

## ***Interactive comment on “Humidity effects on the detection of soluble and insoluble nanoparticles in butanol operated condensation particle counters” by Christian Tauber et al.***

### **Anonymous Referee #1**

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There are some interesting results but the presentation could use some work. Primarily, the humidity effect for detection of NaCl nanoparticles is prominently displayed in a couple of figures but this effect is nearly lost because of all the text about charge or charging effects. The authors need to motivate, and consider significantly paring down, the data and discussion of charge effects.

Also important is that there is a lack of discussion on how others could apply the humidity effect for these types of particles.

A concerning factor as to whether these results apply to the atmosphere: Are there actually any nanometer-sized NaCl aerosol in the atmosphere?

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The discussion of the rearrangement / change in shape of these particles is missing any experimental description. This experimental data is a (another?) humidity effect and seems to be pertinent to the topic here.

The discussion around this shape effect would be greatly helped if data could be presented with the DMA run at the RH of interest. Why was not a recirculating pump / filter not used for some measurements? That would help the interpretation of the overall results and may lead to some sort of basis for a model description.

There is previous work on humidity effects for nanometer-sized sulfuric acid particles out of the Eisele-McMurry collaboration at NCAR. Also the O'Dowd group explored chemical effects and the activation of nano-particles. Those two studies were focused on pulse height analysis but the humidity effect explored here is integral to those experiments. I think the Donaldson group out of Toronto also discussed humidity effects in butanol CPCs. There are probably others and they should be cited. How would the PSM (Seinfeld, Kulmala etc.) instrument data be affected? How about alternate condensing fluids like diethylene glycol or FC43 (the latter used on aircraft campaigns by Brock and co-workers) ?

The authors should consider changing the language from inverse temperature to something like non-congruent (with the Kelvin ....) temperature dependence. Inverse temperature to many physical scientist means a  $1/T$  dependence....

The non-native English speaking authors have had difficulty translating their thoughts into English. Hard to follow their logic at times. More on this at a later time: wanted to get these major comments to the authors for discussion etc.

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