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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The Morning NO_x maximum in the forest atmosphere boundary layer" *by* M. Alaghmand et al.

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Alaghmand et al. present a very interesting set of observations of NOx made at the PROPHET field site. They found that NOx concentration peaks occur during the early morning hours. The authors determined that the peak is not due to increases in NO. The NO measurements can be explained by the photolysis of NO2. The NO concentrations are in reasonable agreement with the NO-NO2-O3 photostationary state. The authors examined several possible explanations of the NOx peak: HONO production and photolysis, downward mixing of polluted air, downward mixing of polluted air and anthropogenic sources. None of these sources appear to fit the data and therefore it is

concluded that there must be a surface NOx source.

Consideration of HONO as a source of the NOx peak seems irrelevant in view of their previous conclusion that the peak is due to NO2. The photolysis of HONO produces NO and not NO2.

The paper should be restructured so that the final conclusions are better linked to the presented measurements. The conclusion that the source is the surface may well be correct but is it possible to strengthen this argument? The elimination of the assumed explanations does not provide a completely satisfactory proof that the NOx peak must be a surface source.

This reviewer does not agree with Anonymous Referee #2 on the elimination of so many figures; Figures 1 and 2 seem essential to the paper.

However, improvements and adjustments should be made. A statement giving the surface temperature and lapse rates should replace figure 4. Figure 5 does not show great evidence of an early morning NOx peak; what is its purpose? Figures 6 to 9 are difficult to read due to the large amount of data presented

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