2000 Fall Meeting
Search Results:

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withers

HR: 1330h
AN: P62B-02
TI: Shallow Ridges in the Martian Northern Plains
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AB: The northern plains of Mars, as seen by Viking, are essentially flat and featureless. The causes of their youth and smoothness are still debated. The Mars Orbiter Laser Altimeter (MOLA) instrument on the Mars Global Surveyor (MGS) spacecraft has drastically improved our knowledge of the topography of these plains, reducing km-scale vertical uncertainties from the Viking era by several orders of magnitude. MOLA data reveal that the northern plains are the flattest known surface in the solar system and that the plains are not featureless. The plains are criss-crossed by ridges. The ridges have characteristic heights of 100 metres, characteristic lengths of 100s of kilometres, and characteristic slopes of only 1 degree. Their incredibly shallow slopes explain why they escaped detection in the Viking era. Ridge locations and strikes are not distributed randomly. Ridges are most common near obvious stress centres such as Alba Patera and the Utopia Basin. In these regions, ridge strikes are preferentially radial to, or circumferential to, the stress centre. In regions of high ridge density, ridge spacing is on the order of 100 kilometres. Profiles across the ridges indicate that the ridges are asymmetric. The distribution of the ridges around obvious stress centres suggests that they have a tectonic origin. Analysis of the ridges within a tectonic model will provide insight into the hitherto unknown stress history of this large region of Mars. Analysis of the superposition of ridges and craters will constrain the ages of the ridges. Identification of similarities and differences between the different ridges will enable them to be classified into groups which share similar histories. Such a large group of shallow ridges has not been identified before on a terrestrial planetary body. Ridges are studied on all terrestrial planetary bodies to reveal the stress history of the body. Improving our knowledge of ridges by studying this new class will improve our knowledge of ridges and stress on all terrestrial planetary bodies. Acknowledgements: Dave Smith, Maria Zuber, USRA/GSFC Graduate Student Summer Program.
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