

Interactive comment on “Nucleation and growth of new particles in Po Valley, Italy” by A. Hamed et al.

A. Hamed et al.

Received and published: 7 December 2006

The authors would like to thank the referees for their constructive comments and suggestions that helped a lot to improve the value of this manuscript.

Below are our answers to the different points from both of you.

Answering the comments from Referee 1:

1) Table (2) is removed from the manuscript. We agreed with the referee this table makes no sense if it is presented separately so we combined the number of observations for different measured parameters (presented before in table 2) with table 1 since it still necessary information for a reader to have an idea how many data points for each parameters we are dealing with. The context changed accordingly.

2) In figure (3) we removed (%) sign from the Y label, since the percentage numbers already shown on Y-axis.

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Answering the comments from Referee 2:

In the General comments, referee 2 sees the interpretation of the results as "at some points weak". Unfortunately we are not given clues as to what these points might be. We have tried to make a fairly comprehensive comparison to data series from other environments, see e.g. discussion on the seasonal distribution of events on page 9611-9612, or the discussion on the different nucleation parameters, page 9624-9626. Making definitive interpretations of the causes of the differences would of course require that we understand the nucleation and growth mechanisms in different environments well enough, but this is unfortunately not yet the case. The main purpose of the present manuscript is to characterize the Po Valley nucleation events as thoroughly as we can, and subsequent analysis is given in further publications (see the papers by Mikkonen et al. and Sogacheva et al. in the same volume). Comparing with particle nucleation in different environments in more specific details and deeper interpretation is one of our future aims, and we are at the moment carrying out more analysis concerning nucleation at different stations. This is analysis that requires a considerable amount of work. We are certainly going to interpret this analysis in the near future, but publication of the results will have to be left to a future paper.

1) Page 9604, line 12: The referee asked that we should mention here that the formation rate is for particles < 3 nm. In fact, we calculated the formation rate for particles at 3 nm, from the increase of 3-50 nm particle number concentration between the event start time and the time when the particle concentration exhibits a maximum during the event. Please reread section 3.4.2 in page 9615, where our method for FR calculations has been explained, so the formation rate we mentioned in page 9604, line 12 was not for particles less than 3 nm.

2) Page 9604 line 18: Probably the referee meant line 25 in page 9604, more recent references are added

3) Page 9605 line 5: More references are added here

4) Page 9606 line 25: We changed “This work was a part of the QUEST” into “This work was part of the QUEST”

5) Page 9619 line 27: Sorry about that mistake, we typed a wrong reference of Bonn and Moortgat, now the reference has been corrected and the corresponding sentence referred now to their finding.

6) Page 9633 table 1: why the authors give for NO₂ and O₃ two ranges

The reason of the two indicated ranges for the gas monitors; the two ranges are the minimum and the maximum range, user selectable, over which the instrument can operate. Particularly, the ranges we used, over the instruments were operated, were the minimum one for all the measured gas monitors.

7) Page 9633 table 1, line NO₂: changed from 0-50pp into 0-50ppb

8) Here we respectfully disagree with the referee. Let's take an example: on a given month our measurement is operational on 50% of the days, and we record nucleation on 50% of those days. Should we report nucleation frequency of 50% or 25% for that month? Clearly, the former is the correct choice, and we are confident that in papers reporting from other stations, instrument malfunction has also been correctly accounted for.

References:

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ACPD

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