limited to the technique of measurement used here nor to solar maximum, L-band scintillation was measured from maximum to minimum of solar cycle # 21 also at Ascension Island. Here S4 is found to increase linearly with solar flux, a relation that can exist only because scintillation increases linearly with NmF2: The dependence shown here has the consequence that, if NmF2 can be predicted, the maximum possible S4 can be predicted, examples of which are given in the following paper.

The large TEC fluctuations near the Equatorial ionization anomaly during the equatorial spread F: observation from the GPS network over Brazil and simulation

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To monitor the scintillation induced by ionospheric irregularities, a number of GPS receivers are deployed over Brazil. They provide the real-time distribution of scintillation activity and TEC fluctuations induced by the equatorial spread F. We has found that the TEC fluctuations is large near the equatorial ionization anomaly (EIA) as compared to the equatorial region where they are originally generated. The large TEC fluctuations near EIA region needs an explanation. To do so, we carry out the 3D numerical simulation of spread F bubble including the dynamics parallel and perpendicular to the magnetic field. The simulation shows that the large ionospheric density gradient in the equatorward boundary of EIA region is probably responsible for the observed large TEC fluctuations.

The simultaneous rocket observation of electron density and temperature inside the equatorial spread-F bubble and their numerical simulation

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The ionospheric irregularities associated with spread F were first observed from the rocket flights 40 years ago. Such in-situ measurements provides useful information regarding the development of plasma depletions or bubbles and subsequent generation of small scale irregularities. These measurements have been used to obtain the power spectrum of fluctuations associated with the equatorial spread F. An equatorial station Alcantara (2.31^{o}S, 44.4^{o}W) in Brazil has a rocket launching facility. From this station, rocket carrying Langmuir probe was launched on 18th December 1995 at 21:17 LT. The electron density and temperature were measured from the Langmuir probe. This in-situ measurement identify the depletions along the trajectory of the rocket. Together with the density fluctuations, the temperature fluctuations are also noticed. The simultaneous measurements of density and temperature provides insight into the energetics of the spread F phenomena. The two dimensional numerical model is developed to simulate these fluctuations. The model solves the hydromagnetic equations (continuity, momentum, energy and Poisson equations) in a plane perpendicular to the terrestrial magnetic field. The measurements and numerical results are further discussed to understand the energetics of the bubble.