Reflection height of tweek atmospherics during the solar cycle 21

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The purpose of this study is to reveal variations of tweek reflection height during the solar cycle 21. 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 10^2 cm^{-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 1976-1979. The reflection heights at the solar maximum tend to be lower than those at the solar minimum. In the presentation, we discuss possible causes of this long-term variation of reflection height.