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Interactive comment on "Migrating and Non-Migrating Tides Observed in the Stratosphere from FORMOSAT-3/COSMIC Temperature Retrievals" *by* Uma Das et al.

Anonymous Referee #2

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General comments

Temperature data from the FORMOSA Satellite Series No. 3/Constellation Observing System for Meteorology, Ionosphere and Climate (FORMOSAT-3/COSMIC) observations obtained during 2009 to 2010 have been used to analyze migrating (DW1) and non-migrating (DS0 and DW2) diurnal tides in the middle atmosphere from 10 to 50 km over equator and 65°N. For this, the authors have separated two overlapping groups with data from 4 satellites each besides to consider data from 6 satellites group. The analysis of each group was performed considering 21 days data centred over each 11 days. The topic of the manuscript is interesting for understand the source of generation

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Discussion paper

of non-migrating tides in the high latitude during winter, as well as to identify aliasing effects in satellite data analysis. The manuscript presentation is clear and the scientific contribution is appropriate for this journal. However, there are some moderated issues that need to be addressed.

Specific comments

Some important works that deal with short-term variability of the tides were not contemplated. For example: using NAVGEM-HA reanalysis and meteor radars McCormack et al. (2017) have observed day-to-day variability of the winds and tides. Recently, Baumgarten and Stober (2019) have estimated the tidal variability from 10-day continuous lidar observation.

Information about the COSMIC mission and its temperature profiles was not sufficiently addressed. Could the authors include a brief summary containing minimal information about the COSMIC mission as well as the temperature derivation process?

What is the COSMIC post-processed level of data used in the study? The authors could also add information about the spatial distribution of the COSMIC observations (vertical and horizontal resolutions) of the data used in the study.

Based on correlation analysis between tides and SPW1 amplitudes, the authors claim that the contribution of nonlinear interaction to non-migrating tides generation is not important. To provide convincing support for this finding, an effort should be undertaken to include additional analysis (for example, cross-correlation and phase coherence).

The discussion needs to be improved considering some studies on tidal variability in both stratosphere and mesosphere. For example: nonmigrating diurnal tides generated by tide-planetary wave interactions have been studied by Lieberman et al. (2015), and Niu et al. (2018) have discussed this issue and their relationship to SSW.

Minor/Technical comments:

Throughout the manuscript, many acronyms were used without proper designation.

Please provide compound term on first appearance.

Lines 28-29: “TIMED satellite” Line 45: “satellite observations of TIDI and SABER instruments onboard TIMED” Line 46: “UARS”

Line 105: change “As mentioned earlier 10 days data from all six COSMIC” to “As mentioned earlier +-10 days data from all six COSMIC”

References:

McCormack et al. Comparison of mesospheric winds from a high-altitude meteorological analysis system and meteor radar observations during the boreal winters of 2009-2010 and 2012-2013, J. Atmos. Solar-Terr. Phys., 154, 132-166. 2017.

Baumgarten, K. and Stober, G. On the evaluation of the phase relation between temperature and wind tides based on ground-based measurements and reanalysis data in the middle atmosphere, Ann. Geophys., 37, 581–602. 2019.

Lieberman, R.S.; Riggin, D.M.; Ortland, D.A.; Oberheide, J.; Siskind, D.E. Global observations and modeling of nonmigrating diurnal tides generated by tide-planetary wave interactions. J. Geophys. Res. Atmos., 120, 11419–11437. 2015.

Niu, X. Du, J., Zhu, X. Statistics on Nonmigrating Diurnal Tides Generated by Tide-Planetary Wave Interaction and Their Relationship to Sudden Stratospheric Warming. Atmosphere, 9, 416. 2018.

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