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Study of Ionospheric Total Electron Content (TEC) Variations before The 2019 M 6.9 Sunda Strait Earthquake in Indonesia

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Researchers around the globe have been carrying out studies related to short-term earthquake predictions. The studies use various approaches of observation methods to find the early signs of anomalies, both physically or chemically changes before the occurrence of earthquakes, as known as precursors. One of the precursors is the emergence of total electron content (TEC) anomaly within the ionosphere. Stress accumulation in the lithosphere can cause microfractures resulting in charged particles possibly release from those microfractures around the earthquake preparation zone toward the atmosphere and disturb the TEC variations. Therefore, this research aims to find the anomaly of TEC before M 6.9 of the 2019 Sunda Strait earthquake which hit several provinces in Indonesia around the Sunda Strait that caused 6 casualties and hundreds of injured. Moreover, this study implements the correlation technique with a threshold and obtains the TEC data from Global Ionospheric Maps (GIM) of the Center for Orbit Determination in Europe (CODE). As a result, it shows that an anomaly of TEC was recorded 22 days before the earthquake occurrence. Also, the Disturbance storm time (Dst) index is utilized to validate that the recorded anomaly is not caused by the geomagnetic storm.

Keywords: Earthquake, TEC, Ionosphere, Precursor.

Promotional text

I am very enthusiastic to participate in the CTBT Science and Technology 2021 Conference for improving my capacities and capabilities as a geophysicist. In addition, I also want to expand my network with other researchers, scientists, and professional careers around the globe.

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