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Observation of water in Saturn with Herschel: probing Saturn's 2011 storm

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Saturn's usually slowly evolutive seasonal cycle has been disrupted in December 2010 between 20° N and 50°N by the outbreak of an unexpected planetary-scale storm system. First Cassini/CIRS and ground-based observations have shown that temperatures, winds and chemistry have been rapidly affected by the storm in the stratosphere. Subsidence of warmer stratospheric air around the initial vortex at 1 mbar caused a dramatic increase in the infrared emission. Initially, a 16 K difference between these warm stratospheric regions, referred to as "beacons", and the cool central vortex was reported. Data taken in May 2011 by Cassini/CIRS show that the "beacons" have merged into a single hot spot. The temperature at 1 mbar had reached 190 K over a wide region according Cassini/CIRS.

In this paper, we will present observations of water in Saturn carried out with the Herschel Space Observatory during the storm, in July 2011. These observations will be analyzed and differences in terms of temperature and/or water abundance between the beacon region and the rest of the planetary disk will be evaluated.