

The Accuracy, Stability, and “Value” of Geodetic Reference Parameters for Mars

David E. Smith¹ and Maria T. Zuber²

¹ NASA Goddard Space Flight Center, Greenbelt, MD

^{2,1} Dept. Earth, Atmospheric & Planetary Sciences, MIT, Cambridge, MA

Recent geodetic observations of Mars by the Mars Global Surveyor spacecraft, particularly the altimetry and gravity experiments, have provided a new framework in which Mars may be geodetically described. The complexity of Mars’ shape and its topography has made the simple definition of “reference ellipsoid” or “reference surface” of questionable value. In addition, the quality of the data now available has enabled seasonal variations of these geodetic parameters due to the atmosphere to be detected and, although small, they provide a real limit on the precision of any “constant” for Mars. We will discuss the implications for Mars geodesy and cartography.