



Measuring the stress state of the Saturnian inner magnetosphere

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A planetary magnetosphere is shaped by the planet's internal magnetic field and the currents that flow through the region. These currents are affected by the solar wind, magnetospheric plasma populations, and by processes like magnetic storms. Close to the planet, the dominant perturbations are from the magnetopause current, the tail current, and the ring current. At Earth, the Dst index measures the total magnetic perturbation at the equator due to these currents. There exists, however, no measure of the perturbation of the saturnian magnetosphere from its quiet state, a situation we seek to rectify with measurements made by the Cassini magnetometer. We restrict our data set to the magnetically quiet region near 5 Saturn radii when the spacecraft is close to the equator, thus minimizing the influence of transient signatures farther from the planet and of polar current systems. On each leg of Cassini's orbit, we subtract a model field from the magnetometer data and average the residuals over our quiet region. This averaged residual is the measure of the magnetosphere's stress on that orbit. Here we present the resulting index for the Cassini mission thus far.