Supplementary material for *Investigating relationships between aerosol optical depth and cloud fraction using satellite, aerosol reanalysis and general circulation model data*

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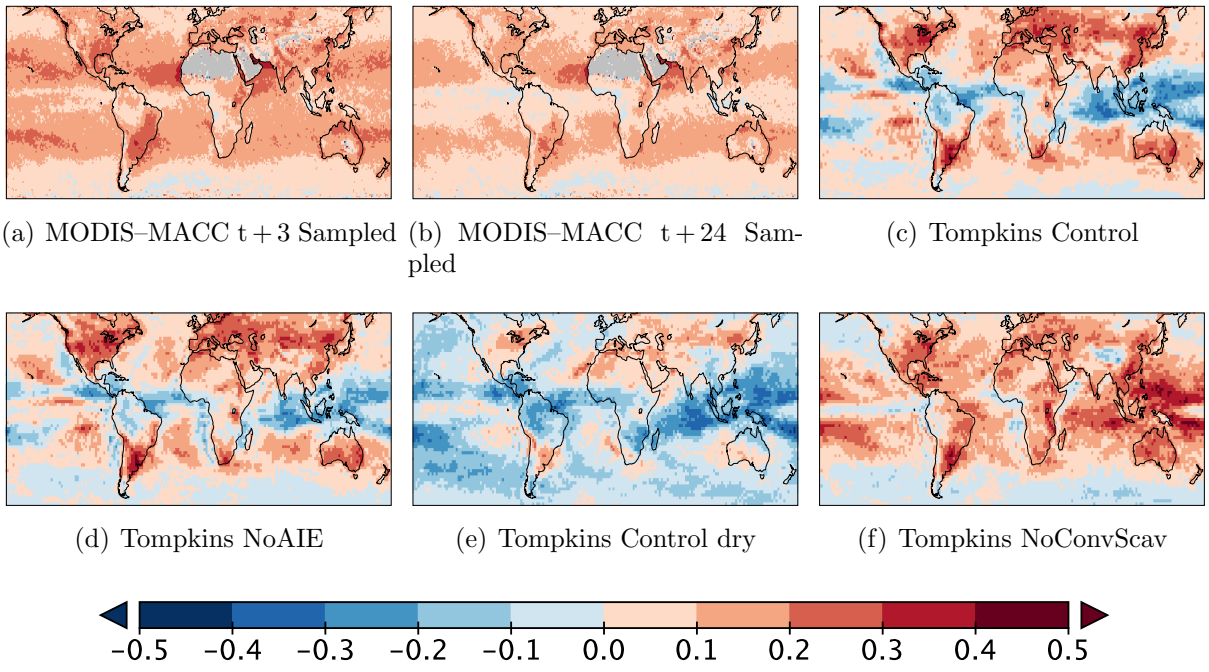
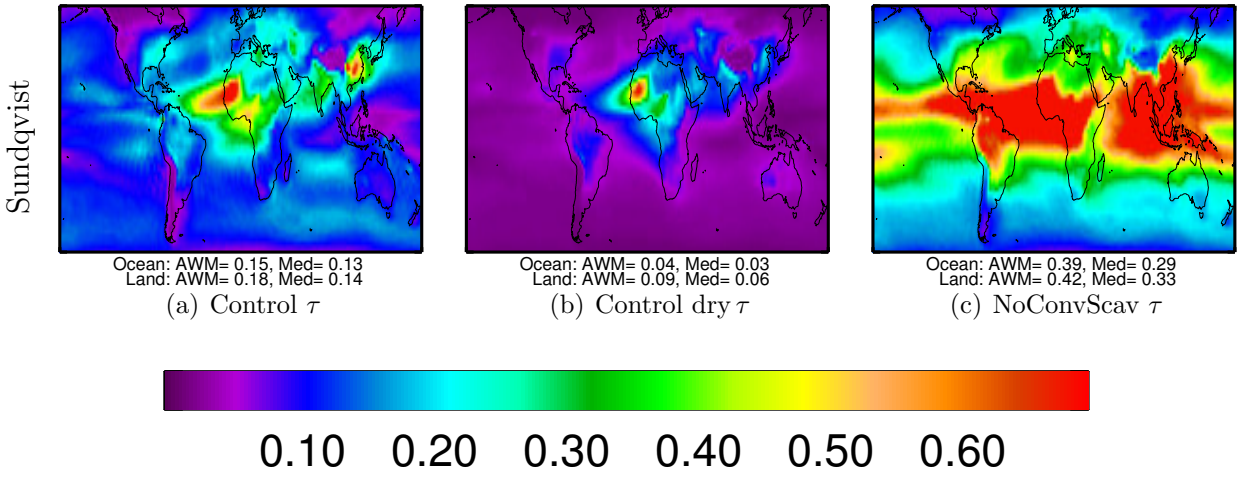


