Asmi et al, Aerosol decadal trends (II): In-situ aerosol particle number concentrations at GAW and ACTRIS stations.

acp-2012-586

Reply to reviewers

We thank both of the reviewers for their comments and observations on the manuscript. The suggested corrections have on our opinion improved the manuscript and pointed out some of the features not mentioned in the analysis earlier.

The corrected manuscript will be submitted shortly, with the changes highlighted in red.

Notable change is the addition of one additional DMPS measurement time series from Southern Sweden (Vavihill). This does not change any of the conclusions in the paper, as VHL dataset seems to behave generally quite similarly as other Nordic DMPS datasets.

Detailed answers on comments (our reply in blue):

Referee #1

There is no discussion on comparing the observed trends with AERONET or MODIS AOD or with global models trends. They would certainly enhance the manuscript. In a certain sense, the manuscript is a bit too much particle number centric, but a broader approach would be nice to enhance the discussion in the final part of the manuscript. They left most of the discussions to the companion paper, but we feel a bit that the discussion could be enhanced a bit in this manuscript.

This discussion has now been included. The overall agreement seems to be relatively good in US and EU, but we still consider different properties (AOD, scattering, PM) so different that direct comparisons are quite speculative

1) Page 20851, Line 21: provide a more recent reference for decreased visibility associated with aerosol number concentration. For example, you could refer to one of the several studies conducted under the scope of the US Interagency Monitoring of Protected Visual Environments (IMPROVE) like BRAVO and MOHAVE.

Done

2) Page 20852, Line 3: sounds better if you omit the word “more”.

Ok

3) Page 20853, Lines 2-3: the sentence “Numerous and highly variable nano-particles with diameters less than approximately 50nm do not act as CCN” is misleading, since it gives the impression that nano-particles do not have any impact on CCN formation or on climate. In the following paragraph you clearly explained that these particles may act as CCN if the grow. So I suggest you rephrase the refereed sentence.

Good point. Re-phrased.

4) Page 20853, Line 11: the sentence “Such growth does not directly affect the particle number concentration total” is not strictly correct, since growth by coagulation affects the aerosol particle number concentration.

Also corrected.

5) Page 20854, Line 23: I suggest you add the term “mass concentration” after “particulate matter (PM)”

Added.

6) Page 20855, Line 4: suppress "or optical", since optical properties is enclosed into "physical properties"

Corrected.

7) Page 20867, Line 13: in all available datasets BUT PAL.

Changed to “most datasets”