

## Analysis of parameters controlling the occurrence and growth of equatorial plasma bubbles using GAIA

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In our previous studies, the linear growth rates of the Rayleigh-Taylor (R-T) instability in the ionosphere were obtained with a whole atmosphere-ionosphere coupled model GAIA, and the growth rates were compared with observations [Shinagawa et al., 2018]. We found that a high growth rate of R-T instability tends to correspond to the actual equatorial plasma bubble (EPB) occurrence. The result suggests that the occurrence and growth of EPB are controlled both by atmospheric waves propagating from the lower atmosphere and by geomagnetic activities. However, dependence of various parameters such as electric fields, electron and neutral densities, and neutral wind velocities on the EPB occurrence and growth has not been quantitatively understood. We will discuss how those parameters affect the linear growth rates of the R-T instability using GAIA simulation data, and report the importance of the parameters in controlling the EPB occurrence and growth.

Keywords: Ionosphere, Atmosphere, Model, Plasma bubble, Linear growth rate, Parameter