

Title: Influence of solar, solar wind, and geomagnetic activity on the ionospheric propagation factor $M(3000)F_2$ over Ouagadougou in the African equatorial sector

Summary:

Author presents different scale variabilities of $M(3000)F_2$ from diurnal to monthly and seasonal to yearly variation of using ionosonde data from June 1966 to February 1998 over Ouagadougou in the African equatorial sector using three years as the representative years of high solar activity (HSA, 1991), moderate solar activity (MSA, 1993), and low solar activity (LSA, 1995). The author also analyzes the monthly variations of the ionospheric propagation factor $M(3000)F_2$ with the solar radio flux and its response to geomagnetic storms. The results revealed a diurnal variation pattern that $M(3000)F_2$ is consistently highest during the LSA year, intermediate during the MSA year, and lowest during the HSA year, suggesting an inverse dependence of $M(3000)F_2$ on solar activity and seasonal variation with minimum in spring equinox. Variability of $M(3000)F_2$ with geomagnetic storm was also reported. The authors claimed that this is the first report of a long-term study of the ionosphere over Ouagadougou in the African equatorial sector using $M(3000)F_2$. This makes the work interesting and offers a good merit for publication.

Technical observations and suggestions

1. Title: Influence of solar, solar wind, and geomagnetic activity on the ionospheric propagation factor $M(3000)F_2$ over Ouagadougou in the African equatorial sector

Suggested Title: Influence of solar wind, and geomagnetic activity on the ionospheric propagation factor $M(3000)F_2$ over Ouagadougou in the African equatorial sector

2. In figure 2 and in figure 6 some figure caption contains two figures some contains only one, make it uniform.
3. It is difficult to compare quiet time variation in $M(3000)F_2$ versus the main and recovery phases during geomagnetic storm when plots are as second panel in figures 5.1b to 5.7b. Plot them in time series as quiet time versus stormy days in different color legend taking x-axis days and y-axis $M(3000)F_2$.
4. The text consists of many short paragraphs. Kindly merge the short paragraphs together.
5. The text presented in discussion section 4.4 Implications for HF propagation and ionospheric modelling does not lead a specific discussion.
6. In page no 14 line from 223 to 227, first sentence describes high solar activity (1991) $M(3000)F_2$ at solstices, but in moderate solar activity (1993) and low solar activity (1995) it discusses for equinox and solstice. Make the discussion uniform.
7. In the Data and Method of Analysis section, author used a formula to calculate % $\Delta M(3000)F_2$ equation 3, but neither its plot nor its tabulated value is included in the text.

8. Author studied seven geomagnetic storms of different strength and of different phases of the solar cycle. What is the justification behind selecting these storms and of different month of the same years.
9. Kindly reduce the text coherence and more scientific rather than simply describing the results.

Recommendation:

It requires a major revision before publication.