



Imaging and Geologic Mapping of Tectonic Features on the Saturnian Satellites Dione and Rhea by the ISS Cameras in the Cassini Equinox and Solstice Missions

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Dione and Rhea, 1125 km and 1528 km in diameter, are neighbours in orbit about Saturn. Since July 2004, the narrow angle (NAC) and wide angle (WAC) cameras aboard the Cassini orbiter have observed their surfaces at regional (200 – 500 m/pxl) and high resolution (< 200 m/pxl) in several non-targeted (and at least one targeted) flybys. Both satellites are characterized by old, densely cratered plains which are more or less globally abundant and are at least 3 – 4 Ga old [1][2]. In addition, both satellites exhibit various tectonic features. On Dione, tectonism has occurred in several regions, with the highest intensity documented from its trailing hemisphere. Sets of linear to arcuate troughs and graben with bright scarps caused by exposed water ice are abundant. Mutual crosscutting of these sets indicate several tectonic episodes [2]. On Rhea, tectonic features are more or less restricted to the trailing hemisphere and are characterized by north-south trending sets of graben. In several cases on both satellites, graben transect craters with lower superimposed crater frequency compared to crater frequencies in the cratered plains, implying that tectonism has persisted longer than the period of heavy bombardment. Dependent of the applied cratering chronology model [1], tectonism on both satellites could have been active until \approx 3 to 1 Ga ago. Since the beginning of the Cassini Equinox Mission (first mission extension, Cassini orbits 074 – 138) in July 2008 and the Cassini Solstice Mission (second mission extension, orbits > 139) in Sep. 2010, the cameras have carried out several observations of Dione's and Rhea's tectonized regions. Non-targeted flybys on Dione in Cassini orbits 125, 129, 137 and 139 have improved previous observations where some of the tectonic features could only be seen at oblique viewing angles and at lower resolutions. The best images of Rhea's trailing hemisphere, including its tectonic features, were obtained in orbits 102 and 121. On Jan. 11, 2011, the ISS cameras are expected to observe the eastern part of the tectonized area and the adjacent cratered plains in the closest Rhea flyby to date. *References:* [1] Dones L. et al. (2009), in *Saturn from Cassini-Huygens* (M. K. Dougherty et al., eds.), p. 613 – 635, Springer, Dordrecht, NL. [2] Jaumann R. et al. (2009), in *Saturn from Cassini-Huygens* (M. K. Dougherty et al., eds.), p. 637 – 681, Springer, Dordrecht, NL.