

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

WRS Stockwell (Referee)

william.r.stockwell@gmail.com

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Alaghmand et al. present a very interesting set of observations of NO_x made at the PROPHET field site. They found that NO_x 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 NO_x 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

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concluded that there must be a surface NO_x source.

Consideration of HONO as a source of the NO_x 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 NO_x 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 NO_x 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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