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Geomorphology of Saturn's satellite Rhea: preliminary implications from the Cassini ISS data

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With a mean diameter of 1528 km, Rhea is Saturn's second-largest satellite. Its density of 1.233 gcm^{-3} implies a primarily icy body with smaller amounts of heavier elements. Spectroscopically, water ice absorption bands and a high geometric albedo (0.65) infer a surface dominated by the presence of water ice. Prior to the Cassini Mission, image data of the Voyager cameras showed a very old, heavily cratered surface. Up to now, the Cassini spacecraft has completed 35 revolutions around Saturn and has imaged Rhea globally at resolutions up to 350 m/pxl. The highest resolutions achieved so far are 6.5 m/pxl. In this paper we discuss the dominant landforms on Rhea and their ages obtained from cratering chronology models. Also, geomorphologic features on Rhea are compared to its inner neighbour satellite Dione which hosts a number of comparable features on its surface. **Results:** At regional scale, the densely cratered plains show little variation in terms of albedo and morphology. Lineations created by tectonic stresses appear to be characteristic for the cratered plains. Average model ages in these plains are on the order of 4 billion years (b.y.) and higher. Large craters and multi-ring structures are abundant, but ring structures have only one or two rings. Young, bright ray craters are not common on the icy saturnian satellites. At least one such crater (48 km diameter) with an extended ray system is found on Rhea. According to chronology models, this crater was formed either 2.5 b.y. or only 70 million years (m.y.) ago. As on Dione, features termed *wispy streaks* on low-resolution Voyager images which were thought to be volcanic deposits turned out to be tectonic in origin. While troughs and ridges found in various locations on Rhea infer preferentially extensional and (minor) compressional tectonism, en-echelon patterns of scarps and troughs in this former *wispy streak* region indicate shear stress.