

## ***Interactive comment on “Characteristics of layered occurrence ratio of polar mesosphere summer echoes observed by EISCAT VHF 224 MHz Radar” by Shucan Ge et al.***

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### General Comment

The manuscript entitle “Characteristics of layered occurrence ratio of polar mesosphere summer echoes observed by EISCAT VHF 224 MHz radar” by Ge et al. bring an interesting data analysis on the occurrence of strong echoes detected mostly during the summer by radars from polar mesosphere that are called Polar Mesosphere Summer Echoes (PMSE). They have covered a solar cycle of observation from 2004 to 2015 at high latitude (Tromso, Norway).

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They have also released important results like (1) non-correlation between the occurrence mono- and double-layers PMSE and solar activity and (2) anti-correlation between the triple-layer PMSE and solar activity.

A priori two reviewers have been nominated to evaluated the paper. Besides, I have some important concerns (listed below) that I would like to be addressed by the authors.

Minor points:

Pg. 1, Throughout the manuscript: earth -> Earth. Pg 2, line 14: ... (1) these echoes are summer phenomena. Pg 3, lines 5-6: Please, verify the citations Pg 3, lines 9-11: This statement is confuse, please, re-write it. Pg 4, lines 3-4: The authors have mentioned 6 modes of the radar operation. However, they describe only two of them. Maybe they could explain shortly the difference among all operation modes. Table 3: Please, put the units into the brackets, i.e., (min) instead of /min Pg 7. lines 9-11. Please, give a meaning for the Spearman rank coefficient, in this case. Pg. 16. line 10. “But, we still can not. ...”

Major points:

The authors must clarify their contribution with this study. They are using an almost solar cycle of data to study PMSE occurrence and the data is really valuable to understanding some unsolved points on this topic.

Page 8. Line 7. As the author has only o solar cycle, it is not prudent to say that the layered OR has a period of 7-8 year. More data are necessary to conclude about the periodicity that seems to follow the solar activity.

Figures 3 and 4. Why do the authors fit a polynomial curve to the PMSE OR? Is not a sinusoidal curve more appropriated?

Further explanation on Subsection 4.1 and Figures 5, 6 and 7 are necessary. The main point released by the authors was not clear to me, i.e., that there is not direct relation

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between the PMSE OR and solar activity.

The same comment above can be extended to Figure 8.

Another concern is regarding to the usage of the threshold to determine the PMSE OR. The authors have not explained why they are using those assumptions. The main conclusion of them are based on these analysis, then it must be clear.

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