

Interactive comment on “The transient variation of the complexes of the low latitude ionosphere within the equatorial ionization anomaly region of Nigeria” by A. B. Rabiou et al.

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Received and published: 1 January 2015

The transient variation of the complexes of the low latitude ionosphere within the equatorial ionization anomaly region of Nigeria A. B. Rabiou, B. O. Ogunsua, I. A. Fuwape, and J. A. Laoye

Review by K. Unnikrishnan

This study was conducted using Total Electron Content (TEC) time series for 2011, measured from 5 GPS receiver stations in Nigeria by employing chaotic non linear analysis. The detrended TEC time series were reconstructed and the values of chaotic quantifiers namely, Lyapunov exponents LE, correlation dimension, and Tsallis entropy

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were estimated to reveal dynamical complexity of the system. Authors aim to link the chaotic quantifiers and ionospheric behaviour over Nigeria using non linear techniques, which is further verified by surrogate data test, and they produced some interesting results. The paper is well written and worth publishing. I strongly recommend for the publication of this article after minor revision based on the points listed below: 1) The convergence of the computed Lyapunov exponents should be discussed by showing whether they are stable with the change of the embedding dimension, and the time delay. This aspect is very important since the computations of LE depend strongly on the ability to track the dynamical trajectories in the embedded space. For this, in the revised version, authors may present plots for LE versus time delay, by keeping embedding dimension a constant, and also between LE and embedding dimensions, at constant time delay. 2) The wavelike pattern exhibited by LE and Tsallis entropy with the drop in values at equinoxes (Figures 7, 9, 12 and 13) possibly due to self-organized critical phenomenon of the system, is an interesting observation. It would be better if authors could present some more clarifications to link the self-organized critical phenomenon of equatorial ionosphere and the observed wavelike pattern of LE and Tsallis entropy.

3) Axis title and labels for Figures 1,2,7,9,10,11, and 13 are very small in size. Please redraw them with more clarity.

Interactive comment on Nonlin. Processes Geophys. Discuss., 1, 1855, 2014.