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SUPIM-INPE as a predictor of the ionospheric impact of solar eclipses

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Abstract

Historically, solar eclipses have been astronomical events that have fascinated humanity. The ionosphere, the conductive layer of the atmosphere, depends directly on solar radiation, so it is affected during solar eclipses. Some of the ionospheric layers are more affected than others. SUPIM-INPE is a model that has worked well over South America during the 2019 and 2020 eclipses. The modifications of the model for these eclipses were done in two independent steps: 1) considering the decrease in solar EUV radiation of the chromosphere, and 2) in the solar corona. Based on what has been learned in those previous studies, some modifications have been made in order to improve the measured observed response. Specifically, the thermospheric wind model has been updated, and the neutral composition changes observed during eclipses have been considered. This work presents the predictions of the ionospheric response to the two following eclipses that will occur in America, the solar eclipse of October 14, 2023 and April 8, 2024.