

Interactive comment on “Investigation of Effects of Coronal Mass Ejections on Ionospheric Total Electron Content over Nsukka, South Eastern Nigeria” by Esther A. Hanson et al.

Anonymous Referee #1

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Comment on “Investigation of Effects of Coronal Mass Ejections on Ionospheric Total Electron Content over Nsukka, South Eastern Nigeria”

This manuscript reports the GPS/TEC observations over Nsukka, in south eastern Nigeria. The authors focus on the diurnal variation of the GPS/TEC and discuss its connection to the speed of the CME from the Sun. The study, however, does not mention the physical processes behind the ionosphere-CME connection at all. If the causal effect is explained in the framework of the magnetic/ionospheric storm, the CME must hit on the magnetopause first, then cause geomagnetic disturbances, and by changing the electric field or injecting heat into the atmosphere to disturb the ionosphere.

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My concerns are therefore as follows: 1. The authors did not show how they choose the CME events. Did these CME actually hit on the magnetosphere and cause geomagnetic disturbances? If not, how can they affect the ionosphere? 2. The diurnal variation of the ionosphere can be affected by several mechanisms related to the coupling between the magnetosphere, ionosphere, and the thermosphere. For example, the prereversal enhancement (PRE) of the electric field in the ionosphere, is known to occur around sunset and shortly enhance the ionospheric electron density before night. This feature seems to be exhibited in some of the authors' figures, but it is interpreted as an effect of CME in the text. 3. The data used in Fig. 10 and Fig. 12 seem to have some gaps (noticing the straight green line segments in the figures). The gaps could largely distort the diurnal variation of the TEC, so the data should be discarded or replaced with more continuous records.

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