Response to reviewer evaluations (during the interactive ACPD discussion forum) of 'Comment on the paper "Classification of aerosol properties derived from AERONET direct sun data" by G. P. Gobbi et al. (2007)' by O'Neill, N. T.

Below; reviewer comments are in italics, author comments are in straight text

First reviewer (Anonymous Referee #1)

General comments: The paper of N. T. O'Neill is an interesting contribution to the subject of the classification of aerosol properties based on the spectral aerosol thickness information. Although the true aerosol classification can be achieved only using also other optical measurements (and not just the transmission of the direct solar beam).

I'm not sure what a "true aerosol classification" means but, the reviewer is no doubt aware, that every combination of optical measurements has limitations. If one's classification objectives are in terms of retrieving bi-modal parameters of the aerosol particle size distribution (namely fine mode fraction and an average indicator of fine mode particle size) then spectral transmission data can be used to achieve a simple but very useful classification of these robust and critical aerosol properties.

The author shows that the aerosol classification method of Gobi et al. (2007) can be presented in the analytical form. Specific comments: The symbols in the definition of the phase shift parameter must be explained.

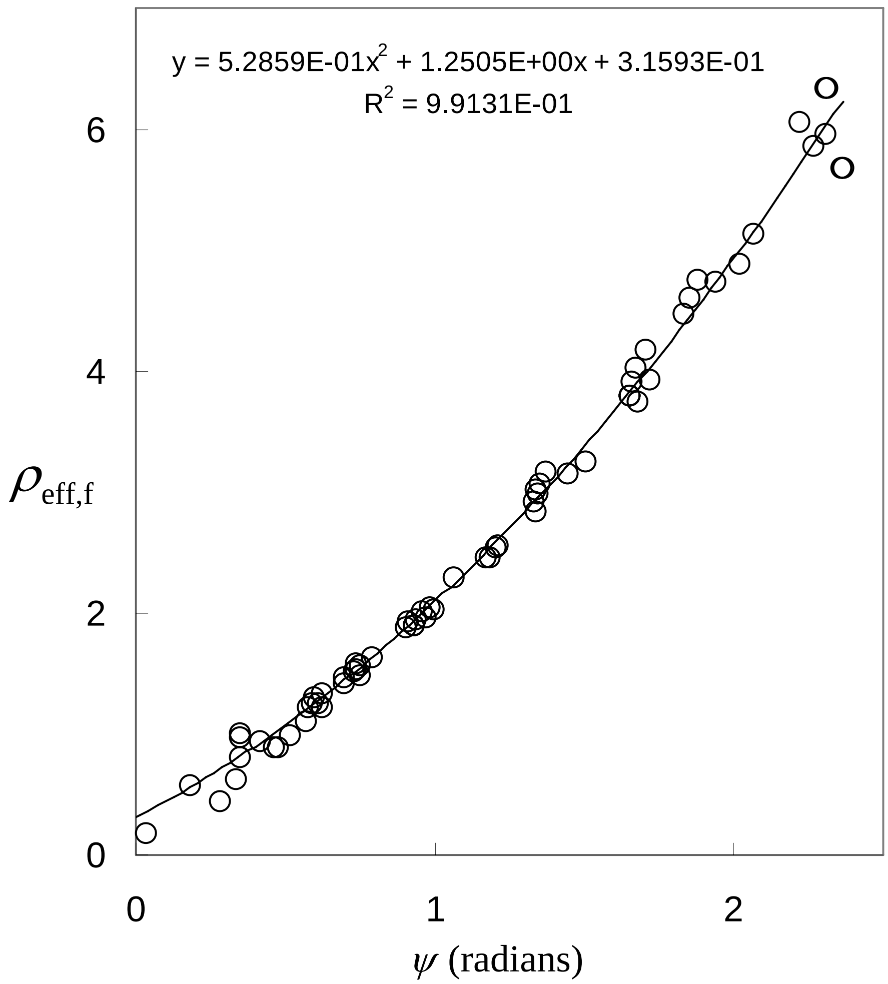
The refractive index was defined, which leaves only the ubiquitous (effective) size parameter of $x_{eff,\, f} = 2\, \pi\, r_{eff,,f} / \lambda$. I believe the reader can be left to his own devices on this.

Second reviewer (Anonymous Referee #2)

The comment by O'Neill outlines the analytical form of the method for aerosol classification from sun photometer data by Gobbi et al. It is a useful contribution to the problems of aerosol retrieval

No comment is needed here.

Figure 1 from "Correction to the effective radius expression by O'Neill et al. (2005)" ($\alpha'_{f,0}$ and $\alpha_{f,0}$ are defined in that paper);



$$\rho_{eff,f} = a_0 + a_1\psi + a_2\psi^2$$

where;

$$\rho_{eff,f} = 2\frac{2\pi r_{eff,f}}{\lambda}|m - 1| ,$$

$$\tan\psi = \frac{\alpha'_f - \alpha'_{f,0}}{\alpha_f - \alpha_{f,0}} ,$$