(a) MODIS–MACC t + 3 Sampled (b) MODIS–MACC t + 24 Sampled (c) Tompkins Control

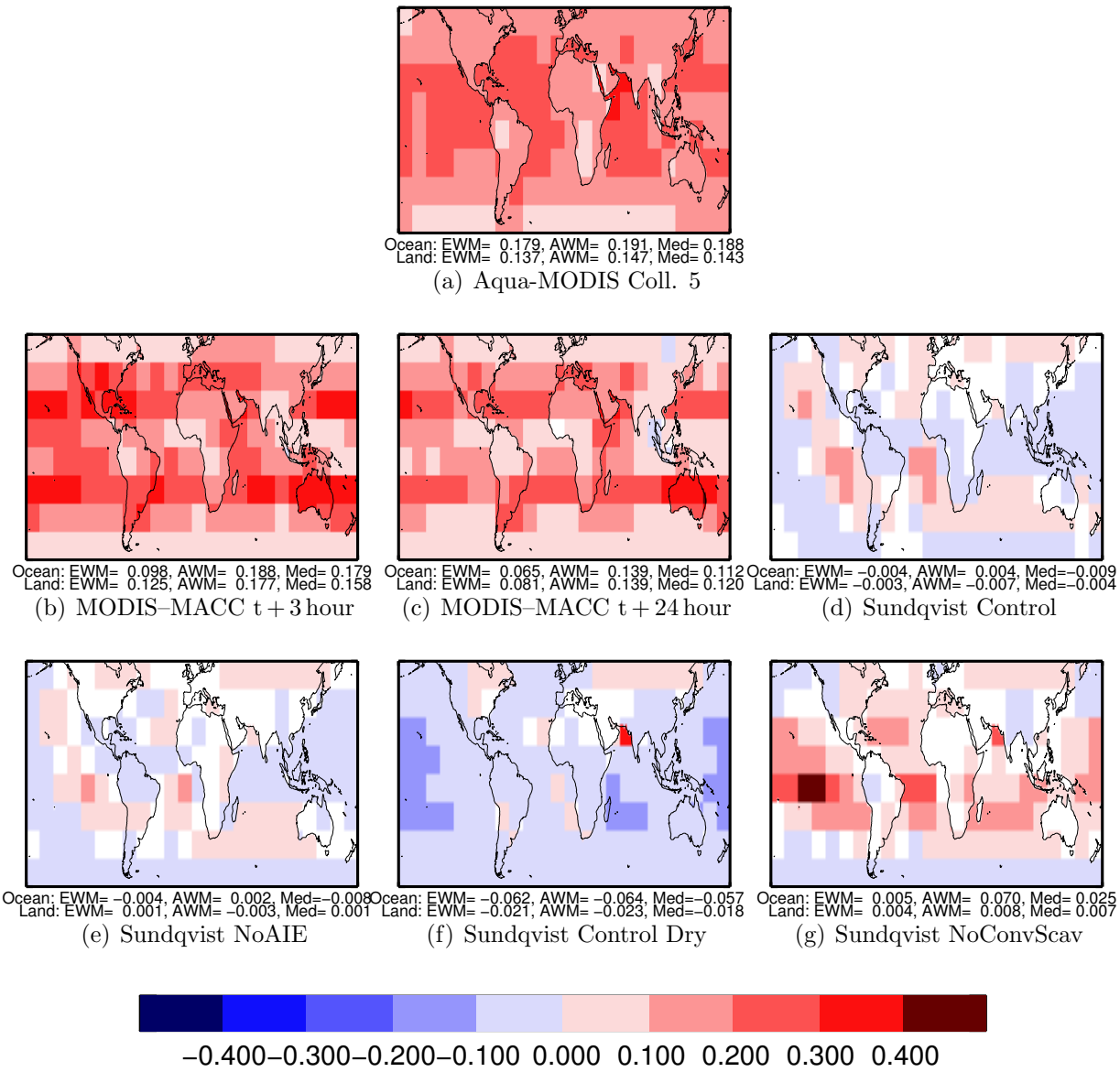
(d) Tompkins NoAIE (e) Tompkins Control dry (f) Tompkins NoConvScav

Figure S1: Same as Figure 2 but for (a), (b) MODIS–MACC sampled according to MODIS τ availability and (c)–(f) ECHAM5-HAM Tompkins simulations.



(a) Control τ (b) Control dry τ (c) NoConvScav τ

Figure S2: Annual (all seasons) mean aerosol optical depth (τ) for ECHAM5-HAM Sundqvist simulations. The area-weighted means (AWM) and median (Med) for both ocean and land are shown beneath each map. The Tompkins simulations have very similar annual mean τ fields to the respective Sundqvist simulations. The NoAIE simulations have very similar annual mean τ fields to the Control simulations. The area-weighted mean (AWM) and median (Med) for both ocean and land are shown beneath each map.



