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A study on anomalies of the ionospheric total electron content and worldwide M≥6.0 earthquakes

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Statistical analyses on pre-earthquake ionospheric anomalies (PEIAs) are implemented on the relationship between the total electron content (TEC) in the global ionosphere map (GIM) derived from measurements of ground-based GNSS (global navigation satellite system) receivers and worldwide M≥6.0 earthquakes during 2000-2017. Both mean-based and median-based analyses are employed to find the characteristic of TEC anomalies related to the earthquakes. The normality of the GIM TEC shows that the mean-based analysis is not suitable and applicable. Results of the median analyses reveal that PEIAs could be significantly negative (decrease) and/or positive (increase) in the GIM TEC, which vary location-by-location, and appear few days before the earthquakes. PEIAs with the negative polarity appear more frequently than those with the positive one.