2-dimentional FDTD simulation about spatial structure change of sporadic E layer

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Sporadic E layer occurred in the E region of the ionosphere at the altitude of 90km to 140km causes unexpected propagation characteristics of the MF radio waves. Es layers with spatial structure are found in recent observations. In order to confirm the influence of spatial structures of the sporadic E layer on the MF radio waves propagation, we performed a series of 2-dimensional FDTD simulations using different Es layer models. In these simulations, we observed the spatial profiles of the magnetic field and the altitude profiles of the magnetic field along the assumed trajectory of the sounding rocket.

Simulation results indicate that spatial structure of Es layer affect the propagation characteristics of MF radio waves. These influences are shown especially on propagation characteristics of MF radio waves above the altitude of the Es layer. Therefore, spatial structure of Es layer can be estimated by analyzing the altitude profile of the magnetic field.

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