Response to Referee #1:

We would like to express our sincere gratitude to Professor Horvarth for his helpful comments that will contribute to improve the quality of the manuscript. A point by point response is included below. Comments are in blue and italics, and our responses are in black.

Titos et al. have analyzed a large set of data with respect to humidity growth. The work horse for this investigation are two nephelometers operating at <40% RH and at high relative humidity. As can be seen from figure 7 there is a slight decrease in scattering coefficient for humidity below 40%, thus a precise value of the reference humidity is needed. I miss a description of the method. If the low humidity is achieved by temperature increase some volatile parts of the aerosol particles might disappear, which on the other hand are included in the wet nephelometer. If diffusion drying is used, the same argument applies. So a description of the drying process and a discussion of possible effects of artefacts is needed. (page 3366 lines 6 to 7)

The measurements presented in this study were conducted following the standard aerosol sampling protocol of the GAW network. The sampled aerosol was gently heated when necessary to achieve a low relative humidity (RH) of 40% or below. The mean ± standard deviation of the temperature and relative humidity within the dry nephelometer for the whole measurement campaign were T = 26±4 ºC and RH = 30±13 %. In order to minimize losses of volatile compounds the temperature of the sampled air was kept below 35 ºC (Bergin et al., 1997; ten Brink et al., 2000). Only 0.5% of the 1-min observations occurred at temperatures above this value and these data were not further considered in the study. Despite these considerations, if losses of volatile compounds occurred due to heating, both nephelometers would be affected since the nephelometers were operated in series separated by the humidifier control system. This information and the corresponding references will be included in the Instrumentation section of the revised manuscript.

Bergin, M. H., J. A. Ogren, S. E. Schwartz, and L. M. McInnes. 1997. Evaporation of ammonium nitrate aerosol in a heated nephelometer: Implications for field measurements. Environ. Sci. Technol., 31, 2878–2883.

ten Brink, H. M., A. Khlystov, G. P. A. Kos, T. Tuch, C. Roth, and W. Kreyling. 2000. A high flow humidograph for testing the water uptake by ambient aerosol. Atmos. Environ., 34, 4291–4300.

The scattering enhancement factor with respect to wind speed is indirectly biased by the direction, since in this investigation lower wind speed also means winds from the West, which is evident in figure 6. So I suggest to omit the right part of figure 5, since the better information is given in figure 6.

Following the reviewer suggestion we have omitted Figure 5, since the better information is given in Figure 6 and this figure is also easier to visualize. Figures have been renumbered accordingly.

It is difficult to guess the humidity growth with only one information on the aerosol (the single scattering albedo). The authors are aware of this and the large error bars on the first constant in equation 4 and 5 demonstrate this, which even make it likely that no increase in scattering coefficient can occur. This relation obtained by the authors mainly has been found since only two types of aerosols are "competing": Sea salt particles on the one hand, and the high influence of the anthropogenic aerosols on the other hand. If a third component, e.g. desert aerosol particles could also occur, this formula may fail.

We agree with Prof. Horvarth in that the parameterization has limitations. We are aware that this particular study had a strong covariance between SSA and SAE, which allowed a reduction in the γ fit to a single parameter and that this relationship is only valid for the TCAP data. In this particular study, the coarse mode was predominantly dominated by sea salt particles and the presence of other species that typically accumulate in the coarse fraction like dust particles was negligible. Due to the similar characteristics of sea salt and dust particles in terms of SAE and SSA, but the strong difference in the hygroscopic behavior, the parameterization proposed in this study would fail under the presence of both types of aerosols as dust does not experience significant hygroscopic growth. The Cape Cod study may be considered as representative of an aerosol from the Northern Atlantic coast with anthropogenic influence. The same analysis needs to be applied to other regions and aerosol types to catalog exponential fit parameters of γ versus SSA over a variety of aerosol types and atmospheric conditions. In this sense, preliminary analysis to check the validity of this parameterization at different sites (pristine and polluted marine, anthropogenic, rural, desert and forest sites) suggest that the model agrees well with the experimental measurements for all sites except for the desert site (Titos et al., 2014). The discussion about the limitations of the parameterization will be strengthened in the revised manuscript.

Titos, G., Jefferson, A., Sheridan, P. J., Andrews, E., Lyamani, H., Ogren, J. A. and Alados-Arboledas, L.: Estimating aerosol light-scattering enhancement from dry aerosol optical properties at different sites, European Geoscience Union Assembly, Vienna, 2014.