

The role of the inner radiation belt dynamic in the generation of auroral-type sporadic E-layers over South Atlantic Magnetic Anomaly (SAMA)

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Abstract: Solar wind structures can potentially impact the magnetosphere, affecting the upper atmosphere's ionization through the low-energy electron precipitation. The impact of low-energy electron precipitation on the high-latitude ionosphere is well understood since the 1960's decade. Conversely, it is still not well understood over South American Magnetic Anomaly (SAMA) currently. In this study, a short period under the influence of the strong geomagnetic storm associated with an Interplanetary Coronal Mass Ejection is selected for analysis. The atypical auroral sporadic E layers (Esa) over SAMA are observed in concomitance with the hiss and magnetosonic wave activities in the inner radiation belt. The wave-particle interactions may have occurred, and the dynamic mechanisms that caused the low-energy electron precipitation over SAMA are discussed here. The pitch angle scattering resulted in low-energy electron precipitation (tens of keV) into the atmosphere over SAMA, which contributed to the ionization in the altitude range from 100km to 150 km, able to generate the Esa layer in this peculiar region.

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