

## عنوان مقاله:

A Study on the Effects of Solar Protons on the NOy by Magnetic Storm Events from ۲۰۰۳ to ۲۰۱۲: A Comparison between the Southern and Northern Hemispheres

## محل انتشار:

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## خلاصه مقاله:

In the study of solar-terrestrial relationships, magnetic storms and solar activity play important roles. In this paper, the intense magnetic storms in company with solar proton events occurred in October and November ۲۰۰۳, January ۲۰۰۵, December ۲۰۰۶, January and March ۲۰۱۲ have been considered. The variation of the odd nitrogen (NOy) oxides and ozone in the stratospheric layer is investigated by the effects of energetic particle precipitation. Anomaly percentage of the odd nitrogen (NOy) oxides and ozone are calculated separately for the Southern and the Northern hemispheres and geographic latitude from ۶۰ to ۸۰ degrees. The analyzed results of the observational data showed that the intense magnetic storms, which consist of more than ۵۰۰ (particles/cm<sup>2</sup> s sr) solar energetic proton ( $E > 10 \text{ MeV}$ ), gave rise to the increase of the odd nitrogen (NOy) oxides in the stratosphere, from level ۱ mb to ۲۰۰ mb. Also, the results showed that in November ۲۰۰۳, January ۲۰۰۵, December ۲۰۰۶, January and March ۲۰۱۲ the odd nitrogen (NOy) oxides, which consist of over ۵۰۰ (particles/cm<sup>2</sup> s sr) increased in the Northern hemisphere but decreased a little in the Southern hemisphere. Among the events of the magnetic storms in the autumn and winter seasons, the only event on the October ۲۰۰۳, showed that the odd nitrogen (NOy) oxides increased in the Southern hemisphere. The results showed that the increase in the odd nitrogen (NOy) oxides caused a decrease of ozone in the altitude below the odd nitrogen (NOy) with a delay.

## کلمات کلیدی:

Magnetic storms, solar proton, solar activity, odd nitrogen oxides, energetic particles

## لینک ثابت مقاله در پایگاه سیویلیکا:

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