

Interactive comment on “New-particle formation events in a continental boundary layer: First results from the SATURN experiment” by F. Stratmann et al.

F. Stratmann et al.

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Paragraph 1: A table of all balloon-borne measurements carried out during the SATURN experiment has been inserted into the text (page 1698, line 23).

Paragraph 2: It should be noted that Figures 10d) and e) suggest a connection between SO₂ concentration, N10 and N800, and consequently the size distributions plotted in Figure 11. To make this clearer and to account for the referee’s concerns, the descriptions of Figures 10 and 11 have been modified (page 1705, lines 19-23):

“As can be seen in Figure 10e), the number concentrations (N10: 3-10 nm and N800: 3-800 nm) show a significant increase at 07:30 UTC. Both number concentrations feature a second maximum between 10:30 and 12:00 UTC, i.e., shortly after the appearance of small cumulus clouds (Figure 10a). The evolution of N10 and N800 seems

to be connected to the evolution of the SO₂ concentration. However, for the second maximum in N10, this is less pronounced.”

and (page 1706, line 8-11)

“Between 10:30 and 12:00 UTC (see also Fig. 10e), an absolute maximum located around 20 nm appears. The occurrence of this maximum coincides with the appearance of small cumulus clouds (see Fig. 10a) and is in some degree correlated with the second increase in SO₂ concentration (see also Figs. 10d and e).”

Paragraph 3: The text has been modified to account for the referee’s suggestions (page 1708, line 1-3):

“A similar behavior can be observed for the SO₂ concentration profile, which features a minimum around 220 m. Due to the response time of the SO₂ monitor, which is in the order of 20 to 60 s (corresponding to 30 to 80 m in barometric height) this minimum is shifted downwards.”

Paragraph 4: Figure 15 depicts a situation where ACTOS is partly inside the ML and partly inside the RL. Therefore, Delta N values from inside the RL are available. This is now stated in text more clearly (page 1709, 6-8):

“Therefore, sometimes ACTOS is inside of such an up-draft with highly increased turbulence and a significant number of newly formed particles and sometimes ACTOS is inside the RL where the turbulence is much weaker and Delta N is close to zero, i.e., no newly formed particles are detected.”

Paragraph 5: A short paragraph has been added to the summary section (page 1711, line 13): “However, it must be pointed out that during the experiment new-particle formation events were observed under different PBL conditions indicating that there are several types of mechanism as discussed in Nilsson et al., 2001. Further detailed analysis of the SATURN data will be necessary to give a deeper insight in the process and location of new particle formation. For example, the estimation of the vertical

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turbulent particle flux as calculated from the balloon data should give an indication of the source of the newly formed particles.”

Technical corrections: Page 1694, line 1: `4 June' changed to `14 June'

Page 1695, line 27: `... about 50 km apart from to the balloon site.' changed to `... about 50 km apart from the balloon site.'

Page 1710, line 17: At page 1705, line 10 the text has been modified:

``From Figures 10a-c, it can be seen, that June 3 featured an increase in global radiation (a radiation maximum near 1000 W/m-2) and temperature, and decreasing relative humidity during morning hours, i.e. a behavior attributed to typical radiation days.”

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