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Título da Palestra: "Investigations of the nighttime equatorial and low latitude ionospheric irregularities over Brazil"

Palestrante Convidado da Sessão Ionosfera Terrestre e Planetárias: Terça-feira, 23 de março de 2021, das 11h00 às 11h40

Resumo: The post sunset equatorial ionosphere becomes unstable to perturbations in density and polarization electric field, when the layer is subjected to upward displacement due to vertical plasma drift. The instability process results in the structuring of ionosphere into plasma irregularities of wide ranging scale sizes. These irregularities are of two types: those confined to the F layer bottom-side, and those that develop upward to dominate also the topside ionosphere. We investigate the relative importance of the different ionospheric parameters driving the generation of rising bubble type and bottom type spread F (ESF) irregularities. Digisonde data from the equatorial and low latitude locations in Brazil for the complete month of October 2001, a solar maximum epoch (F10.7=210), and October 2008, an extended solar minimum period (F10.7 =70), are analyzed to examine the spread F intensity and occurrence rate as a function of the evening prereversal vertical drift velocity, and the corresponding F layer heights and the bottom-side density gradient. While the ESF observed at an equatorial site is indicative of both the bottom-side irregularities and rising bubbles, the ESF at low latitude represents exclusively the latter. Comparison of the results, from the two epochs, reveals large decrease in the intensity and occurrence rate of plasma bubbles, with decrease in solar flux. But notable increase in these characteristics is observed in the case of bottom-side spread F. It is found that a larger (steeper) density gradient of the F layer bottom-side that is present under low solar flux condition is responsible for an enhanced Raleigh-Taylor (R-T) instability growth, counter-balancing a reduction in this rate that may arise from a smaller prereversal vertical drift and lower layer height that also characterize the low solar flux condition. Thus the role of the bottom-side density gradient in the ESF instability growth has been identified for the first time in terms of its ability to explain the contrasting irregularity features as observed during solar flux maximum and minimum years.