

Global plasma irregularity monitoring by FORMOSAT-7/COSMIC-2

利用福衛七號監測全球電漿不規則體分布

S. P. Chen¹, C. H. Lin¹, P. K. Rajesh¹, J. Y. Liu^{2,3}, R. Eastes⁴, M. Y. Chou⁵, and J. M. Choi¹

陳世平¹ 林建宏¹ 查傑希¹ 劉正彥^{2,3} Richard Eastes⁴ 周敏揚⁵ 崔鍾敏¹

¹ Department of Earth Sciences, National Cheng Kung University, Taiwan

² Graduate Institute of Space Science and Engineering, National Central University, Taiwan

³ Center for Astronautical Physics and Engineering, National Central University, Taiwan

⁴ Laboratory for Atmospheric and Space Physics, University of Colorado, USA

⁵ COSMIC Program Office, University Corporation for Atmospheric Research, USA

¹ 國立成功大學地球科學系

² 國立中央大學太空科學與工程研究所

³ 國立中央大學太空科學與科技研究中心

⁴ Laboratory for Atmospheric and Space Physics, University of Colorado

⁵ COSMIC Program Office, University Corporation for Atmospheric Research

Abstract

This study presents early results of the radio occultation scintillation (RO-S4) in the F layer of ionospheric probed by the FORMOSAT-7/COSMIC-2 (F7/C2). The massive and sufficient RO-S4 observations at low latitudes are utilized to construct the hourly global scintillation maps to monitor equatorial plasma bubbles (EPBs). The F7/C2 RO-S4 during the August 2019 to April 2020 show that scintillations are mostly distributed around American and the Atlantic Ocean sectors. Therefore, the RO-S4 near Jicamarca are compared with range-time-intensity (RTI) images of the 50 MHz radar. Result shows that the RO-S4 intensity and the occurrence of RO-S4 = 0.125-0.5 are collocated and more frequently occurred at the bottomside of the RTI spread-F patterns. The occurrence of the RO-S4 are also found increasing at the upward phase of oscillations, which is consistent with the theory that the EPB seeding by the large scale wave in the evening. The locations and occurrences of the RO-S4 greater than 0.5 agree with the EPB patterns in the airglow images taken from the NASA GOLD mission. Climatology analyses show that monthly occurrences of RO-S4 greater than 0.5 well agrees with the monthly EPB occurrences detected by the GOLD, and show similar longitudinal distribution pattern with in-situ measurements such as the DMSP and C/NOFS, suggesting the RO-S4 intensities can be utilized to identify the EPBs around the globe.

Keywords: Scintillation, Equatorial plasma bubbles, FORMOSAT-7/COSMIC-2, RO

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