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A Study of Ionospheric Scintillation by Using GPS Satellites

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For the purpose of FORMOSAT-3/COSMIC project, a high resolution GPS receiver (at 10 Hz sampling rate) was set up at Tainan, Taiwan. Algorithms of analyzing this GPS scintillation signal have been developed, including total electron content and scintillation index. In this talk, the morphology of GPS scintillation will be present by using the data collected in the period 2003-2005. We find that the maximum frequency of occurrence of the GPS scintillations over Taiwan area occur most frequently in equinox seasons, namely, March and September. Also, statistics shows that the sizes of plasma irregularities responsible for GPS scintillations are in the range 50-450 km. From the three simultaneous records of GPS scintillations, zonal drift direction of the plasma irregularities responsible for the scintillation can be determined. The S4 index calculated from S/N of GPS signals without affected by ionospheric scintillation was found to be dependent on elevation angles of GPS satellite in secant law relation.