Simultaneous Observations of D-, E- and F-regions of the Ionosphere During the Solar Eclipse Observed on 22 July 2009

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The solar eclipse of 22 July 2009 was the longest total solar eclipse during the 21st century, not to be surpassed until June 2132 with totality centered 20 ~30 latitude belt. A solar eclipse provides a unique opportunity to study the ionospheric variations (especially D-,E- and F-regions) with the sudden fall in the ionization creating a nocturnal ionospheric circumstances. The ionospheric response to the eclipse has been studied extensively by various methods which include GPS TEC measurements, Ionosonde network, coherent and Incoherent scatter radars. Recently, Patra et al. (2009) studied the E-region plasma irregularities triggered by the solar eclipse which was occurred on 11 August 1999. He conjectured that the solar eclipse can provide nighttime ionospheric conditions which provide the necessary electron density gradient and make the layers unstable through gradient-drift instability mechanism. In this context, present study aims to investigate and discuss the changes in the mid-latitude D-, E- and F-regions of the ionosphere by using observations from Busan Sudden Ionospheric Disturbance (SID) monitor operated from Jeju Island, Korea Science Academy magnetometer operated by radio research agency and Jeju GPS station operated by KASI to study GPS TEC variations during a solar eclipse, on 22 July 2009. The observations reported here should therefore shed some light on the solar eclipse induced mid-latitude ionospheric dynamics which leads to the changes in D-, E- and also F-regions of the ionosphere.

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