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Interactive comment on "Volatile particles formation during PartEmis: a modelling study" *by* X. Vancassel et al.

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Interactive comment on " Volatile particles formation during PartEmis: A modelling study" By X. Vancassel et al. (ACPD 3, 5803-5829).

Answers to anonymous referee # 2

Referee # 2 made several interesting and relevant comments. Please, find below our answers.

Comment concerning lines 7-11 page 5805. In these lines, we did not intend to give an extensive review of the existing e values, but rather give some examples of scatter. We still agree with the reviewer that the e values presented here may lead to some confusion since we did not distinguish between direct and indirect determinations, conversion including the plume or not etc. Therefore, we will re-write slightly this paragraph and add the reference to the work of Kärcher et al. 2000. Note however that we re-

ferred to the more recent work of Schumann et al. 2002, which gives a very good summary of the present knowledge concerning e values.

Concerning the comments on the analysis of the data, it is true that we shift sometime from CE=50% and e ż 2.7 to CE = 100 and e ż 5.2 %. The main reason is that we do not know exactly the wall losses. CE = 100 % represents obviously an upper limit for these losses while 50 % leads to a result for e which is closer to the results collected by MPI. This will be clarified in the text.

The fact that changing the CI emission by an order of magnitude has only a little impact on the estimate of e is not a surprise, at least for the highest ion emission index (or ion concentration at the exit of the engine). Our figure 5 which corresponds to t = 0.9 s (end of the sampling line) shows exactly the same trend as figure 14 (t = 0.9 s) in Yu and TurcoŠs paper (JGR, 103, 25915-25934, 1998). Although the modelling concerns quite different situations, the behaviour of the size distribution remains the same. So our conclusions are not in contradiction with previous studies.

Comments concerning lines 7-8 page 5810. As noted in the text as well as in formula (1) itself, equation (1) is applied only to soot particles. In fact this formula has been determined for particles in the size range 40-100 nm. According to equation (1), depletion occurs but is independent of the size of the particles (as long as they remain in the size range 40-100 nm). For the volatile particles, which are much smaller (size range $<$ 10 nm), depletion to the wall has calculated according to the work of Brockmann et al., 1982, by formula 2.

The comment concerning the abstract is perfectly justified, as we did not change the "microphysical approach". This sentence will be modified.

Comment concerning figure 3. Eleven transverse locations were indeed used for the probe, but some of them were not used for the calculations since they were too close to the walls (bad values of air fuel ratio). In addition some data were not available. Finally, the same probe positions were indeed used for modern and old cruise, therefore the

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indications on the upper horizontal axis (including the numbers 12-18) will be removed. The figure caption will also be modified to indicate that the e values shown are those needed to obtain the same volatile particles concentration as DLR measurements at a given probe position, at 0.9 s, for old and modern cruise.

Figure 5's caption. This is a mistake, we meant Ědoes not change much whenĚ..This will be corrected in the final version.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 5803, 2003.