# Interactive comment on "Diurnal, seasonal and solar cycle variation of total electron content and comparison with the IRI-2016 model at Birnin Kebbi" *by* Aghogho Ogwala et al.

**Aghogho Ogwala et al.**

ogwala02@gmail.com

Dear Reviewers and editor. Sequel to the corrections that you required from the review process, we have made all the corrections as below stated and as well as on the new manuscript attached. We have also edited based on the specifications of the journal. Thank you for your kind co-operation.

Harmonised corrections: Reviewer 1 1. The presentation of data analyses have been improved. See line 173 – 178. 2. Line 16: Magnetic dip of Birnin-Kebbi have been included. 3. Lines 53 – 56: The authors have included some references discussing the ionosphere during quiet and disturbed conditions. 4. Lines 104 – 114 shows more

references have been sited. 5. In line 151, a reference have been cited for equation 4 6. Line 173: We specified that we are using hourly OBS-TEC and hourly IRI-2016 model. 7. Line 189: The whole paragraph have been rephrased, the line talking about day-to-day variation with error bar (line: 193) have also been written clearly. 8. In Lines 198 – 204, the definition of all time and values have been written in a clearer manner. Also, in line 200: The time of occurrence of maximum TEC have been corrected. 9. The daily profile of IRI-2016 in Figures 1 – 4 obtained from IRI website (URSI option) is correct. It is not shifted in time. 10. In line 289 – 295, the paragraph have been written clearly. The time difference for post-midnight and pre-midnight hours have been clearly stated. 11. Line 300 – 304 have been written clearly with Table III to summarize. 12. Figure 10 have been potted on a single frame. 13. Line 312 – 319: Explains the direct impact of solar phenomena in the ionosphere with references. 14. The whole paragraph in line 312 – 319 have been corrected. 16. At this point, the conclusion now captures our corrected results.

Reviewer 2 Methodology: Line 173 – 178 have been revised. Statement about error bars have been deleted. Line 193 explains OBS-TEC error bars signifies standard deviation from mean values. Line 200: Maximum time of occurrence have been changed to 12 – 14 LT. Line 307: "1 TECU variation represents an error of 0.16m in position" replaces "1 TECU = 0.16m" Figure 10 now shows data points connected with line Lines 312 – 313 now reflect the text "Figure 10 shows the comparison of the monthly OBS-TEC and sunspot number, Rz from 2011 – 2014, showing an increase of TEC with solar cycle". The conclusion now includes the scientific contribution of this investigation. Some text in the discussion section have been deleted.

Reviewer 2.2: Line 117 – 118 in the introduction shows our result is similar to result of authors in line 113 – 114. This is further discussed in the result and discussion section (line 252 – 257). Lines 193 – 194: It is clarified that error bar represent the standard deviation of OBS-TEC from mean values. Lines 214 – 215 have stated that maximum OBS-TEC of most of the months shifted to slightly post-noon. Further lines added

reference to the sentence regarding peak shifting in Polar Regions. Lines 225 – 235: The time of suitable IRI predictions have been corrected appropriately. When the IRI curve fit within the error bar of OBS-TEC, the model is said to be suitable. Figures 5 – 8 have included horizontal line. Line 231 defines pre-midnight hour. Line 148: shows "and" have been inserted between satellite bias and receiver interchange bias. Line 176: duplicate word "using" have been deleted. Line 209: Rayleigh-Taylor Instability replaces wrong spelling. Misplaced Y label in Figure 2b have been deleted. Line 271 – 272 have been changed to "minimum and maximum seasonal VTEC values during June solstice and December solstice respectively"

Please also note the supplement to this comment: https://www.ann-geophys-discuss.net/angeo-2018-134/angeo-2018-134-AC5-supplement.pdf

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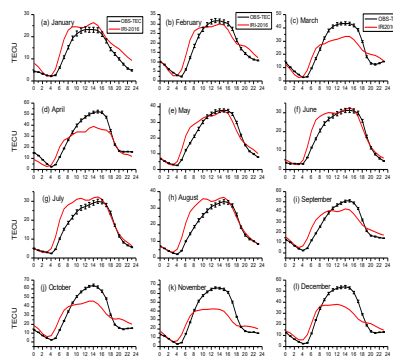
Fig. 1: Diurnal variation of OBS-TEC showing error bar and IRI-2016 model of each month during January – December 2011 at Birnin-Kebbi

**Fig. 1.**