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Abstract Title

Traveling ionospheric disturbances in the far field induced by tsunamis.

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Abstract

Every so often, large tsunamis affect countries on the Pacific Ring of Fire. These events can cause Traveling Ionospheric Disturbances (TIDs), which reach the ionosphere due to the production and propagation of gravity waves. TIDs can be observed several thousand kilometers away from the source. Total Electron Content (TEC), calculated indirectly using signals from Global Navigation Satellite System (GNSS) receivers, enables the detection of TIDs. Additionally, an instrument can be used to measure the behavior of the ionosphere from the ground without integrating the entire electron column and observe the TID. In this case, by incorporating a vertical component, an ionosonde enhances the spatial and temporal resolution provided by TEC, facilitating the detection of TID effects on the ionosphere. This work aims to identify TIDs several thousand kilometers away from the source in the South Pacific, comparing the results with tsunami models and data. This procedure allows us to observe signals that arrive after or at the same time as the tsunami reaches the coasts, but also others that are detected hours before the wave completes its journey over the Pacific Ocean. Establishing a possible association between these TID parameters and transpacific tsunamis would contribute to understanding the mechanisms involved and could aid in the development of early warning systems in near real-time in the future.