

PEM032-P10

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Study on the estimation of the electron density profile in the lower ionosphere with time domain Full wave analysis

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MF radar estimates the electron density profile in the lower ionospheric D and E regions at the altitude from 60km to 100km by using the partial reflection information of MF radar transmission wave. Electrons of lower ionosphere are closely related to neutral dynamic meteorology and chemistry including such as hydrated ion and NO_x in this region, therefore, it has a possibility to find a new physical knowledge in the mesosphere and lower ionosphere. However, it is difficult to observe precise electron density profile in the lower ionosphere continuously with the present MF radar system.

In this study, we are going to simulate the observation process of the present MF radar system with using time domain Full wave method, and investigate the observation method to observe the precise electron density profile in the lower ionosphere. One of the methods to estimate the electron density profile by the present MF radar system is DAE. DAE is a technique to estimate the electron density profile from the differential amount between the left and the right polarized waves reflected by the lower ionosphere. We have simulated the observation process of MF radar and examined the problem and improvement points with time domain Full wave analysis. We found some parameters used in DAE method are not appropriate. We can estimate more accurate electron density profile by using appropriate parameters in DAE method.

Keywords: electron density in the lower ionosphere, Full wave analysis, MF radar, DAE method