



專題演講

Investigation of Ionospheric Scintillation Using GNSS Ground-based and Radio Occultation Measurements

Speaker : **Dr. Aramesh Seif**

Graduate Institute of Space Science, National Central University

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Place : 健雄館(科四館) S4-811 教室

摘要/Abstract :

The Global Navigations and Satellite Systems (GNSS), is a satellite-based radio navigation system, with diverse applications including railway control, highway traffic management, precision agriculture, emergency response, commercial aviation, and marine navigation. These critical applications highly depend on GNSS services and require very high levels of accuracy in positioning, reliability and availability. As GNSS signals propagate through the ionosphere, the propagation speed and direction of the GNSS signals are changed in proportion to the varying electron density along the line of sight between the receiver and the satellite. And, they may experience rapid and unpredictable changes in signal strength (amplitude and phase fluctuations). Such fluctuation is called scintillation, which often lead to degradation in receiver performance in a number of ways, from degradation of accuracy such as the range errors, to the loss of signal tracking the GNSS. Therefore, understand the generation of scintillation-producing plasma structures is crucial. To comprehend scintillation, we have to study the ionosphere and the corresponding physical phenomena. Scintillations are intense in the equatorial region; they are strong at high latitudes and weak at mid-latitudes. The equatorial ionosphere is a region that consists of two ionization belts located at approximately $\pm 15^\circ$ of the magnetic equator, where scintillation has major effects. To study ionospheric scintillation, the equatorial regions are quite important because the magnetic field of the Earth is horizontal to the magnetic equator and the ionospheric height is strongly controlled by electric fields, which make the ionosphere unstable, particularly after sunset. This study focuses on the investigation of ionospheric scintillation at the equatorial region using GNSS signal transmissions received on the ground and from space. We present, characteristics and behavior of nighttime and daytime scintillations. We then discuss the possible physical mechanisms of nighttime and daytime scintillation events.

※歡迎聽講※

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