

A study of equatorial plasma bubbles by 630-nm airglow imaging observations from the International Space Station

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In order to disclose global distribution of the upper atmosphere, Ionosphere, Mesosphere, upper Atmosphere, and Plasmasphere mapping mission (IMAP) on the International Space Station (ISS) started on October 2012. In this study, we analyzed 630-nm airglow images observed during a period from September 5, 2012 to August 28, 2013 by VISI (Visible and Infrared Spectral Imager), mounted on ISS to reveal the longitudinal characteristics of the equatorial ionosphere disturbances. We examined the seasonal and longitudinal characteristics of the occurrence of the plasma bubbles, and found occurrence rate of the plasma bubbles is high in spring and autumn equinoxes, especially at African longitudinal sector. This result is consistent with previous studies. Furthermore, we measured zonal interval between the plasma bubbles and examined its longitudinal characteristics. We found that plasma bubble intervals depend on longitude and that most of intervals are 100-200 km at 0-90o longitudinal sector and 200-300 km at 225-360o longitudinal sector. In this study, we also compare the observed 630-nm airglow intensity with that simulated by GAIA(Ground-to-topside model of Atmosphere and Ionosphere for Aeronomy) model to discuss day-to-day and longitudinal variations of equatorial ionization anomaly.

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