

# Longitudinal Analysis of Ionospheric Scintillation Occurrence and Its Relationship with TEC Depletion and Fluctuation over Indonesia

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## Abstract.

Indonesia is placed in the crest of equatorial ionization anomaly (EIA) region where ionospheric scintillation is most intense and frequent than the others region. This research is aimed to analyze longitudinal occurrence of ionospheric scintillation and its relationship with Total Electron Content (TEC) depletion and fluctuation. Data was obtained from the GPS receiver at the Kototabang (-0.20°S; 100.32°E; geomagnetic latitude -8.97° S), Pontianak (-0.03°S; 109.33°E; geomagnetic latitude -8.82° S) and Manado station (1.48°N; 124.85°E; geomagnetic latitude -6.87° S) from March until May 2013. The results showed the highest occurrence of ionospheric scintillation occurred on April 10, 2013. Furthermore, this research discussed in detail on April 10, 2013. The strong scintillation ( $S_4 > 0.5$ ) first detected in Manado station, one hour later detected in Pontianak and 30 minute later detected in Kototabang as showed on figure-1.

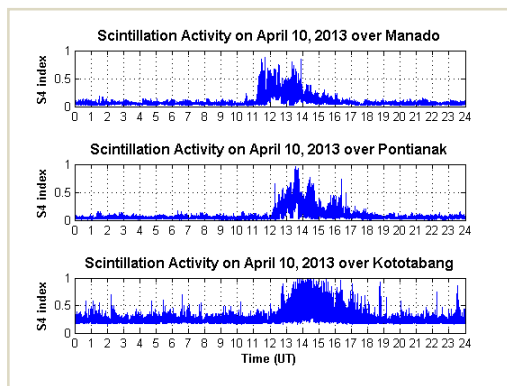


Figure-1. Scintillation Activity on April 10, 2013

Duration of strong scintillation was approximately 3 – 4 hours. The strong scintillation occurred at 20:00 to 21:00 local time in the area equator until 6°S geographic latitude above Indonesia region as seen on figure-2. This data will give contribution to

Ionospheric Scintillation model over Indonesia.

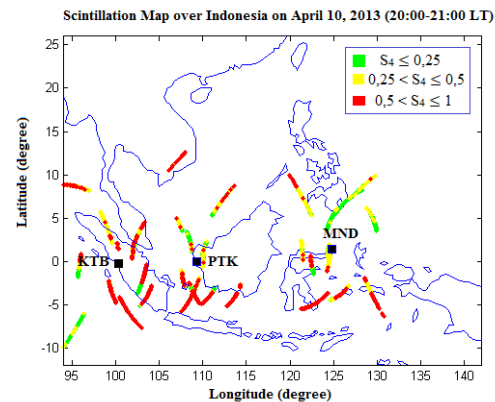


Figure-2. Strong scintillation ( $S_4 > 0.5$ ) occurred around  $-5^\circ \pm 2^\circ$  S.

The other result showed there was TEC depletion and fluctuation when strong scintillation ( $S_4 > 0.5$ ) occurred as showed on figure-3. The Rate of TEC (ROT) also was fluctuated  $\pm 5 - \pm 10$  TECU/minute.

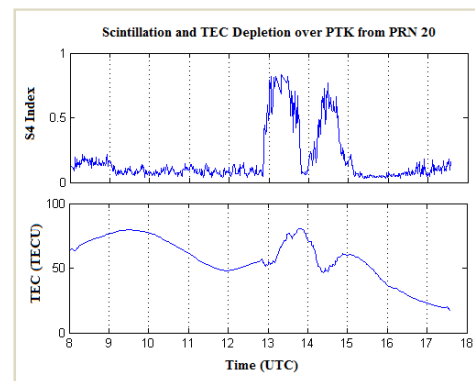


Figure-3. Strong scintillation followed by TEC Depletion over Pontianak

The TEC depletion interpreted as the presence of plasma bubble (lower plasma density) which grow and move upward that caused ionospheric scintillation.