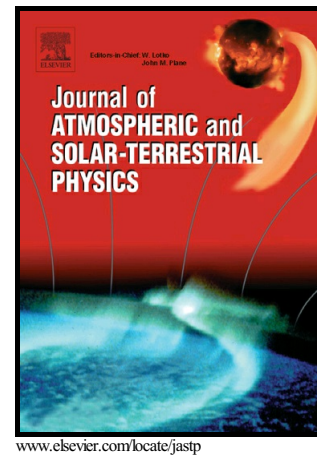


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Hemispheric Differences in the Response of the Upper Atmosphere to the August 2011 Geomagnetic Storm: A Simulation Study

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Abstract

Using a three-dimensional nonhydrostatic general circulation model, we investigate the response of the thermosphere-ionosphere system to the 5–6 August 2011 major geomagnetic storm. The model is driven by measured storm-time input data of the Interplanetary Magnetic Field (IMF), solar activity, and auroral activity. Simulations for quiet steady conditions over the same period are performed as well in order to assess the response of the neutral and plasma parameters to the storm. During the storm, the high-latitude mean ion flows are enhanced by up to 150–180%. Largest ion flows are found in the main phase of the storm. Overall, the global mean neutral temperature increases by up to 15%, while the maximum thermal response is higher in the winter Southern Hemisphere at high-latitudes than the summer Northern Hemisphere: 40% vs. 20% increase in high-latitude

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