

The fractal analysis of the gravitational field and topography of the Mars

Demin S., Andreev A., Demina N., Nefedyev Y.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The aim of this paper is to represent the results of a structured fractal analysis of gravitational and topographical parameters of Mars on the basis of data obtained from the space missions. To analyze Martian fractal structures the observations from the data received from boards of the space missions including «Mars Global Surveyor" has been used. The models of relief and Mars gravitational field have been constructed on the basis of harmonic analysis of the expansion in spherical functions of the satellite observations data. As a result, fractal dimensions of Martian reliefs anomalies and Mars gravitational potential by longitude and latitude have been determined. Mean values of the fractal dimensions D have been obtained as well: mean fractal dimensions of Martian topographic model by latitude $D = 0.86$, by longitude $D = 0.88$; mean fractal dimensions of Martian gravitational potential anomalies by latitude $D = 1.06$, by longitude $D = 1.092$.

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