

Supplementary Material

Table S1. Summary of the AERONET and particulate matter (PM) measurement stations used to evaluate modelled AOD and PM. The geographical positions of the stations are listed as: latitude, longitude, elevation above sea level. The Principal Investigator(s) (PI) responsible for each dataset are shown in the final column. Ascension Island is listed with the African sites because it samples outflow of biomass burning aerosol from the African continent (Swap et al., 1996). When comparing the model and observations, we restrict the time period to between January 2003 and December 2011 (according to the availability of biomass burning emissions data).

Station	Country	Observation period	Geographical position	Location classification	PI
South America					
Porto Velho (PM_{2.5})	Rondonia, Brazil	25/09/09 - 04/10/12	8.687°S, 63.867°W, 94.0 m	Heavily impacted by biomass burning	Paulo Artaxo
Alta Floresta (PM_{2.5})	Mato Grosso, Brazil	24/08/92 - 06/03/05	9.871°S, 56.104°W, 277.0 m	Rural, city outskirts, heavily impacted by biomass burning	Paulo Artaxo
Manaus, TT34 tower (PM_{2.5})	INPA Cuieiras forest reserve,	10/02/08 - 25/10/11	2.594°S, 60.209°W, 110.0 m	Preserved forest	Paulo Artaxo

	Amazonas, Brazil				
Santarem, K67 tower (PM_{2.5})	Tapajos National Forest, Para, Brazil	04/02/00 - 01/04/07	2.850°S, 54.867°W, 70.0 m	Preserved Forest	Paulo Artaxo
Alta Floresta (AERONET)	Mato Grosso, Brazil	21/06/93 - 15/01/14	9.871°S, 56.104°W, 277.0 m	Rural, town outskirts	Brent Holben, Paulo Artaxo
Cuiaba Miranda (AERONET)	Mato Grosso, Brazil	23/03/01 - 07/10/13	15.730° S, 56.021°W, 210.0 m	Rural, city outskirts	P. Artaxo, J. de Souza Nogueira, E. Ojeda de Almeida Filho, A. Jorge
Rio Branco (AERONET)	Acre, Brazil	02/07/00 - 10/11/12	9.957°S, 67.869°W, 212.0 m	Urban, within city limits	Brent Holben, Paulo Artaxo
Ji Parana SE (AERONET)	Rondonia, Brazil	19/01/06 - 09/06/13	10.934°S, 61.852°W, 218.0 m	Rural	Paulo Artaxo
Abracos Hill (AERONET)	Rondonia, Brazil	22/01/99 - 09/10/05	10.760°S, 62.358°W, 200.0 m	Rural	Brent Holben, Paulo Artaxo
Belterra (AERONET)	Para, Brazil	21/09/99 - 24/04/05	2.648°S, 54.952°W, 70.0 m	Rural	B. Holben, P. Artaxo
Santa Cruz (AERONET)	Bolivia	20/01/99 - 26/11/13	17.802°S, 63.178°W, 442.0 m	Urban, city centre	B. Holben
Santa Cruz UTESPA (AERONET)	Bolivia	18/09/06 - 04/11/08	17.767°S, 63.201°W, 432.0 m	Urban, within city limits	B. Holben
Equatorial Asia & Philippines					
Singapore (AERONET)	Singapore	14/11/06 - 19/10/12	103.780°E, 1.298°N, 30.0 m	Urban, city centre	S.-C. Liew, S. V. Salinas Cortijo
Bandung (AERONET)	Java, Indonesia	13/05/09 - 28/09/11	107.61°E, 6.888°N,	Urban, city centre	P. Lestari, B. Holben
Manila Observatory (AERONET)	Quezon City, Philippines	21/01/09 - 30/12/11	121.08°E, 14.635°N, 63.0 m	Urban, within city limits	N. Lagrosas, B. Holben
ND Marbel Univ. (AERONET)	Koronadal, Philippines	17/12/09 - 19/01/12	124.843°E, 6.496°N, 70.0 m	Urban, city centre	S. Dorado
Indochina					
Songkhla Met. Station (AERONET)	Thailand	11/01/07 - 13/12/11	100.61°E, 7.184°N,	Urban, city centre	S. Janjai
Chulalongkorn (AERONET)	Thailand	19/02/03 - 25/09/04	100.53°E, 13.736°N,	Urban, city centre	B. Holben
Ubon Ratchathani (AERONET)	Thailand	09/10/09 - 07/11/12	104.87°E, 15.246°N,	Urban, within city limits	S. Janjai
Silpakorn University (AERONET)	Thailand	15/08/06 - 11/12/11	100.04°E, 13.819°N,	Urban, city outskirts	S. Janjai

Chiang Mai Met. Station (AERONET)	Thailand	17/09/06 - 28/07/11	98.973°E, 18.771°N,	Urban, city outskirts	S. Janjai
Phimai (AERONET)	Thailand	18/02/03 - 10/04/08	102.56°E, 15.182°N,	Rural	B. Holben
Mukdahan (AERONET)	Thailand	07/11/03 - 30/05/10	104.68°E, 16.607°N,	Rural	Brent Holben
Bac Giang (AERONET)	Vietnam	03/03/03 - 26/12/09	106.23°E, 21.291°N,	Rural, city outskirts	N. Xuan Anh
Bac Lieu (AERONET)	Vietnam	10/03/03 - 25/04/11	105.73°E, 9.280°N,	Rural, city outskirts	N. Xuan Anh
Africa					
Ilorin (AERONET)	Ilorin, Nigeria	25/04/98 - 13/09/14	8.320°N, 4.340°E, 350.0 m	Rural, heavily impacted by dust emissions	R. T. Pinker
ICIPE-Mbita (AERONET)	Mbita, Kenya	20/03/06 - 10/04/14	0.417°S, 34.200°E, 1125.0 m	Sub-urban/rural, coastal Lake Victoria	B. Holben
Mongu (AERONET)	Mongu, Zambia	27/06/95 - 15/01/10	15.254°S, 23.151°E, 1107.0 m	Urban, within city limits	B. Holben
Skuzkuza (AERONET)	Skukuza, South Africa	19/07/98 - 03/08/11	24.992°S, 31.588°E, 150.0 m	Rural	B. Holben, S. Piketh
Wits University (AERONET)	Johannesburg, South Africa	09/05/02 - 14/11/11	26.192°S, 28.029°E, 1775.0 m	Urban, city centre	S. Piketh
Ascension Island (AERONET)	Ascension Island	20/11/98 - 31/12/13	7.976°S, 14.414°W, 30.0 m	Island/coastal, Atlantic Ocean	B. Holben