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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Coincident measurements of PMSE and NLC above ALOMAR (69 N, 16 E) by radar and lidar from 1999–2008" *by* N. Kaifler et al.

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1., 2., 3., 6.: english edits: "... were not detected by the radar due to...", "electron number density", "... allows us to derive.." and "... as a set diagram".

We thank the refereee for these corrections in language and phrasing. We have incorporated these changes in the revised version of the manuscript.

4.: removal of EPP events in radar data

Our original statement that EPP events were removed from our data was actually misleading and even incorrect. EPP events lead to natural variability of PMSE but do not

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show up as specific radar signatures otherwise. However, what we did remove were single events like meteor echoes that are not related to PMSE in any way. The text has now been revised as follows:

————- changed in section 2.1:

Additionally, typical contaminations of radar measurements like interfering signals were removed from the dataset. PMSE are detected from 5-minute mean values of the relative signal power. A PMSE event is defined as a power enhancement above the a detection threshold but for a minimum duration of 20 minutes (i.e., 4 consecutive 5-minute averages) in one height channel. This excludes single events like e.g. meteor echoes but does not affect the PMSE occurrence rate.

5.: justification of data conditioning

———— added in section 2.3:

Such a neighbour filter was applied to improve the data quality by removing events that only occur in one time-altitude-bin. As both NLC and PMSE typically occur in layers wider than our altitude resolution, this does not effect these layers but removes single bins that are presumably noise or of other origin. In radar data, meteor echoes occur in single events and are successfully eliminated by this method, which is commonly used (LatteckGRL2007). The total amount of data removed by this method is negligible and the overall occurrence rate of PMSE or NLC is not effected, as these are calculated per time bin.

7.: relation P(PMSE|not(NLC))

We have discussed the conditional probability P(NLC|not(PMSE)) because of its scientific interest. Of course, other conditional probabilities like P(PMSE|not(NLC)) can also be calculated directly from the dataset. We would like to point out, however, that those can also be inferred from the given probabilities that are connected by the law of total probability, which is, in our notation: P(PMSE) = P(PMSE|NLC) * P(NLC) +

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P(PMSE|not(NLC)) * P(not(NLC)) with P(not(NLC)) = 100 % - P(NLC). We have therefore chosen to select scientifically interesting quantities and not to discuss explicitly all possible combinations.

———— Table 2. text added:

Note that the total and conditional probabilities are connected by the law of total probabilities, which is, in our notation, P(PMSE) = P(PMSE|NLC) * P(NLC) + P(PMSE|not(NLC)) * P(not(NLC)) with P(not(NLC)) = 100 % - P(NLC).

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 25081, 2010.

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