

Variations in the tweek reflection height during Solar Cycle 21

Hiroyo Ohya^{1*}, Kazuo Shiokawa², Yoshizumi Miyoshi²

¹Chiba University, ²STE lab., Nagoya University

The purpose of this study is to reveal variations in the tweek reflection height during Solar Cycle 21 (1976-1986). Typical tweek atmospherics are reflected at a height where the equivalent electron densities are 20 - 30 cm⁻³. Descent (rise) of the reflection height corresponds to increase (decrease) in electron density in the ionospheric D- and lower E-regions. It is well known that electron density in the sub-ionosphere depends on solar activities, although the detailed investigation has not been sufficiently performed yet. An advantage of using tweeks is to be able to monitor variations of electron density less than 10²cm⁻³ along long propagation paths (several thousands of kilometers). From cut-off frequency for the first order mode on dynamic spectrum, we can estimate the reflection height. We use tweek data obtained at Kagoshima (31.5N, 130.7E), Japan, on magnetically quiet days during 1976-1981. The results showed that a correlation coefficient between the tweek reflection height and the sunspot number was low to be -0.32. A weak negative correlation reveals that the tweek reflection height decreases from 105 km to 95 km with standard deviations of +/- 2.5 km with increasing the sunspot number. In the presentation, we discuss possible causes of this long-term variation of the reflection height.