

Cassini Imaging Science at Saturn: Global Atmospheric Dynamics and Cloud Morphology

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We present recent results produced by the ISS visible-wavelength imaging camera onboard the Cassini spacecraft, which has been orbiting Saturn since 2004. The atmosphere of Saturn is not static. Just like that of Earth, it harbors many phenomena with a wide range of timescales that evolve over time. Our presentation will first present a mean-state of Saturn using a global mosaic of Saturn. The cloud features of Jupiter are well-characterized due to the stark contrast presented by light and dark bands, the Great Red Spot, and other discrete vortices. In comparison, Saturn's cloud bands and features are more muted due to the thick global stratospheric haze layer that masks the tropospheric clouds. In addition, we emphasize that, because the rings and ring shadows obscures much of the winter planet, global maps of Saturn can be obtained only from the vantage point of an orbiting spacecraft. Using the images of Saturn obtained before and after the equinox of 2009, we have constructed global cloud mosaics of Saturn. We also present temporal evolution of the zonal wind profile between 2005 and 2013.

We will first give a global overview of cloud features on Saturn that has been observed by Cassini and then focus on individual regions of interest. Among the many cloud features, we focus on the following. The first feature we will report on is the changes exhibited by the region where the Great Storm of 2010-2011 erupted. The disturbance left behind the storm continues to evolve, and we present the latest update. Second, we present the morphology of the north polar region. The hexagonal cloud feature at 75 degree N latitude emerged from the winter shadow in 2008, and its morphology fully came into view after the equinox in 2009. The cloud contrast has been evolving with seasons, and we present our observation. We also report our observation of the north-polar vortex, and compare that to its southern counterpart.

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