

## Estimation of spatial structure of sporadic E layer observed by sounding rocket with 2-dimensional FDTD simulations

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We developed a 2-dimensional FDTD simulation code which can treat wave propagations in magnetized plasma. According to sounding rocket experiments, we can only obtain altitude profile of wave intensity, usually magnetic field intensity. In this study, therefore, we are going to estimate spatial structure of sporadic E layer in the lower ionosphere by analyzing the altitude profile of the magnetic field intensities.

We compared simulation results and observation results obtained by S-310-40 sounding rocket, but were not able to identify spatial structure of the sporadic E layer. This is because the scale of the spatial structure of the sporadic E layer assumed in the simulation was inappropriate. We are going to perform 2-dimensional FDTD simulations with different spatial scales of the sporadic E layer, and investigate the influence that a scale of the space structure gives electric wave propagation. Then, we will identify spatial structure of the sporadic E layer observed by S-310-40 sounding rocket from the altitude profile of the magnetic field.

Figure 1 shows an example of our 2-dimensional FDTD simulations. We extract the altitude profile of wave strength from the spatial profile of wave strength in the ionospheric FDTD simulation, then compare these simulation results and sounding rocket observations.

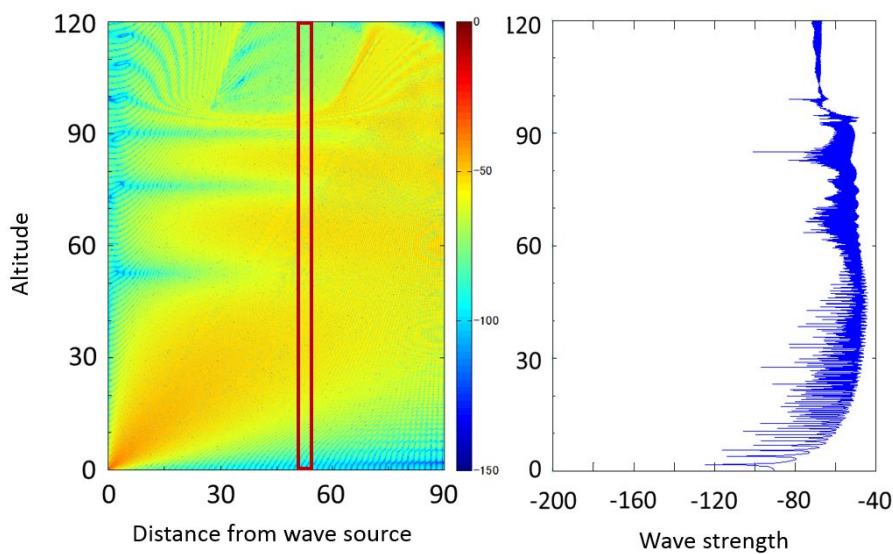


Fig.1: Spatial profile and altitude profile of wave strength in the ionospheric FDTD simulation