

Ionospheric responses to the 21 Aug 2017 total solar eclipse observed by Digisondes

*Shih-Sian Yang¹, Jann-Yenq Liu^{1,2}, Yang-Yi Sun³, CHIYEN LIN¹

1. Institute of Space Science, National Central University, Taiwan, 2. Center for Space and Remote Sensing Research, National Central University, Taiwan, 3. Institute of Geophysics and Geomatics, China University of Geosciences, China

The photoionization processes in the ionosphere are triggered by solar radiation and hence the ionosphere could be influenced by a solar eclipse. In the present study, ionospheric parameters sounding by Digisonde are employed to study the ionospheric responses to the 21 Aug 2017 total solar eclipse, over the three stations of Boulder (40.0°N, 105.3°W, with a maximum obscuration of 1.00), Alpena (45.1°N, 83.6°W, 0.717), and Millstone Hill (42.6°N, 71.5°W, 0.631) in the United States. All the records over these stations show significant decreases in F2 layer critical frequency (foF2) during the eclipse. Meanwhile, the F2 layer peak heights (hmF2s) are also varied during the eclipse. Further wavelet analyses reveal that hmF2s are oscillated over these three stations during the eclipse, with wave periods around 60 to 80 minutes. However, no correlated oscillation is found in foF2. The results indicate that the ionosphere are vertically oscillated, which may be attributed to longitudinal waves causing by the solar eclipse.