

## ***Interactive comment on “Diagnosis of dust- and haze pollution-impacted PM<sub>10</sub>, PM<sub>2.5</sub>, and PM<sub>1</sub> aerosols observed at Gosan Climate Observatory” by Xiaona Shang et al.***

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This work reported five-year measurements of the mass concentration and composition of PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> at Gosan climate observatory. Based on the concentration of soluble ions and OC/EC data, PCA and distribution frequency analysis were performed to understand the influence of soil dust and anthropogenic pollution on bulk aerosol. Although the authors provided long term dataset of PM at this observation site, the results are not so attractive based on their analysis. At the current state, it is not publishable on ACP. 1. As for principle component analysis, three factors explained 71% of the total variance. It means 29% of the variance was not explained. The residue was quite large. What's the possible contribution for this unexplained part? 2. Because the number of the tracer was limited and the tracers were lack of uniqueness,

C1

the results about source apportionment were not so robust. For example, PC3 was dominated with NH<sub>4</sub><sup>+</sup> and Ca<sup>2+</sup>, while secondary formation of NH<sub>4</sub><sup>+</sup> might also lead to the correlation between NH<sub>4</sub><sup>+</sup> and Ca<sup>2+</sup>. 3. The time series of mass concentration for each PC should be given after the PCA data. This is important for understanding the sources of PM. 4. It was unclear about the diagnosis of dust and haze based on frequency distribution. There was no robust criterion to differentiate haze from dust events. As shown in Fig.4, the mass loading of PM on dust or haze events varied greatly. The data could not well support the conclusions drawn by the authors.

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C2