



Supplement of

A study of the impact of synoptic weather conditions and water vapor on aerosol-cloud relationships over major urban clusters of China

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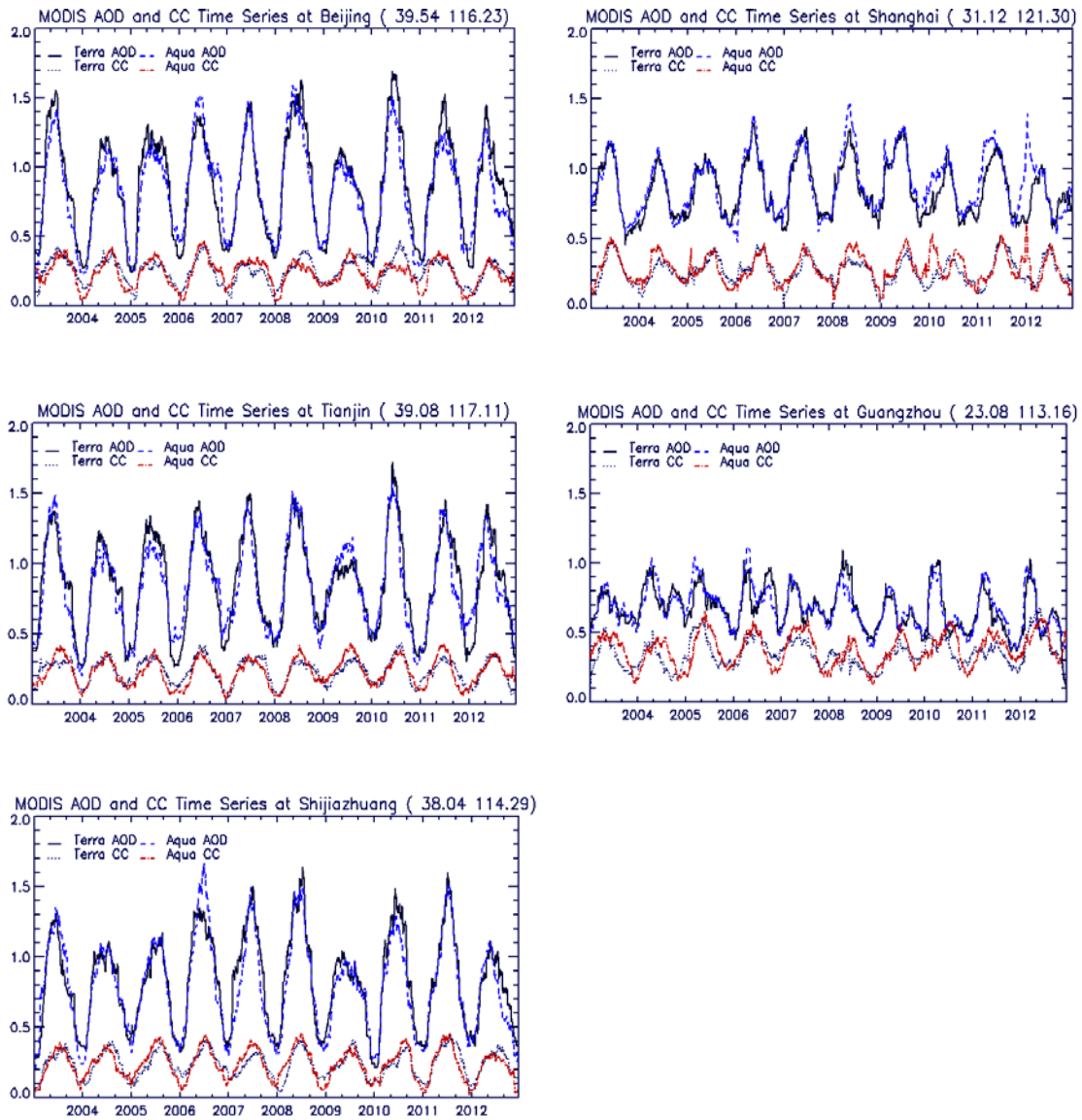


Figure S1. AOD and CC timeseries from TERRA and AQUA satellites at Beijing (upper left), Shanghai (upper right), Tianjin (middle left), Guangzhou (middle right) and Shijiazhuang (lower left), for the time period 2003 - 2013. The three cities on the left are within the BTH cluster, Shanghai lies within the YRD cluster and Guangzhou lies within the PRD cluster.

