

PRELIMINARY ELECTRON DENSITY RECONSTRUCTIONS
OF THE APRIL 2002 GEOMAGNETIC STORM

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One of the interesting features of the strong geomagnetic storm that occurred between April 17 and 20, 2002 is the rather smooth recovery, which followed. This storm peaked on April 20 and was followed by a recovery period over April 21-22, 2002. On April 20, the *Dst* index reached a minimum level at -149 nT at 0900 UT. Similarly, the Kp level reached 7.33 between 0300 and 0700 UT, indicating a strong G3 geomagnetic storm. Over the next two days, the *Dst* index recovered to nominal conditions. The Kp index returned to undisturbed values of 2.67 by 2200 UT on April 20, and remained under 3 for most of April 21-22, 2002. These dramatic changes in the geomagnetic conditions drive major changes in the global ionosphere. These changes can be observed by examining space weather maps of the global electron density distribution. This study presents preliminary space weather maps of the electron density demonstrate the global ionospheric behavior during this storm recovery. These maps are generated by the Ionospheric Data Assimilation Three Dimensional (IDA3D). IDA3D is a 3DVAR algorithm for ionospheric electron density. It statistically minimizes the available measurements and a background electron density field. Typically, this electron density field is determined from a climate model of the ionosphere, for this study the RIBG model. IDA3D uses several data sets of electron content and electron density measurements including ground-based GPS electron content, LEO-satellite-based GPS electron content, GPS-occultation electron content, radio beacon tomography electron content, ionosonde electron density, incoherent scatter radar electron density and *in situ* satellite electron density observations.

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