

# Estimation of Ground-Level Particulate Matter on the Base of Multi-angular Polarimetric Remote Sensing and Oxygen Absorption Bands Using GRASP Software

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Ground-level particulate matter has a significant association with the health risk that can affect people's lungs and hearts [1]. As a multi-angular polarimetric remote sensing product, GRASP/POLDER provides retrievals of aerosol properties that are traditionally difficult to obtain from remote sensing, such as aerosol scale height, aerosol size distribution and particle refractive index or chemical composition [2], which could be directly used to estimate PM<sub>2.5</sub> concentrations. Meanwhile, Oxygen A and B absorption bands (O<sub>2</sub>-bands) can be used to improve the ground-level PM<sub>2.5</sub> estimation accuracy due to its sensitivity to the variation of aerosol vertical profile [3].

In this study, the global estimation of ground-level PM<sub>2.5</sub> using the GRASP/POLDER chemical component approach [4] combined with the O<sub>2</sub>-bands has been demonstrated. Through a series of synthetic tests, the accuracy of the PM<sub>2.5</sub> estimation has been evaluated utilizing the GRASP/POLDER-3 products. Furthermore, we compared the effects of three assumed aerosol vertical profiles (exponential profile, threshold profile and Gaussian profile) on ground-level PM<sub>2.5</sub> estimation. Finally, the error analysis of aerosol vertical distribution, aerosol chemical composition, aerosol size distribution and their impacts on the accuracy of PM<sub>2.5</sub> estimation have been studied.

## References

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