

Interactive comment on “Enhanced extinction of visible radiation due to hydrated aerosols in mist and fog” by T. Elias et al.

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Specific comment by H. Gerber: "It is interesting to digress a bit and note that the closely related and published paper on Paris fogs by Hammer et al., 2014: ACP, 14, 10517-10533, in which some co-authors of the present paper also appear, does list Gerber (1991) in the reference list, but not in the text. Perhaps the comment in the Hammer paper that "short supersaturation spikes - - - are irrelevant" was addressed to the findings of Gerber (1991) where RAD/EVP fogs showed SS transients and droplet spectra with sizes up to somewhat larger than 10 μm ; even though the fog had a mean RH \sim 100%. Hammer et al also note that "...cooling of air parcels below dew point results in formation of cloud or fog". The fogs in Gerber (1991) appeared to form

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differently by mixing near-saturated parcels at different temperature causing supersaturations. This raises the questions: How relevant are the values of SS_{peak} discussed in Hammer et al when turbulence and mixing dominates fog formation as in Gerber (1991)? See also, for example, Rodhe (1962: Tellus, 14, 49-86) for this fog-formation mechanism. Is it necessary to know the fine details of fog formation including SS, or is the use of SS_{peak} sufficient to produce realistic droplet spectra? A good test is to use SS_{peak} values and CCN spectra to calculate fog droplet spectra and compare them to accurate measured droplet spectra. Unfortunately, the latter is still appears to be somewhat of an issue for ground-based measurements. It seems more effort is needed to properly address relationships between CCN, hydrated mist particles, fog droplets, and fog (and cloud) dynamics."

Response from Emanuel Hammer: "The value effective peak supersaturation is describing the maximum supersaturation that a CCN experienced for a long enough time grow to a cloud or fog droplet. With the measurement setup used during the ParisFog campaign and described in Hammer et al. (2014, ACP, 14, 10517-10533), the effective peak supersaturation was given for a droplet population. Thus, it does not address the turbulence of the fog formation itself. However, it is describing the fog droplet population at the state where the Kelvin effect becomes less important. This again is the reason for the difficulty you mentioned: using SS_{peak} values and CCN spectra to calculate fog droplet size is not well comparable to accurate measured fog droplet sizes. We agree that more effort is needed to properly address relationships between CCN and fog droplets from several fog types."

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