

Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System (B)
Mercury: Visiting an Elusive Planet (B07)

MESSENGER'S FIRST MERCURY FLYBY: NEW INSIGHTS INTO GEOLOGICAL PROCESSES

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The MErcury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) spacecraft successfully completed the first of three flybys of Mercury in January 2008. The Mercury Dual Imaging System acquired color and high-resolution image data of regions previously unseen by spacecraft. These new data show that smooth plains are abundant in the newly imaged portion of Mercury; plains show evidence for embayment and flooding of impact crater interiors and exteriors typical of volcanic flooding processes. Different plains units have different albedo, color, and crater densities, supporting a volcanic origin for at least some smooth plains. Extensive tectonic scarps and wrinkle ridges characterize the newly imaged regions. The full Caloris basin was imaged, and the interior plains and exterior plains of Caloris have different albedo, color, and crater densities. The central part of the Caloris basin is characterized by an unusual array of radiating graben. Other unusual features include a floor-fractured crater, a kidney-shaped depression, and other features consistent with a volcanic and magmatic origin of parts of the surface of Mercury. These data, together with those from other instruments in the payload, provided baseline measurements that will aid in the interpretation of data from

the mission orbital phase.