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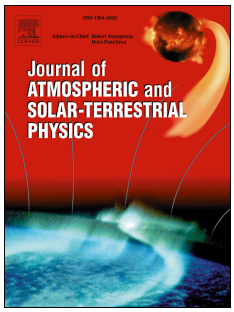

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Radio Refractivity Gradients in the Lowest 100 m of the Atmosphere over Lagos, Nigeria in the Rainy-Harmattan Transition Phase

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Abstract

Radio engineers and researchers in conjunction with the International Telecommunication Union (ITU) have established the pivotal role of radio refractivity to the propagation of electromagnetic energy in the troposphere. In particular, the refractivity gradient statistics for the lowest 100 m in the troposphere are used to determine the probability of occurrence of anomalous propagation conditions known as ducting. The major challenge to characterising the propagation condition over any environment is accessing the data of the lowest boundary layer of the atmosphere, which is highly dynamic and turbulent in evolution. High resolution radiosonde data from the Nigerian Meteorological Agency (NiMet) were used for a synoptic study of the rain-harmattan transition phase. The rain-harmattan transition phase marks the onset of the dry season due to the movement of the intertropical convergence zone interplay between (north-easterly and south-westerly) trade winds and monsoonal circulation. The lowest 100 m data were analysed to determine the frequency of ducting per month. Progressive increase in the occurrence of ducting was observed during the rain-harmattan transition phase, which coincides with the West African Monsoon retreat. The results show significant divergence

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[1]ITU International Telecommunication Union
[2]LMM Late monsoon month
[3]NiMet Nigerian Meteorological Agency
[4]PMM Post monsoon months
[5]WAM West African monsoon