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Global observations of proton precipitation during the 21.-25. October 2001 geomagnetic storm

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The SI-12 camera onboard the IMAGE satellite is the first camera to provide global images of the proton aurora. A major part of the magnetospheric ring current consists of protons with energies detectable by the SI-12, and it is thus believed that the trapped ring current kinetic energy, represented by the SYM-H index, is closely related to the proton precipitation observed by the SI-12. IMAGE's highly elliptical orbit provided good views of the northern hemisphere during the 21.-25. October 2001 geomagnetic storm, including the entire growth phase. A comparison of proton precipitation with the SYM-H index shows that in general, the proton precipitation does not follow -SYM-H. Furthermore, the SI-12 data shows an immediate response to changes in solar wind pressure. The proton precipitation seem to increase during times when SYM-H is decreasing, probably due to injection of new protons in the nightside through convection and substorm processes.