

A NEW VIEW OF GEOLOGICAL PROCESSES ON MARS FROM MARS ORBITER LASER ALTIMETER (MOLA) DATA

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A new view of geological processes on Mars from Mars Orbiter Laser Altimeter (MOLA) Data HEAD, III, J. W., and THE MOLA TEAM. Brown University, Providence, RI 02912, USA. The MOLA instrument has provided global topography of the surface of Mars. New information is now available on the topographic characteristics of such geological features and processes as impact craters, volcanoes, eolian and polar deposits, and the general topography and slope frequency distribution. Among the more interesting regional features is the northern lowlands. An ancient northern lowland ocean has been proposed to account for the fate of water from the outflow channels and geomorphic evidence cited by some suggests that coastal erosion occurred on a scale comparable to terrestrial paleolakes (Contact 2). We use MOLA data to test these hypotheses and to document the possible presence of water in the past history of Mars elsewhere. MOLA data show that the surface of Mars is smoother at all scales below Contact 2 than above. The volume of the region below Contact 2 is between the minimum estimated total outflow channel discharge and the maximum estimated megaregolith pore space. Contact 2 is close to an equipotential line. These results are consistent with the hypothesis that a large standing body of water may have occupied the northern lowlands in the past history of Mars. This and other new geologic findings from MOLA are described in the context of the geologic history of Mars.