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ionosphere has been greatly advanced in recent several decades owing

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to modernized instruments, much improved numerical models, and powerful computing capabilities. On the other hand, many important aspects of ionospheric dynamics are still not well understood, especially during geomagnetic storms, because of the complexity of the coupled magnetosphere-ionosphere-thermosphere system. This book provides a comprehensive overview of global ionospheric research ranging from the polar cap to the equatorial region. The book consists of five parts. Part 1 addresses magnetospheric-ionospheric coupling, magnetospheric energy input in the high-latitude ionosphere, ion outflow, and ionospheric convection in the polar cap and auroral zone. Part 2 concerns interhemispheric asymmetries, ionospheric structures such as large-scale storm enhanced density plumes, and meso- and small-scale structures in the subauroral and mid-latitude ionosphere. Part 3 focuses on the low-latitude ionosphere, including equatorial ionospheric electrodynamics, equatorial spread F, equatorial electrojet, and equatorial ionization anomaly. Part 4 covers global ionospheric processes such as penetration electric fields, magnetospheric-ionospheric coupling at middle and subauroral latitudes, sudden stratospheric warming impacts on the ionosphere, longitudinal dependence of ionospheric dynamics, and travelling ionospheric disturbances. Part 5 discusses ionospheric effects on HF wave propagation and satellite navigation, as well as ionospheric disturbances caused by earthquakes and tsunamis"--