



**SDI Review Form 1.6**

Journal Name:	<a href="#">Physical Science International Journal</a>
Manuscript Number:	2014_PSIJ_9748
Title of the Manuscript:	Quiet time foF2 variation at Ouagadougou station and comparison with TIEGCM and IRI-2012 predictions for years 1985 and 1990
Type of the Article	

**General guideline for Peer Review process:**

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)



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**PART 1: Review Comments**

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<b><u>Compulsory</u></b> REVISION comments	<p><b>1. This manuscript only used 5 days in a month to present the seasonal variation. The data is too weak to explain the difference.</b></p> <p><b>2. The result shows the IRI 2012 model to be better than TIEGCM model. However, the author should explain the reason why.</b></p>	<p>1 Using the five quietest days mean value as the monthly quiet time condition level is a common practice in geomagnetic study (see several works of Mayaud) and the others who built geomagnetic index. Our study follows the same way. Therefore it is not weak to explain the difference as the reviewer said.</p> <p>2. We gave it in the revised manuscript our point of view. This is highlighted in yellow at the end of the following text:</p> <p>Figure 3 shows the histograms of the mean relative error (MRE) of each model compared with data. It can be seen in the left panel that except in March the MRE of TIEGCM is always higher than that of IRI- 2012. This shows that during solar minimum IRI-2012 well express the data variability. The left panel of figure 3 exhibits the equinoctial asymmetry. During December, IRI-2012 gave a better result. Such result may be due to the fact that IRI is a semi empirical model that integrates data in its database.</p>



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<b><u>Minor</u></b> REVISION comments		
<b><u>Optional/General</u></b> comments	<p>1. The abstract should be arranged, since it is not a formal format. The bold type items should be the contents including in the abstract, but not list form.</p>	<p>This remark is now taken into account in the revised manuscript. The new abstract is:</p> <p>The purpose of this study is to appreciate the estimation of TIEGCM (Thermosphere Ionosphere Electrodynamics General Circulation Model) and the 2012 version of IRI (International Reference Ionosphere) in African Equatorial Ionization Anomaly (EIA) region throughout the diurnal variation of F2 layer critical frequency (foF2). The comparison is made between data and theoretical values carried out from TIEGCM and IRI-2012 during solar cycle minimum and maximum phases and under quiet time condition and that over seasons. Data concern solar cycle 22 foF2 data of Ouagadougou station (Lat: 12.4° N; Long: 358.5°E, dip: 1.43° for 2013) provided by Télécom Bretagne. Our study is made on the one hand under geomagnetic quiet time conditions determined by daily aa inferior or equal to 20 nT and on the other hand during solar cycle maximum and minimum phases given by sunspot number Rz superior to 100 and Rz inferior to 20, respectively. We take into account seasons by considering December as winter month, March as spring month, June as summer month and September as autumn month. The seasonal Hourly quiet time foF2 is given by the arithmetic mean values of the five quietest day hourly values. Data profiles show</p>



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		<p>noon bite out profile with more and less pronounced morning or afternoon peak in equinox and that during solar maximum and that also in solar minimum except during solstice where the profile fairly is dome or plateau. During solar minimum, both models present more or less pronounced afternoon peak with more or less deep trough between 1000 LT and 1400 LT. During solar maximum, in general, TIEGCM shows afternoon peak and IRI-2012 present plateau profile. The Mean Relative Error (MRE) shows better prediction for IRI-2012 except in September for the both solar cycle phases involved. The worst prediction during solar minimum and maximum is seen in September for IRI-2012 and that of TIEGCM is observed in solstice and June, respectively. Models predictions are better during solar maximum than during solar minimum and strongly dependent to pre-sunrise and post sunset periods. As foF2 type of profile is link to E-region electric current and ionosphere electrodynamics mechanisms, models' predictions highlight that they do not well express all the dynamic process in this African sector. Therefore, for this sector they must be revisited for improving.</p>
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