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Detection of lower ionosphere by using signal to noise ratio data of radio occultation technique

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With the advent of global positioning system (GPS), radio occultation (RO) technique has been used to detect the Earth's atmosphere. Taiwan has launched six low Earth orbit satellites as a RO constellation mission, named FORMOSAT-3/COSMIC (F-3) in 2006. F-3 mission release 1500-2000 high rate (50 Hz) RO set for neutral atmosphere per day and the average upper altitude is 120 km. When GPS signal propagate through the ionosphere, the irregularities of ionosphere will affect the signal and cause fluctuation in signal to noise ratio (SNR) profiles. In this study, the relation between electron density and the fluctuation in SNR profile is simulated by using ray tracing method based on geometrical optics. Furthermore, an analysis method of the fluctuation data is developed to map the global coverage of fluctuation distribution.