# Investigation of the electron density variation during the August 21, 2017 Solar Eclipse

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This paper presents a comparison of Field Line Interhemispheric Plasma (FLIP) model calculations [e.g., *Richards et al*., 2017] with Digisonde measurements of the ionosphere electron density for the August 21, 2017 solar eclipse (Figure 1) The instrument was operated by the Idaho National Laboratory in Idaho Falls (43.81˚N, 247.32˚E). The maximum solar eclipse occurred at 17.53 hours UT on August 21 when the obscuration was 99.6%. The solar apparent time was 9.96 hours, and the duration of the eclipse was 2.7 hours. It was found that the assumption of no chromosphere emission and 30% coronal emission remaining at totality gave the best fit to the electron density variation at 150 km, and that was used for all the calculations. The agreement between the modeled and measured electron density is excellent at 150 km with the assumed 30% coronal emission at totality [*Reinisch et al.*, 2018] At other altitudes, the agreement is very good but the altitude profile would be improved if the model peak electron density ($N_mF_2$) decayed more slowly to better match the data. The minimum $N_mF_2$ in the model occurs ~10 minutes after totality when it decreases to 0.55 from its non-eclipse value. The minimum of the measured $N_mF_2$ data occurs between 6 and 10 minutes after totality but is ~15% larger. The total electron content decreases to 0.65 of its pre-eclipse value. These relative changes agree well with those predicted by others prior to the eclipse [*Huba and Drob*, 2017].

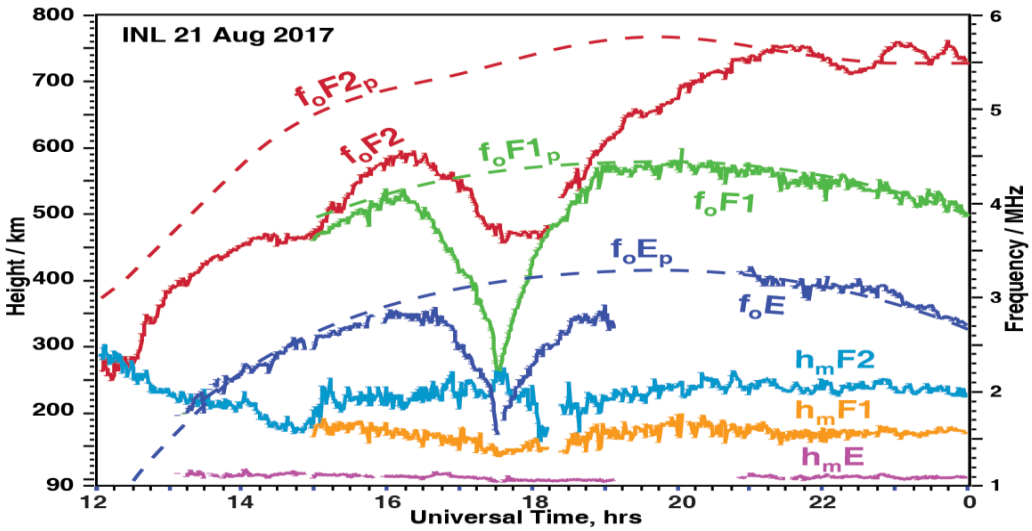


**Figure 1.** Measured ionospheric characteristics and IRI predictions

Huba, J.D. and D. Drob (2017), SAMI3 prediction of the impact of the 21 August 2017 total solar eclipse on the ionosphere/plasmasphere system, *Geophys. Res. Lett*., 44, 5928–5935, doi:10.1002/2017GL073549.

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Richards, P., R. Meier, S.-P. Chen, D. Drob, and P. Dandenault (2017), "Investigation of the causes of the longitudinal variation of the electron density in the Weddell Sea Anomaly, *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2016JA023565, 2017.