Comment on acp-2021-413
Anonymous Referee #3

This paper attempts to understand the relationship between AOD and PM2.5. However, after reading through, I feel that the paper is more of a GEOS-Chem validation and uncertainty analysis work, rather than offering physical explanation of the AOD-PM2.5 relationship. Specifically, could the authors clarify, perhaps with additional analysis, how different factors, such as PBL height, RH, organic matter fraction, etc, contribute to the uncertainty in AOD-PM2.5 relationship? How does the role of each factor vary with region (e.g., Korea vs. China)? The only clear conclusion is that AOD and PM2.5 have reversed seasonality because of seasonally varying PBL height, but this is already well known.