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## **MGS MOC and Water on Mars: No Northern Plains Ocean, no Gusev Crater Lake Sediment Access**

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More than 35,000 high resolution (1.5 to 12 m/pixel) pictures have been acquired by the Mars Global Surveyor (MGS) Mars Orbiter Camera (MOC) since 1997. Despite recent findings suggesting that there may be modern aquifers within a few hundred meters of the martian surface (Malin and Edgett, *Science* 288, 2330-2335, 2000), many old, Viking-based hypotheses regarding past water on Mars are not standing up well to the scrutiny of MOC. Thousands of images have been specifically targeted to test published hypotheses regarding geomorphic evidence for past martian lakes and oceans. The ocean hypothesis centers on the northern lowland plains. In the 1980s, several investigators speculated that Viking orbiter images showed shorelines in terrain around the margins of the plains. MOC images reveal unequivocally that none of the features resemble what they were said to resemble—the shorelines of large Pleistocene Great Basin lakes such as Bonneville. In many cases, nothing is present, in others, a break in slope, a fretted terrain landform, a geologic contact between two layered rock units, or an albedo contact is present. The view that the ocean “story” has passed a critical topographic test on the basis of MGS Mars Orbiter Laser Altimeter data is equally unsupported by MOC observations. Intracrater lake hypotheses have focused on Gusev Crater, which is connected to the Ma’adim valley. Gusev has received considerable attention as a possible landing site to serve the interests of the Mars astrobiology community. MOC images show that there is no access at the surface to the types of materials of which astrobiologists dream (*e.g.*, sedimentary rock outcrops, salt pans, tufa towers). Gusev’s floor and walls are highly modified and mantled; and while small impact craters may sample the subsurface, such materials are also mantled and their provenance is problematic. Other impact basins, however, do show tantalizing evidence of access to layered sediment (whether subaerial or sublacustrine is unknown); of particular interest is Holden Crater, connected to Uzboi Vallis, which exhibits outcrops of alternating light- and dark-toned bands. Unfortunately, such locations are inaccessible to presently-conceived lander/rover missions which are dictated by engineering constraints rather than science objectives. New MGS MOC images are received every day, and analysis is on-going.

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