

Interactive comment on “Observations of new particle formation in enhanced UV irradiance zones near cumulus clouds” by B. Wehner et al.

Anonymous Referee #1

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This manuscript presents interesting experimental results, measurements performed by Fast CPCs, on detection of elevated ultrafine particle concentrations near the cloud edge regions, mostly right outside the cloud. Based on the data, it is apparent that ultrafine particles are formed near the cloud edge, but the reason seems to be a bit unclear. It is discussed in the manuscript that the reason for NPF may be linked to elevated irradiance, presence of chemical precursor vapors or extent of turbulence or some other thermodynamic phenomena. Here however a conclusion is drawn that elevated irradiance must be causing to the observed new particle formation events (NPF). To my opinion, it seems that the authors emphasize too much the role of irradiance but understate the role of e.g. turbulence and precursors. If so, the discussion on pages 5-7 should be accompanied with less ambiguous discussion and more straightforward

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quantitative analysis on irradiance being the main reason, and data to exclude the others. I think in reality the explanation for NPF might be more complicated than the one presented here.

Why is the NPF event observed usually only at one side of the cloud? Is there systematic data available to verify this? Were differences observed between different points of compass when entering/leaving the cloud?

To my opinion, the data described in the manuscript should be published, but more in the form of an observation, and not as a self-evident consequence of elevated irradiance only. The simplest procedure would be changing slightly the emphasis, and the title, of the manuscript, not to exclude thermodynamics, turbulence or possible precursors.

Minor: The quantity PDF plotted on the y-axis of Fig 9 should be explained. Why is the LWC marked in light blue in all the other Figures but in marine blue in Figure 10? Is there an apparent reason for this?

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