Abstract

Diurnal, seasonal and latitudinal variations of Vertical Total Electron Content (VTEC) over the equatorial region of the African continent and a comparison with IRI-2007 derived TEC (IRI-TEC), using all three options (namely; NeQuick, IRI01-corr and IRI-2001), are presented in this paper. The variability and comparison are presented for 2009, a year of low solar activity, using data from thirteen Global Positioning System (GPS) receivers. VTEC values were grouped into four seasons namely March Equinox (February, March, April), June Solstice (May, June, July), September Equinox (August, September, October), and December Solstice (November, December, January). VTEC generally increases from 06h00 LT and reaches its maximum value at approximately 15h00–17h00 LT during all seasons and at all locations. The NeQuick and IRI01-corr options of the IRI model predict reasonably well the observed diurnal and seasonal variation patterns of VTEC values. However, the IRI-2001 option gave a relatively poor prediction when compared with the other options. The post-midnight and post-sunset deviations between modeled and observed VTEC could arise because NmF2 or the shape of the electron density profile, or both, are not well predicted by the model; hence some improvements are still required in order to obtain improved predictions of TEC over the equatorial region of the Africa sector.