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Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the Relationship Between Cloud Water Composition and Cloud Droplet Number Concentration" *by* Alexander B. MacDonald et al.

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On the Relationship Between Cloud Water Composition and Cloud Droplet Number Concentration

I welcome a study in which the data on aerosol-cloud interaction is generalised. As a surprise I notice that the parameterisation(s) as initiated 25 years ago like B&L still are central in modelling.

Following are comments and questions

-I would have projected that a negative relation of Nd with Na would be seen because

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the few large seasalt particles favourably compete with the smaller much more numerous sub-submicron CCN composed of nSS (Steve Ghan). While in the remote ocean seasalt could increase CDNC it seems highly unlikely this could occur off the coast in an area with sufficient small CCN as in your case.

-line 459 e.f. the negative correlation with NO3 in case it is combined with ammonium seems to me of quite some importance given the rather high values of the two as compared with sulphate. What about a combination of sulphate and nitrate or rather nSS and nitrate, both deriving from rather similar sources and possibly similar geographical location.

-line 132 sampling was inland in continental clouds

-line 491. "...and it is worth noting that only five of our 385 samples are considered low turbulence according to the criterion of Leaitch et al.". This contradicts the later conclusion that the data can be translated to the NE-coast situation. There should at least some discussion on the absence of stratus-like clouds in your region.

1006. first entry in the table: a common error made in citing this reference, though not expected in this paper on cloud-water sulphate: the unit in the Leaitsch et al. paper of 1992 is cw-sulphate in nequivalents/m3.

Finally I really dearly miss a back-trajectory analysis of at least some typical flights or those with high nSS / NO3 and Na.

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