

## **Characterization of GNSS Scintillations over Three Nigerian Stations; Nsukka, Ile-Ife and Ilorin during 2010–2012**

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This study investigates the effects of ionospheric scintillations on GNSS signals over three Nigerian equatorial GPS stations; namely, Nsukka, Ile-Ife and Ilorin over a period of three years (2010 –2012). We arranged the scintillation data on daily, monthly, seasonal and yearly scales. The first aspect of this study investigates the climatology of ionospheric scintillations over the three stations. In this aspect, in order to suppress multipath effects, we imposed a 30<sup>0</sup> elevation masking on the data. For a more in-depth analysis, in the second part of this study, we considered the entire data on a satellite-by-satellite basis, irrespective of the elevation angles of the satellites. GNSS scintillations at the three stations commenced after sunset and decayed around local midnight. The climatology of scintillation occurrences revealed marked occurrences during the months of March, April and October, and least occurrences during the months of June, July and December. On a seasonal note, more occurrences were recorded during March equinox and the least during June solstice. On a year-by-year analysis, 2012 recorded the highest, while 2010 recorded the least. At the three stations, the GNSS receivers also received signals from the three EGNOS satellites (PRN 120, 124 and 126). EGNOS satellites signals were observed to correspondingly experience weak scintillations at the three stations during the time intervals when GPS satellites signals experienced scintillations. Distributing the scintillation occurrences on sky-plots over the three stations, our results showed that scintillations clustered more within the northern skies of the three stations. Overall, these results could be of support to GPS and EGNOS service providers and designers, with a view to providing robust GNSS services for the African users' community.