ISSN: 2320-5407
International Journal of Advanced Research
Publisher's Name: Jana Publication and Research LLP
www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: IJAR-56551

Title: Variability of the F1 Ionospheric Layer During Periods of Quiet and Shock Geomagnetic Activity at the Korhogo station

Recommendation:
Accept

Rating	Excel.	Good	Fair	Poor
Originality	Yes			
Techn. Quality	Yes			
Clarity		Yes		
Significance	Yes			

Reviewer Name: Dr. Ashish Yadav

Detailed Reviewer's Report

Reviewer's Comment for Publication.
Acceptance Comments are mentioned below suitable for the paper titled "Variability of the F1 Ionospheric Layer During Periods of Quiet and Shock Geomagnetic Activity at the Korhogo station"

Reviewer Comments: Accept

Reviewer Comments –

Introduction
The manuscript investigates the variability of the equatorial F1 ionospheric layer over the Korhogo Station under quiet and shock geomagnetic conditions. The introduction clearly highlights the importance of understanding the F1 layer, given its role in radio signal propagation and space weather effects, and establishes the research gap for region-specific equatorial studies. By focusing on diurnal variations of the critical frequency (foF1) and virtual height (h′F1) and their response to geomagnetic disturbances, the study sets a clear objective and provides a strong rationale for examining both seasonal and solar cycle influences.

Literature Review
The literature review situates the study within existing research, citing foundational work on geomagnetic classification by Jean-Pierre Legrand and Paul Simon (1989) and summarizing the known behavior of the F1 layer under photochemical and geomagnetic influences. It highlights that while the F1 layer is primarily controlled by solar radiation, geomagnetic shocks can induce significant perturbations through electric fields, thermospheric winds, and recombination processes. The review also identifies the scarcity of observational studies from equatorial African stations, which strengthens the novelty and relevance of the present research.

ISSN: 2320-5407
International Journal of Advanced Research
Publisher's Name: Jana Publication and Research LLP
www.journalijar.com

REVIEWER'S REPORT

Methodology

The study adopts a systematic approach, analyzing ionosonde data from the Korhogo equatorial station to examine foF1 and h′F1 variability during quiet and shock geomagnetic periods. Study days were identified using pixel diagrams and classified according to the Legrand and Simon (1989) geomagnetic activity framework. Mean diurnal profiles were generated for each season and solar phase, allowing the authors to examine both regular and disturbed F1 layer behavior. This methodology is appropriate, reproducible, and well-suited to capture temporal and seasonal trends in ionospheric parameters under varying geomagnetic conditions.

Results and Discussion

The results demonstrate that during quiet geomagnetic periods, the F1 layer exhibits regular, dome-shaped diurnal profiles, with foF1 showing strong seasonal and solar dependence, confirming photochemical dominance. In contrast, shock geomagnetic periods result in significant perturbations, including ionization troughs, compressions of h′F1, vertical instabilities, and a shortened F1 layer lifespan, particularly in summer and solar maximum phases. The discussion convincingly links these disturbances to penetrating electric fields, altered thermospheric winds, and enhanced recombination, providing a clear explanation of the physical processes governing equatorial F1 layer variability under geomagnetic stress.

Conclusion and Future Scope

The study effectively concludes that the F1 ionospheric layer over the Korhogo equatorial station is strongly influenced by geomagnetic activity, seasonal variations, and solar cycle phases, with quiet periods showing stable diurnal patterns and shock events inducing significant structural and temporal perturbations. The findings contribute valuable observational data for equatorial ionospheric dynamics and have implications for improving space weather modeling and radio communication prediction. Future research could expand these insights through multi-station observations, integration with satellite data, and numerical modeling to simulate the observed perturbations, enhancing predictive capabilities and understanding of equatorial ionospheric responses.