AN ANALYSIS OF THE DATA OF MARS ORBITER LASER ALTIMETER. Rodionova J[1]., Iluhina J[2]., Michael G[1], [1]Sternberg State Astronomical Institute, jeanna@sai.msu.ru, [2]Moscow University

An analysis of the heights of the Martian relief is fulfilled on the base of Mars Orbiter Laser Altimeter (MOLA) data, an instrument on the Mars Global Surveyor (MGS) spacecraft [1]. Hypsometric maps of the hemispheres of Mars were compiled using a file of 64 800 points of the heights of 1° trapeziums. A digital model of the relief was constructed with the software ArcGis, ArcView 3.2 (Spatial Analyst). The contour interval is 1 km. The areas between the contours were measured automatically. The results of the measurement are represented on fig.1 The graphic shows the distribution of the height levels against their areas. The histogram on fig.1 differs from the histogram in the paper [1]. The maximum of the difference in the area of the level from 2 to 1 km and from 1 to 0 km consist of 6% or 8.7 billion sq. km. Also there are differences of about 4% in the determination of the area of the height levels from -3 to -4 km and from -4 to -5 km.

It is known that the distribution of the height levels on Mars has two maxima [1,2.3]. One can see two peaks on fig.1. The first, for the height levels from -2 to -5 km, corresponds to the martian plains. The total area of the plain is 50 billion km or 34.5%. The second peak is due to the levels from 1 to 3 km. 35% of the total area is occupied by these levels. The mountains above 5 km occupy 2.5% of the total surface of Mars (the highest of them above 10 km - only 1%). The transient zone from plains to the highland due to the level from -2 to 1 km and correspond 25%. The deepest depressions (less than 5 km) compose 2.5%.

Fig 2 shows the distribution of the heights levels in the northern and southern hemispheres. Two main peaks are represented clearly on the graphics. There are the predominant levels from -2 to -5 km in the northern hemisphere and from 1 to 3 km in the southern one. It is interesting that in the western and eastern hemispheres both maxima are represented on fig.3.

The comparison of the heights of different regions obtained by MOLA with the previous investigations represented on the maps [4] show that there are not systematic differences there. We have compared the main large forms of Martian relief. For example Acidalium planitia has a prevailing level from -4 to -5 km (MOLA) but from -1 to -2 km on [4] and Argyre planitia from 0 to -3 km (MOLA) and from 1 to +3 km on [4]. Noachis terra is on the levels from 0 to 2 km (MOLA) and from 3 to 4 km on [4].

References

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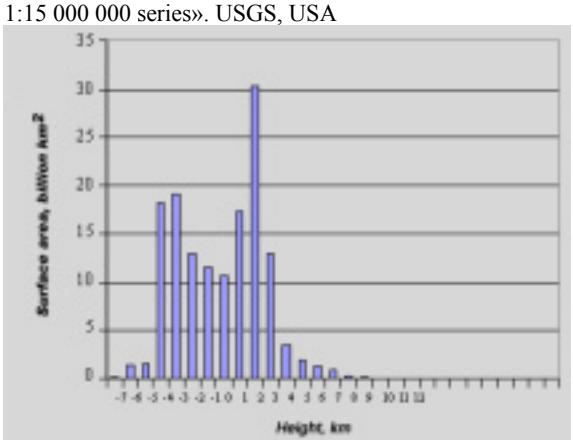

Fig.1 The dependence of the distribution of the heights levels versus the area occupied

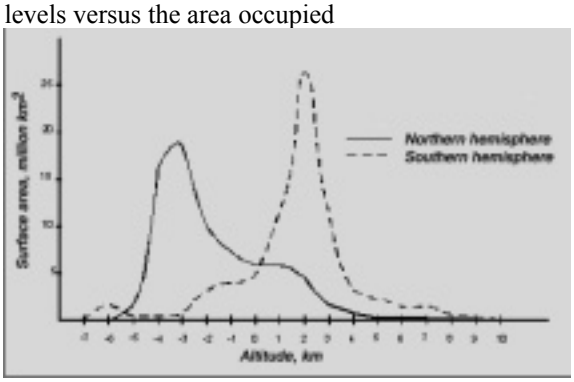

Fig.2 The distribution of the areas of heights levels in the northern and southern hemispheres

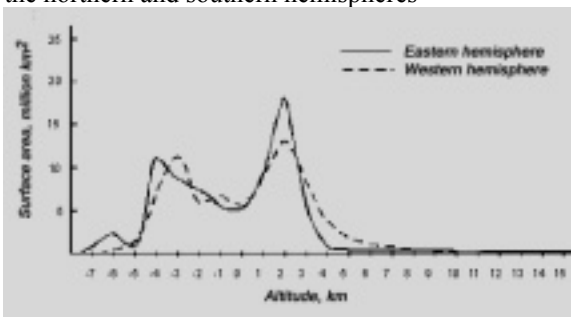

Fig.3 The distributions of the areas heights levels in eastern and western hemispheres of Mars