in the Planetary Sciences and Remote Sensing group generated a mosaic and a terrain model of the Olympus Mons volcano. The image data show that the volcano shield is shaped in the form of arched terraces and the foot of the otherwise very flat volcano drops steeply. The origin of the terraces and the steep slope of Olympus Mons were discussed heatedly in previous publications. This study indicates that the observed deformations of the volcano are due to gravity, which on Mars is about 40 percent of the Earth's gravity, and to low frictional resistance in the volcano subsurface.

The new investigations of the interactions between the Martian volcano and the ground underneath it were done in cooperation with the planetary scientists at Freie Universität Berlin, the Research Centre for Geosciences in Potsdam (Physics of Earthquakes and Volcanoes

section), and Arizona State University (School of Earth and Space Exploration) in Tempe, Arizona, USA. The computer simulation prepared by the Planetary Sciences and Remote Sensing team demonstrates for the first time the formation of terraces during the volcanic growth phase.

The Olympus Mons volcano on Mars with a height of 22 km is nearly two and a half times as high as Mount Everest. Its diameter is 600 km, which is about the distance between Berlin and Munich. Olympus Mons is thus the largest [volcano](#) in our solar system. The latest findings about this supervolcano will also help to give scientists a better understanding of volcanoes on Earth.

Provided by Freie Universitaet Berlin

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