



## **Relationship between fine-mode AOD and precipitation on seasonal and interannual time scales**

Hwayoung Jeoung (1), Chul E. Chung (1), Twan van Noije (2), and Toshihiko Takemura (3)

(1) School of Environmental Science and Engineering, Gwangju Institute of Science and Technology, Gwangju, Korea, Republic Of (hj102@gist.ac.kr), (2) Royal Netherlands Meteorological Institute, De Bilt, Netherlands (twan.van.noije@knmi.nl), (3) Research Institute for Applied Mechanics, Kyushu University, Fukuoka, Japan (toshihiko.takemura@gmail.com)

On seasonal and interannual time scales, weather is highly influential in aerosol variability. In this study, we investigate the relationship between fine-mode AOD (fAOD) and precipitation on these scales, in order to unravel the effect of wet weather on aerosol amount. We find with integrated satellite and ground observations that biomass burning related fAOD has a relatively greater seasonal variation than fossil fuel combustion related fAOD. It is also found that wet weather reduces biomass burning fAOD and increases fossil-fuel combustion fAOD. Aerosol simulation models forced by reanalyses consistently simulate the biomass burning fAOD reduced during wet weather but only in the tropics and furthermore do not consistently increase fossil-fuel combustion fAOD during wet conditions.

The identified relationship between fAOD and precipitation in observations allows for seasonal predictability of fAOD, since average precipitation can be predicted a few to several months in advance due to the well-established predictability of ENSO. We reveal ENSO-covariant fAOD using a rotated component principal analysis of combined interannual variation of SST, precipitation and fAOD. During the warm phase of ENSO, we find that fAOD increases over Indonesia and the eastern coastal area of China, and decreases over South Asia, the Amazon and the continental parts of China.