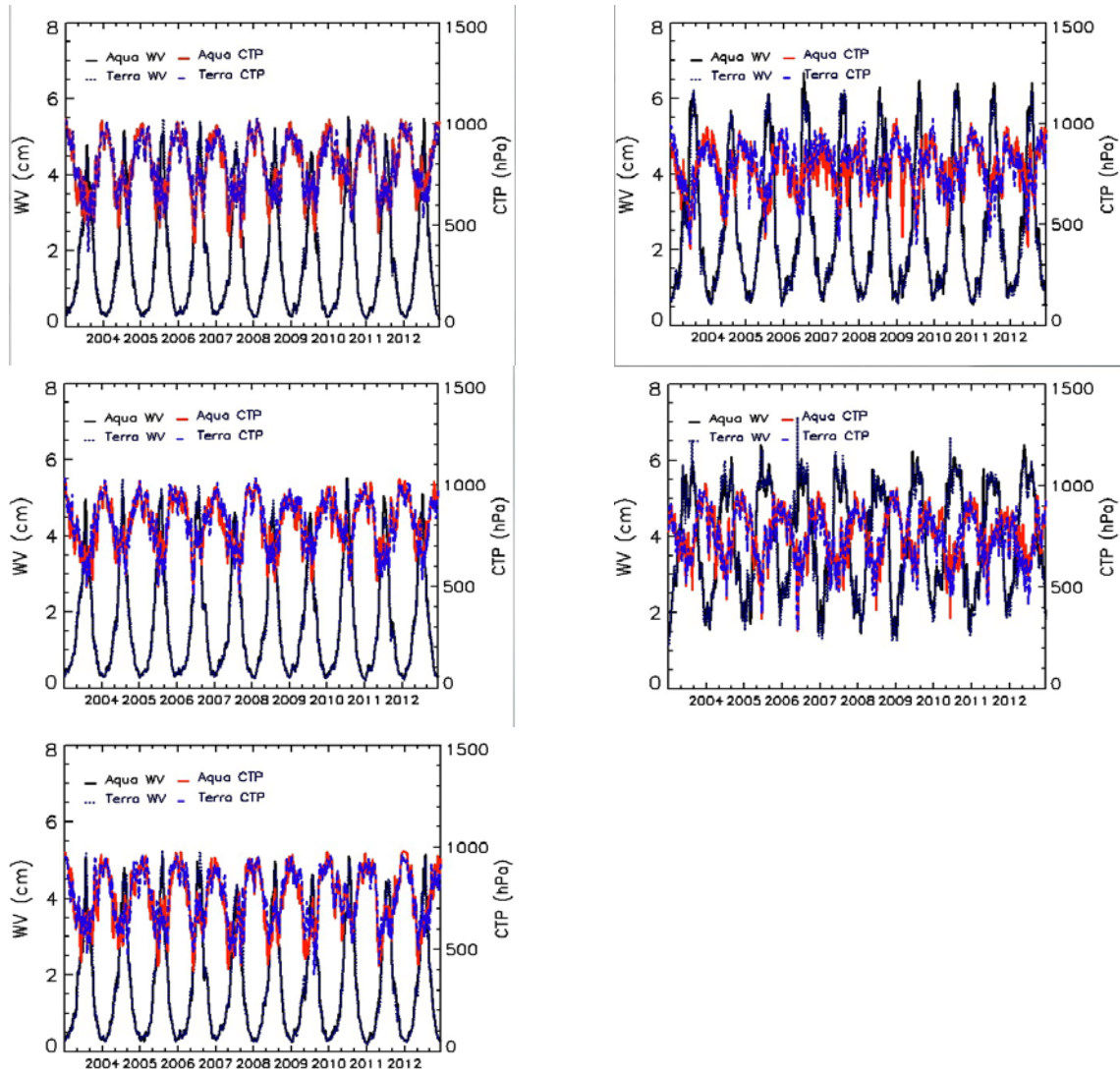


Figure S2. WV and CTP timeseries from TERRA and AQUA satellites at Beijing (upper left), Shanghai (upper right), Tianjin (middle left), Guangzhou (middle right) and Shijiazhuang (lower left), for the time period 2003-2013. The three cities on the left are within the BTH cluster, Shanghai lies within the YRD cluster and Guangzhou lies within the PRD cluster.

