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Observations of ionospheric outflow events as measured by the Low Energy Neutral Atom (LENA) imager on IMAGE in association with variations in the solar wind.

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Abstract:

The Low-Energy Neutral Atom (LENA) imager on the IMAGE spacecraft was designed to observe ionospheric outflow events in the energy range, 10-100eV. The energetic neutrals, created through charge exchange processes involving superthermal ionospheric ions and atoms in the exosphere, are imaged by LENA and provide an insight into the dynamics of the topside ionosphere and interaction of the solar wind with the magnetosphere. In the study presented here, we present several clear enhancements observed by LENA, which originate close to the Earth, suggestive of classic outflow events. These events appear to be associated with fluctuations in solar wind pressure and also to variations in Dst, as measured by ground magnetometers in the equatorial plane. We present the data in a systematic study to try to understand the generation mechanism for the outflow events and to try to charcaterise them to changes in the solar wind-magnetospheric environment. By determining the flux and energy of the outflow events, we have a means of associating them to global magnetospheric changes.