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What is the function between the geomagnetic indices and the ionospheric foF2 parameter during the maximum of the #24 solar cycle at midlatitude?

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In our study we analyzed the differences between the effect of CME-related (Si disturbance) and of HSS/CIR-related (Gs disturbance) geomagnetic storms in the ionospheric F2-layer during the maximum of the recent #24 solar cycle (2012-2015). These effects were investigated by taking into consideration the seasonal and daytime variations also. We used the ionospheric foF2 parameter from the midlatitude ionosonde of Széchenyi István Geophysical Observatory (IAGA code: NCK) in this work. A total number of 62 geomagnetic storm periods were analyzed: 21 from summer and 41 from winter time periods. In the main phase of the storms we compared the data of the foF2 parameter with the global geomagnetic Dst-, Kp- and AE-index.
In summer at Noon an Si disturbance decreases the foF2 parameter (negative ionospheric storm effect), while the Gs disturbance triggers an increase (positive ionospheric storm effect) in the F2-layer parameter value as a function of geomagnetic storm magnitude. On the other hand, the Dawn data doesn't show such a reverse effect: both storm types causes decrease in the foF2 parameter value.
In winter time period the Noon data presents a much more scattered behavior during Si disturbances which makes impossible to establish a trend (positive or negative) as a function of storm magnitude. At the same winter time period we can observe a clear increase in the foF2 parameter value during Gs disturbances as a function of geomagnetic storm magnitude.
The response of ionospheric parameter values to a geomagnetic storm are very similar at Dawn during summer and winter: slight decrease.
We can conclude that in summer the effect on ionospheric parameters of both geomagnetic storm types (i.e, Si and Gs) is more significant than in winter. Another conclusion is that while the Kp-index does not correlate well with the ionospheric parameter values, the Dst index shows a very good correlation with the ionospheric parameter values during a geomagnetic disturbance.