Global Analysis of Sporadic E layer from COSMIC–GPS Radio Occultation

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As well known, the Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC) can provide ~2,500 GPS radio occultation (RO) soundings per day to support the atmosphere and ionospheric research. If in the transmitted ray path between satellites high-density ion layers exist in a narrow-altitude region in the E region ionosphere, the multiple paths effects will disturb the received GPS signals. Thus from the analysis of these disturbed signals Es layer can be defined. In this report, nearly 3 years GPS/COSMIC radio Occultation monitoring ionosphere data from 2006 July to 2009 March are used to analysis Es phenomena. The algorithm of detecting Es phase and SNR two frequencies signals variation is similar to the method introduced by *Wu et al*. [2005] that developed in GPS/CHAMP. Information extracted from the fluctuations of L1 phase and SNR indicate seasonal global Es variance occurrence rate maps have strong dependence of the Es strength on geomagnetic dip angle at 95-115 km. The summertime Es occurs at inclination angles I=20°~70° in north-hemisphere, the wintertime Es in the south-hemisphere I=-80°~-20°, while in spring and fall seasons I=20°~60° and I=-60°~-20° simultaneously. The mid-latitude semidiurnal tide with peak hours ~0800 and ~2000 LT and slightly descending from 110 km to 100 km in summer and winter are similar reported by *Wu et al*. [2005]. From the fact that most Es layers phase varied profiles have the shape property of normal function, with the algorithm fitting the phase and SNR varied profiles from a Gaussian curve and a suitable root mean square cutoff of them such that Es thickness can be estimated. Statistic all available profiles show that Es layer thickness distribute in 3~12 km with first and second dominate peak at ~5 and ~8 km, respectively.