NCU-GISS 國立中央大學太空科學研究所 Graduate Institute of Space Science

# 專題演講

## Current progress of Lithosphere-atmosphere-ionosphere coupling study in China University of Geosciences

Speaker： **Yang-Yi Sun**

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Place： 健雄館(科四館) S4-811 教室

摘 要/Abstract：The Lithosphere-atmosphere-ionosphere coupling study in China University of Geosciences (Wuhan) includes ionospheric weather, ionosphere response to lower atmosphere activities, and impact of ground perturbations on the atmosphere and ionosphere. (1) Ionospheric weather: We studied the ionospheric electron density structures response to the total solar eclipse on 21 August 2017. The supersonic moon shadow not only reduced the ionosphere electron density by 40% but also induced an ionospheric bow wave front which consists of acoustic shock and recombination effect within the shadow area. We also study the ionospheric plasma density irregularity and its relationship to vertical ionospheric electron density gradients using FORMOSAT-3/COSMIC (F3/C) radio occultation (RO) soundings of S4 index and electron density. (2) Atmosphere-ionosphere coupling: The El Nino - Southern Oscillation (ENSO) is well known as a planetary-scale ocean-atmosphere-coupled phenomenon that widely affects global climate and weather systems. However, the knowledge for the ENSO effect on the thermosphere and ionosphere is limited. We examined atmospheric diurnal tides from 21-year GAIA simulation and 15-year TIME/SABER observation and found that the ENSO phases significantly control the quasi-biannual oscillation component of the tides in not only the stratosphere, but also the lower thermosphere. Moreover, the 10-year TIMED/TIDI zonal wind and F3/C electron density observations show that the ENSO signature in the wind DE3 at the lower thermosphere drives the ionospheric tides. (3) Lithosphere-atmosphere-ionosphere coupling: The F3/C RO technique vertically scanned the atmosphere from 0 to 800 km altitude over the eastern Asia and Pacific Ocean during the 2011 Mw9.0 Tohoku earthquake and tsunami. The mean wavelet spectra derived from dozens of atmospheric and ionospheric RO sounding profiles within ten hours after the earthquake illustrate that the atmospheric oscillations with vertical wavelength ranging from 0.5 to 40 km appear at the altitudes from the lower atmosphere to ionosphere. The RO-observed long-lasting atmospheric and ionospheric oscillations consist of the earthquake/tsunami wavefront and its residual oscillatory tail.

※歡迎聽講※

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