

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)

Recent Advances in Equatorial, Low- and Mid-Latitude Mesosphere, Thermosphere and Ionosphere Studies (C1.1)

Either poster or oral presentation (no preference).

EFFECTS OF THE DIFFERENT TIMES OF SUNRISE AT DIFFERENT ALTITUDES IN THE IONOSPHERE

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It is well established that the sunrise and sunset periods are of particular importance to ionospheric research and modeling because of the rapid changes in the ionospheric plasma density, temperature, and dynamics. In particular, the sharp increase in the ionisation following sunrise results in a quick increase in the ionospheric peak density, $N_m F_2$, and a decrease in the peak height, $h_m F_2$. Changes in plasma temperature, scale height and transport processes add further complexity which makes it difficult to investigate and model the ionospheric behaviour during this transitional period from night to day. One of the aspects contributing to this difficulty is that not all ionospheric altitudes are exposed to the first sunlight of the day at the same time. During sunrise, the upper part of the ionosphere is illuminated prior to the lower part which is still in the dark. The boundary between sunlit and dark regions moves downwards until it reaches the surface of the Earth, which is commonly taken as the moment of sunrise at certain geographical coordinates. This means that the “traditional” sunrise does not occur until after the entire ionosphere has been illuminated. During sunset, the same process happens in reverse order. In this presentation, we will address the issue and report on our study of some of the effects of this altitude-dependent time of sunrise on the diurnal variations in the ionospheric characteristics.