

GPS wave propagation in an equatorial anomaly and atmosphere by ray tracing

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As GPS satellites are located outside the plasmasphere, it is an important to clarify that how the propagation change by the background electron density and atmospheric refractive index configurations. To estimate the delay time and ray path, we made ray tracing program with an equatorial anomaly and plasmopause model based on diffusive equilibrium model. As the results, it is found that waves transmitted from the GPS satellite are greatly bent by the electron density gradient in an equatorial anomaly, and its delay time increase by the enhanced density. It is also found that L1 and L2 are not same path, and the dilute plasma within plasmopause slightly bend the propagation direction, but, its delay time variation is very small.