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Significance of Water-Related Features on Mars

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Abstract
The debate on whether water exists on Mars has been resolved by recent data from the Mars Phoenix Polar Lander. The lander found water ice just below the surface in the high northern latitudes of Mars. The questions to be answered now are: how much water was present in the past, how much water is currently present, what was the state the water in the past, and what is the current state of water on Mars. The morphology and spatial relationships are examined between three different landforms (pitted cones, giant polygons, and putative shorelines) considered to be the result of water-related processes. At two locations, Utopia Planitia and Cydonia Mensae, these three features exhibit the same topographic relationship. Non-water-related features adjacent to or nearby the landforms, such as the Dichotomy Boundary, multi- ringed basins, and locations of recent methane release, are examined for possible relationships to the formation of these 3 landforms. My results support previous work that indicates a large water body existed in the northern lowlands of Mars at some time in the past. In addition large amounts of

sediment must have been shed from the highlands to the lowlands during this period to support the mud volcanism and giant polygon formation. Evidence also exists that mud volcanism was a common phenomenon during, and possibly after, the existence of the water body.