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Magnetic Field Variations in the Saturnian Magnetotail Induced by Solar Wind Pressure Enhancements

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In order to understand the response of the Saturnian magnetosphere to solar wind dynamic pressure enhancements, we investigate magnetic field and plasma variations observed in-situ by the Cassini spacecraft. We take advantage of two particular orbits (Rev. 26 and 27) with similar radial distance, latitude and local time coverage of the Saturnian magnetotail to examine the large-scale structure and dynamics of the nightside current sheet. The observations obtained during these two orbits differ remarkably. During one of this orbit (Rev. 27), several increases of lobe magnetic pressure are observed, followed by a sudden change in the average position of the current sheet. The deformation of the current sheet lasted for several days before it returned to its past position. Correlation with enhancements in Saturn Kilometric Radiation emissions suggests that solar wind disturbances may have triggered the observed reconfiguration of the Saturnian magnetotail by compressing and relaxing the magnetosphere. We test this hypothesis using a solar-wind dependent model of the current

sheet and provide a plausible interpretation of the observed event that illustrates the Solar-planetary magnetosphere coupling.