(a) Aqua-MODIS Coll. 5

(b) MODIS–MACC t + 3 hour

(c) MODIS–MACC t + 24 hour

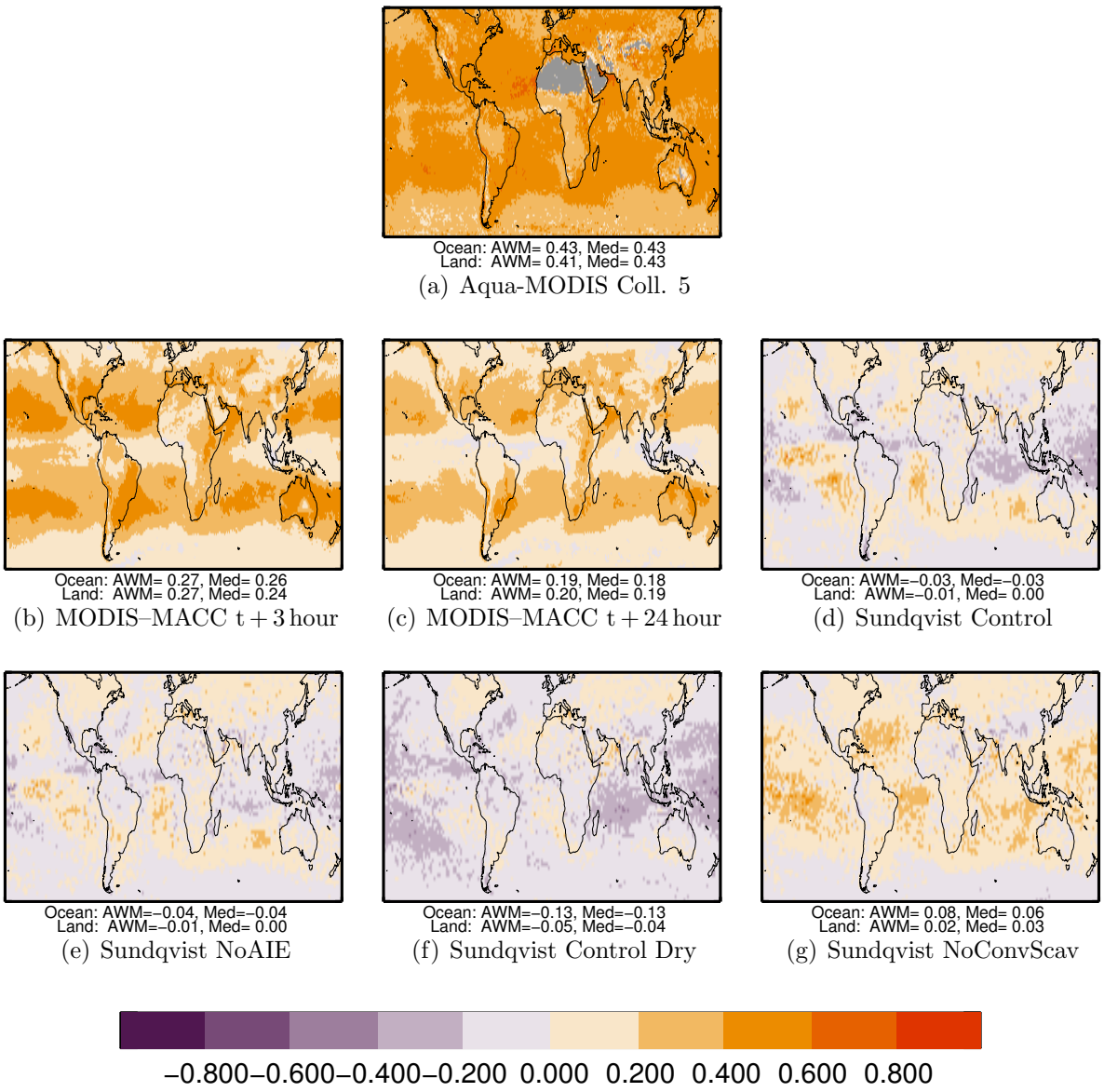
(d) Sundqvist Control

(e) Sundqvist NoAIE

(f) Sundqvist Control Dry

(g) Sundqvist NoConvScav

Figure S3: Same as Figures 1 and 2, but for $\frac{df_c}{d\ln\tau}$. The grid-method of Grandey and Stier (2010) has been used. The lin–log relationship was chosen based on semi-empirical considerations (Chapter 3 of Grandey, 2011). White regions are where the data are not significantly different from zero at two-sigma confidence. The error-weighted mean (EWM), area-weighted mean (AWM) and median (Med) for both ocean and land are shown beneath each map.



(a) Aqua-MODIS Coll. 5

(b) MODIS–MACC t + 3 hour

(c) MODIS–MACC t + 24 hour

(d) Sundqvist Control

(e) Sundqvist NoAIE

(f) Sundqvist Control Dry

(g) Sundqvist NoConvScav

Figure S4: Same as Figures 1 and 2, but for df_c–$d\ln\tau$ correlation.

References

Grandey, B. S.: Investigating aerosol–cloud interactions, Ph.D. thesis, University of Oxford, UK, URL http://ora.ox.ac.uk/objects/uuid:8b48c02b-3d43-4b04-ae55-d9885960103d, 2011.

Grandey, B. S. and Stier, P.: A critical look at spatial scale choices in satellite-based aerosol indirect effect studies, Atmos. Chem. Phys., 10, 11 459–11 470, doi:10.5194/acp-10-11459-2010, 2010.