# Development of the electron density automatic estimation algorithm in the ionosphere lower region

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In the lower ionosphere, the approximate electron density profile can be estimated from the comparison between these observation results obtained by sounding rocket and propagation caracteristics calculated with Full wave method. This estimation process, which is so-called ”wave absorption method”, has some problems. At first, we have no clear standard for comparing observation results and propagation characteristics calculated with Full wave method. In addition, we have to iterate many times correcting the electron density profile by handwork, calculating propagation characteristics with Full wave method and comparing observation results and calculated propagation characteristics. This iteration takes too long to estimate appropriate electron density profile. To reduce these problems, we developed an application to realize automated estimation of electron density profile by analyzing radio wave propagation characteristics.

In the previous study, they succeeded to estimate accurate electron density profile in the ionosphere automatically in very short time. In the estimated electron density profile, however, there was an unnatural sudden fluctuation of the electron density in low-altitude region. We improverd the estimation algorithm and succeeded to estimate natural electron density profile automatically.

Keywords: ionospheric lower region, Full-wave method, altitude profile of electron density