Ionospheric detection of underground nuclear explosions

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GNSS measurements can be used to determine the ionospheric delay along the paths of the signals. The ionosphere responds not only to the solar activity and space weather condition but also to earthquakes, tsunamis, tropical storms, chemical explosions, underground explosions, and other geophysical activities. These phenomena can generate disturbances in the ionosphere, referred to as traveling ionospheric disturbances (TIDs). Consequently, TID can be extracted from the ionospheric delay of GNSS signals by eliminating the dominant trend from the solar diurnal variation. The aim of this study is to discriminate the specific TID wave generated by the underground nuclear explosion from other events such as earthquakes.