

GNSS Receiver Performance under environment of Ionospheric Scintillation

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ABSTRACT

Ionospheric scintillation is a kind of environmental interference to GNSS receiver, leading to degradation of position fixing performance or even loss of lock[1, 2]. A comparison on different GNSS (BD and GPS) receivers' performance under various ionospheric scintillation conditions is made with field data. It shows that two receivers maintain their position fixing capability under weak scintillation with $S_4 < 0.3$ (Please see Figure 1). Strong scintillation with $S_4 > 0.6$ and lasting for a period of time will cause "jitters", occasional loss-of-lock or loss of capability of positioning (Please see Figure 2). The difference in resisting scintillation effects depends on receivers design. The results of research could be a reference for anti-scintillation receiver development or classification of scintillation effects.

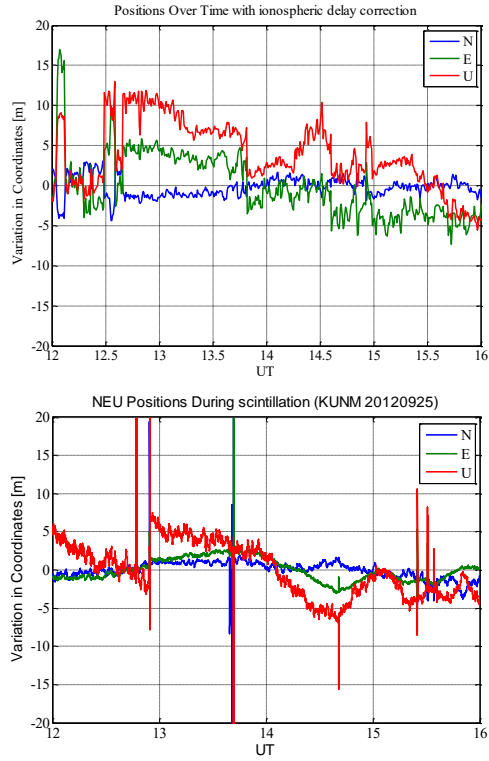


Figure 1. Positioning results of GPS and BD receivers under scintillation for 25, Sep, 2012

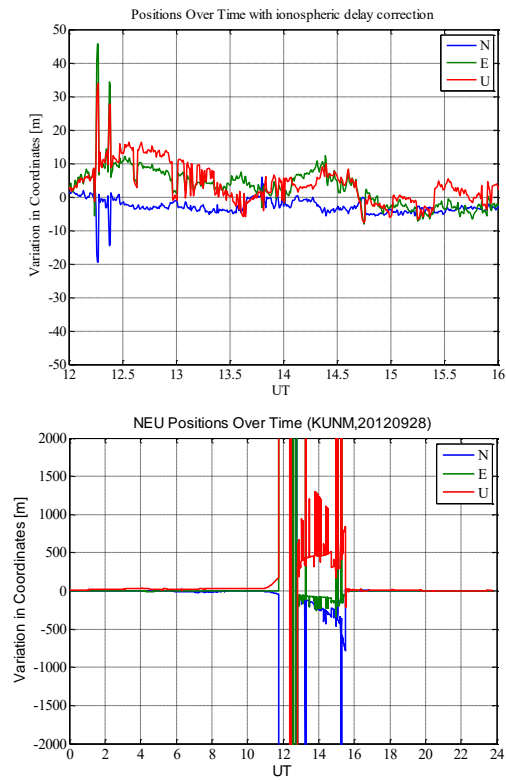


Figure 2. Positioning results of GPS and BD receivers under scintillation for 28, Sep, 2012

Key words: Ionosphere; scintillation; scintillation index; GNSS.

References:

[1]Knight,M.F., Finn,A.(1996), The Impact of Ionospheric Scintillations on GPS Performance [C],ION GPS, , 555-564.

[2]Knight, M.F., A.Finn, and M.A. Cervera (1998), Ionospheric effects on Global Positioning Receivers[M]. Res.Rep.DSTO-RR-0121, Def. Sci and Technol. Org., Salisbury, South Aus. Australia.

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