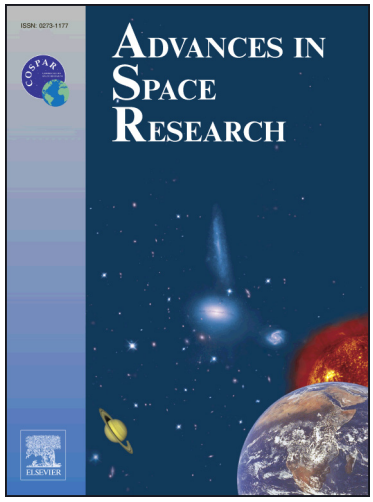


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# Ionospheric effects of solar flares and their associated particle ejections in March 2012

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## Abstract

Flares of March 4–9, 2012 were accompanied by an intensification of solar electromagnetic and corpuscular radiations and five coronal mass ejections. Bursts of X-rays and increased solar cosmic ray fluxes caused an increase in ionospheric absorption manifesting itself in data from vertical sounding stations as enhancements of the lowest frequency of reflections up to 4–6 MHz at the daytime and as the disappearance of reflections in the ionograms of high latitude stations. Interplanetary coronal mass ejections (ICME) generated March 7–8 moderate and March 8–11 intense magnetic storms accompanied by ionospheric disturbances. At the peaks of both magnetic storms there were abrupt afternoon-evening decreases in the ionospheric F2-layer critical frequency (foF2). During the March 7–8 storm, the foF2 decrease concurred with the reversal of the interplanetary magnetic field azimuthal component (IMF By) which initiated restructuring of magnetospheric convection; during the March 8–11 storm, with the abrupt weakening of the interplanetary magnetic field southward component (IMF Bz) which triggered a substorm.

*Keywords*: Ionospheric disturbance; Magnetic storm; X-ray flare; Solar cosmic rays; Coronal mass ejection

## 1. Introduction

Solar flares associated with particle ejections can produce geospheric disturbances whose onset, duration and intensity depend on power and spectrum of a flare, its position on the Sun,

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