



Impacts of CME on the TEC at middle and low latitudes during maximum of the 24th solar cycle

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In this study we analyzed the impacts on the GNSS-derived Total Electron Content (TEC) of four selected CME hitting the Earth during the year 2013 at different stations of middle and low latitudes (Ebre, Rabat, Alexandria, San Fernando, M'barara, Matera and Dakar). In order to analyze the seasonal behavior of TEC under these disturbed conditions in the mentioned stations we have selected four CME events occurred during the different seasons (January 19, March 17, July 9 and October 2) of year 2013, at a maximum of the sunspot cycle 24.

At the beginning of each event there is an increase of TEC followed by a decrease. The first increase of TEC is a consequence of the Prompt Penetration of the Electric Field (PPEF). The depletion of the TEC is associated to the Disturbance Dynamo Electric Field (DDEF).

In order to interpret the observations we analyzed the convection patterns at high latitudes given by the radar SUPERDARN. At low latitudes, we derived the ionospheric electric current disturbance D_{iono} from ground magnetic variations. D_{iono} is the sum of the DP2 (PPEF) and D_{dyn} (DDEF) electric current systems.

Finally we found that the strength of the impact at middle and low latitudes depends on the time of the impact of the CME and the season.