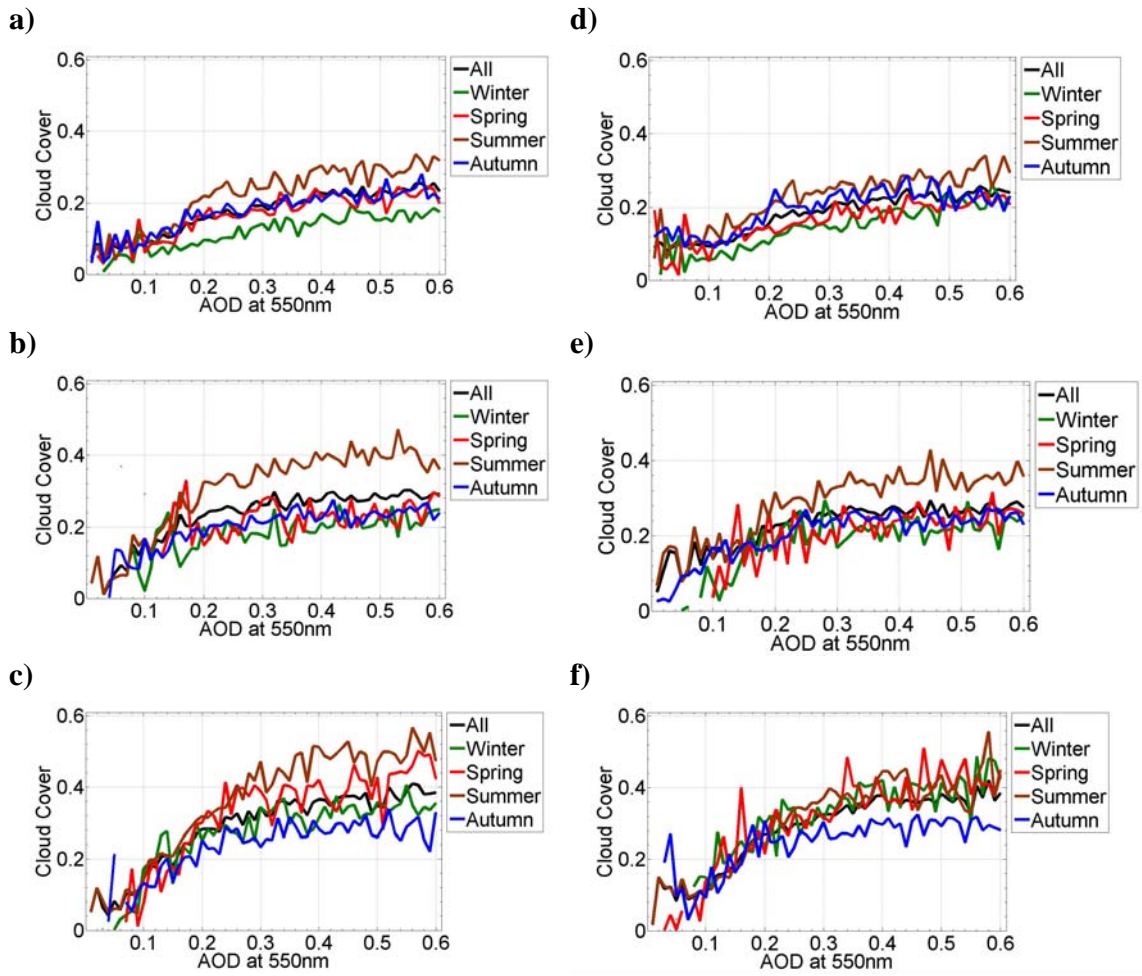


Figure S3. Annual and seasonal AOD as a function of CC over BTH (a,d), YRD (b,e) and PRD (c,f) from AQUA (a-c) and TERRA (d-f) satellites for the time period 2003-2013.

Table S1. AOD-CC slopes for 0-0.22 AOD over BTH, YRD and PRD from AQUA and TERRA satellites for the time period 2003-2013. The values in parentheses represent R^2 coefficients. The asterisks denote statistically significant values at the 95% confidence level ($\alpha = 0.05$).

Aqua					
	All Seasons	Winter	Spring	Summer	Autumn
BTH	0.51(0.83)*	0.31(0.50)*	0.55(0.60)*	0.85(0.83)*	0.56(0.61)*
YRD	1.02(0.87)*	-0.06(0.001)	-0.52(0.08)	1.43(0.88)*	0.75(0.65)*
PRD	1.21(0.92)*	1.62(0.78)*	1.87(0.82)*	1.42(0.93)*	0.89(0.58)*
Terra					
	All Seasons	Winter	Spring	Summer	Autumn
BTH	0.36(0.73)*	0.28(0.28)*	0.33(0.21)*	0.60(0.63)*	0.40(0.39)*
YRD	0.64(0.70)*	1.34(0.81)*	0.76(0.16)	0.80(0.60)*	0.77(0.80)*
PRD	1.00(0.82)*	1.30(0.67)*	1.62(0.77)*	0.98(0.77)*	0.78(0.35)*

Table S2. AOD-CC slopes for 0.23-0.6 AOD over BTH, YRD and PRD from AQUA and TERRA satellites for the time period 2003-2013. The values in parentheses represent R^2 coefficients. The asterisks denote statistically significant values at the 95% confidence level ($\alpha = 0.05$).

