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Sommario/riassunto

"The ionosphere is a layer within the atmosphere that consists of charged particles (i.e., electrons and ions) due to ionization of neutrals by solar radiation and energetic particle precipitation from the magnetosphere. The ionosphere extends from about 60 km above the Earth's surface to about 1,000 km in altitude. Ionospheric dynamics is affected by many different forcings, including solar flares, geomagnetic storms, tides and waves from the lower atmosphere, as well as disturbances triggered by earthquakes and tsunamis. The ionosphere behaves very differently under different solar and geomagnetic conditions, and its variability has direct impacts on radio communication and satellite navigation system. Our knowledge on the ionosphere has been greatly advanced in recent several decades owing

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"--