

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

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Summary

Objective : Unravelling the effect of wet weather on aerosol amount

Findings:

- **1.** Wet weather is correlated with biomass burning fine-mode aerosol optical depth (fAOD) and anticorrelated with fossil fuel combustion fAOD
- 2. El Nino-Southern Oscillation (ENSO) is covariant with fAOD
- Seasonal predictability of fAOD



Introduction

On multi-decadal to centurial time scales,

anthropogenic aerosol emission can change severalfold (Lamarque et al., 2010), and so emission can be the driving factor in determining aerosols.

On the other hand, on seasonal and interannual (2-4) years) scales, weather is expected to be a relatively more important factor in determining the variability of aerosols

Past studies:

- I. Jacob and Winner (2009) summarized how each meteorological variable influences aerosol dry mass in aerosol simulations
- 2. Tai et al. (2010), by analyzing PM2.5 observations, showed that humidity is positively correlated with sulphate and nitrate, but negatively correlated with organic aerosol (OA) and black carbon (BC)
- 3. ENSO impacts on AOD (Wu et al., 2013)

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Data & Result

- **fAOD data** (MODIS+MISR+AERONET) from Lee and Chung (2013)
- Observations and Models) Phase II hindcast experiment :
- All the data (including simulation results) are **monthly means**

Global distribution of fAOD & precipitation





1. Correlation between fAOD and Precipitation

Seasonal correlation ISR+AERONET fAOD vs. Precip (GPCP



1	 Computed using the 2001-2008 climatological seasonal variation 		30N
	Mask-out threshold values		30N -
	MODIS+MISR+AERONET fAOD variance	<1e-04	305

		1
SPRINTARS fAOD	<1e-05	C)
variance		30N
TM5 fAOD variance	<1e-06	EQ
Precipitation variance	<0.05	305
(mm/day)		1

REFERENCES

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