Aqua					
	All Seasons	Winter	Spring	Summer	Autumn
BTH	0.21(0.81)*	0.17(0.59)*	0.17(0.48)*	0.22(0.55)*	0.16(0.50)*
YRD	0.11(0.50)*	0.15(0.27)*	0.13(0.14)*	0.19(0.38)*	0.09(0.27)*
PRD	0.22(0.64)*	0.18(0.35)*	0.28(0.33)*	0.38(0.56)*	0.09(0.11)*
Terra					
	All Seasons	Winter	Spring	Summer	Autumn
BTH	0.18(0.74)*	0.26(0.71)*	0.18(0.56)*	0.19(0.48)*	0.04(0.03)
YRD	0.06(0.27)*	0.06(0.05)	0.15(0.20)*	0.15(0.28)*	0.03(0.03)
PRD	0.23(0.68)*	0.29(0.40)*	0.36(0.46)*	0.24(0.27)*	0.13(0.27)*

Table S3. AOD-CC and AOD-CTP slopes for different WV bins from Fig. 2 over the BTH region for SLP < 1008 and SLP > 1017 from AQUA for the time period 2003-2013. The values in parentheses represent R^2 coefficients. The asterisks denote statistically significant values at the 95% confidence level ($\alpha = 0.05$). (~) denotes very small value.

WV class	SLP < 1008		SLP > 1017	
	AOD-CC	AOD-CTP	AOD-CC	AOD-CTP
1 cm	0.15(0.57)*	151.20(0.65)*	0.19(0.93)*	-7.67(0.01)
2 cm	0.19(0.89)*	28.36(0.13)	0.07(0.57)*	180.50(0.81)*
3 cm	0.15(0.76)*	35.97(0.12)	0.01(~)	132.30(0.65)*
4 cm	0.15(0.47)*	-38.72(0.17)	0.27(0.28)	-295.10(0.72)
5 cm	0.11(0.64)*	-23.01(0.05)	-	-
6 cm	0.14(0.25)	29.47(0.02)	-	-
7 cm	0.28(0.65)*	-151.90(0.43)	-	-
8 cm	0.38(0.23)	-181.9(0.83)	-	-
9 cm	-	-	-	-
10 cm	-	-	-	-

Table S4. AOD-CC and AOD-CTP slopes for different WV bins from Fig. 3 over the YRD region for SLP < 1008 and SLP > 1017 from AQUA for the time period 2003-2013. The values in parentheses represent R² coefficients. The asterisks denote statistically significant values at the 95% confidence level ($\alpha = 0.05$). (~) denotes very small value.

¹: This value represents a line of 2 points

WV class	SLP < 1008		SLP > 1017	
	AOD-CC	AOD-CTP	AOD-CC	AOD-CTP
1 cm	-	-	0.07(0.71)*	219.30(0.48)*
2 cm	0.43(0.67)*	-197.40(0.22)	0.21(0.82)*	-22.55(0.02)
3 cm	0.05(0.14)	161.60(0.92)*	0.18(0.88)*	44.28(0.45)*
4 cm	0.20(0.67)*	-82.04(0.19)	0.33(0.84)*	-5.73(~)
5 cm	0.28(0.75)*	-132.10(0.63)*	0.14(0.28)	-7.55(~)
6 cm	0.25(0.76)*	-207.10(0.84)*	-0.66(1) ¹	-
7 cm	0.11(0.57)*	-140.60(0.78)*	-	-
8 cm	0.18(0.42)	-20.77(0.02)	-	-
9 cm	-	-	-	-
10 cm	-	-	-	-

Table S5. AOD-CC and AOD-CTP slopes for different WV bins from Fig. 4 over the PRD region for SLP < 1008 and SLP > 1017 from AQUA for the time period 2003-2013. The values in parentheses represent R² coefficients. The asterisks denote statistically significant values at the 95% confidence level ($\alpha = 0.05$). (~) denotes very small value.

WV class	SLP < 1008		SLP > 1017	
	AOD-CC	AOD-CTP	AOD-CC	AOD-CTP
1 cm	-	-	0.01(~)	915.00(0.70)
2 cm	-	-	0.03(0.03)	2.64(~)
3 cm	-	-	0.07(0.29)	36.62(0.23)
4 cm	-0.13(0.21)	-38.09(0.02)	0.08(0.32)	85.05(0.66)*
5 cm	0.18(0.34)	-242.70(0.71)*	0.07(0.06)	43.99(0.19)
6 cm	0.17(0.51)*	-175.90(0.87)*	-	-
7 cm	0.14(0.32)	-165.90(0.42)*	-	-
8 cm	-	-	-	-
9 cm	-	-	-	-
10 cm	-	-	-	-