

# **INFLUENCES ON THE DEVELOPMENT OF EQUATORIAL IONOSPHERIC IRREGULARITIES**

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The occurrence of irregularities in the post-sunset equatorial ionosphere has been studied since the initial observations of frequency spreading on ionograms almost 80 years ago. These irregularities can have severe effects on trans-ionospheric radio wave propagation and have remained at the forefront of the ionospheric research community's interest. Despite significant progress from these continued efforts, understanding the physical processes responsible for the development of equatorial irregularities remains elusive. This is complicated by the fact that their development is governed by a variety of competing influences at a multitude of spatial and temporal scales. These influences include background conditions internal to the Earth system (e.g., electric fields, density gradients, neutral winds) and the presence of "seeds", all of which vary as a function of longitude, season, and solar cycle. External forces, such as prompt penetration and disturbance dynamo fields generated during active solar and geomagnetic conditions, further modify these conditions. We present an overview of many of the factors that conspire in the development of post-sunset equatorial irregularities using the combination of several observing modalities, including both optical and radio techniques as well as remote sensing and in-situ techniques. By combining the strengths and mitigating the weaknesses of the individual observing techniques, a better understanding can be gained regarding influences on the development of equatorial ionospheric irregularities.

Equatorial irregularities, instabilities

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