

The authors investigate a potential correlation between D-region electron density enhancements and neutral (OH) temperature changes. A mechanism which proposes a depletion of the OH layer, as a result of energetic particle precipitation effecting the local chemistry at the mesosphere, is invoked to explain the observed temperature changes. The magnitude and direction of the change in neutral temperature is dependent on the local conditions. They conclude that the proposed mechanism can explain their observations. They also conclude that the recovery in temperature is rapid enough, and the duration of events short enough, that EPP driven temperature change likely has little effect on the long-term heat balance of the local atmosphere.

Responses to the majority of review comments are satisfactory. The increased temporal resolution of the spectral measurements is an appropriate adjustment to the method and further supports the conclusions of the paper.

The reviewer continues to agree with the motivation behind the study and remains happy with the quality of data and method of analysis. Some final adjustments, for the sake of clarity, are suggested below.

General comments:

- Some clarification needed in Section 2.2. The author states that ‘the errors bars shown in this study represent the standard deviations (STD) over the average time’. Presumably this refers to the STD of the temperature, which is calculated from the variance of the linear fit? The reviewer understands this could be thought to be obvious, but it should be made much clearer where exactly this number (the STD) comes from, especially considering the role it plays later in determining the classification of the events.
- In Section 4, L:158-159 and Table 1: The author states: ‘The criterion for a changing mesopause temperature is that the change has to be larger than the standard deviation of the temperatures averaged over half an hour’. The reviewer believes the STD in question, which is used for the criteria discussed here, is that on the T_{+2} measurement. This should be made clear. Furthermore, if this is the case, it appears to me that Event 2 does not meet the criteria set out in the text, since it records a ΔT of -13K, and a STD on both T_{-1} and T_{+2} of ± 21 K. This is briefly addressed in lines 263-264 but isn’t concluded on.
- In the discussion of the first event (L174-177), to help with clarity, it should be made clear that this ΔT refers to a longer time interval compared to the others, due to the missing temperature measurement at T_{-1} .
- Figure 3, top right scatter plot. The reviewer is glad of its inclusion, although it raises a further question. A number of points all seem to share very similar relative intensities (approximately 200), but this is not commented on. An investigation and discussion of the cause of this feature is needed before their inclusion in the analysis.
- Figure 3 caption: A short sentence reads: ‘The lower percentile for intensity 35%’. Please clarify this statement.
- Section 5: Lines 257-258. The author states an anti-correlation is seen between the airglow temperature and electron density. This is correct, but the correlation is mild at best. This is later referred to as evidence against periodic behaviour on the timescale of the observations. The reviewer believes that the inclusion of a subset of points on this scatter, corresponding to the 6 events that show a decrease in OH temperature with increased electron densities, could better highlight a supporting

correlation. Furthermore, the correlations in both scatter plots could be statistically quantified to aid discussion.

- Section 5: Lines 299-301 contain a statement that the mesospheric temperature profile can also be relatively steady over the extent of the OH layer, which can result in little to no change in temperature in response to the peak altitude of emission changing. The reviewer believes the intention is to propose that this could be the case during some of the events studied (wherein no significant ΔT was observed), as either an alternative explanation to the short lifetimes discussed in lines 267-268, or in addition to. If so, this would be helped by adding another sentence to clarify this.

Minor comments:

- L164: change 'event' to 'events' since it is now plural.