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# Lower Ionospheric variations during the intense tectonic activity in the broader area of Greece on October of 2020

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In this paper we investigate the Lower ionospheric variations from TEC observations during the intense seismic activity of October 2020 in the area of Greece (35 $^{o}$ £ j £ 42$^{o}$ N, 19 $^{o}$ £ l £ 29$^{o}$ E). The Total Electron Content (TEC) data are been provided by the Hermes GNSS Network managed by GNSS_QC, AUTH Greece, the HxGN/SmartNet-Greece of Metrica S.A, and the EUREF Network. These data were analysed using both, statistical analysis of TEC variations in order to detect uneven gross variations and Discrete Fourier Analysis in order to investigate the TEC turbulence. The results of this investigation indicate that the High- Frequency limit $f_o$ of the ionospheric turbulence content, increases as aproaching the occurrence time of the earthquake, pointing to the earthquake epicenter, in accordane to our previous investigations (Contadakis et al., 2009; Contadakis et al., 2012; Contadakis et al., 2015; Scordilis et al., 2020). We conclude that the LAIC mechanism through acoustic or gravity waves could explain this phenomenology. Thus, observing the frequency content of the ionospheric turbidity we observe a decrease of the higher limit of the turbitity frequency band, as a result of the differential frequency attenuation of the propagating wave. In addition, the statistical analysis shows an excess greater than 3σ from the mean TEC values one and seven days before the earthquake. Since no major disturbance of the geomagnetic field occured during these days, we conclude that we probably observed precursory Ionospheric variations in accordance to analogous findings from the variation of VH/VHF electromagnetic wave propagrations over strong earthquake areas (e.g. Biagi et al. 2019)

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