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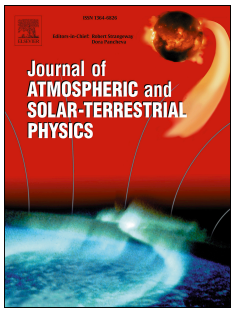

Characteristics of the anomalous refractive conditions in Nigeria

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Abstract

The thirty six years (1979-2014) meteorological data needed to calculate refractivity gradient is obtained from Era interim build on IFS CY31r2 model. Diurnal cycle of ducting occurrence for four seasons in Nigeria were analysed from refractivity gradient. Percentage occurrence of anomalous propagation in thirty locations across Nigeria were estimated. It is discovered that ducting is more frequent at mid night and early morning which also vary seasonally and regionally across the country. Highest percentage of 94 % of ducting and zero occurrence of sub refractive is obtained in Lagos. Highest percentage of 34.24 % and 45.62 % of super refractive and sub refractive are obtained in Sapele and Oban hill, respectively. Minimum percentage of 21.9 % and 4.33 % of ducting and super refractive were obtained for Calabar and Gashua, respectively. The minimum frequency for a radio wave to be trapped within Nigeria troposphere varies between 0.045 GHz and 0.11 GHz. The occurrence of anomalous propagation condition, such as ducts, super refractive and sub refractive provide valuable information about the propagation of radio waves over Nigeria, which will assist the radio engineer in their planning and designing of radio circuitry.

Keywords: gradient, anomalous, ducting, propagation