EUROPE	Andenes(955); Andenes; Arcachon(1506); Arcachon; Aubiere_LAMP(1752); Aubiere_LAMP; Autilla(1718); Autilla; Avignon(3092); Avignon; BORDEAUX(394); BORDEAUX; Barcelona(3641); Barcelona; Bari_University(432); Bari_University; Bayfordbury(795); Bayfordbury; Belsk(2523); Belsk; Berlin_FUB(350); Berlin_FUB; Birkenes(1162); Birkenes; Brno_Airport(353); Brno_Airport; Brussels(1720); Brussels; Bucharest_Inoe(1324); Bucharest_Inoe; Bure_OPE(978); Bure_OPE; CENER(1135); CENER; CLUJ_UBB(1466); CLUJ_UBB; Cabauw(2052); Cabauw; Camborne_MO(330); Camborne_MO; Carpentras(4198); Carpentras; Chilbolton(1878); Chilbolton; Coruna(1381); Coruna; Creteil(353); Creteil; Dunkerque(2264); Dunkerque; Edinburgh(647); Edinburgh; Eforie(1193); Eforie; Ersa(2432); Ersa; FZJ-JOYCE(1111); FZJ-JOYCE; Fontainebleau(1014); Fontainebleau; Frioul(1360); Frioul; Gotland(512); Gotland; Hamburg(2258); Hamburg; Helgoland(1166); Helgoland; Helsinki(1353); Helsinki; HohenpeissenbergDWD(1176); HohenpeissenbergDWD; Hyytiala(1159); Hyytiala; IMAA_Potenza(2262); IMAA_Potenza; ISDGM_CNR(932); ISDGM_CNR; Iasi_LOASL(1095); Iasi_LOASL; Ispra(2833); Ispra; Karlsruhe(1497); Karlsruhe; Kuopio(1418); Kuopio; Kyiv(2355); Kyiv; LAQUILA_Coppito(907); LAQUILA_Coppito; Laegeren(1524); Laegeren; Le_Fauga(1264); Le_Fauga; Lecce_University(3463); Lecce_University; Leipzig(2893); Leipzig; Lille(3399); Lille; Loftus_MO(407); Loftus_MO; Madrid(1946); Madrid; Magurele_Inoe(893); Magurele_Inoe; Mainz(2393); Mainz; Martova(869); Martova; MetObs_Lindenberg(668); MetObs_Lindenberg; Minsk(2708); Minsk; Modena(2088); Modena; Moldova(3765); Moldova; Moscow_MSU_MO(2978); Moscow_MSU_MO; Munich_University(2202); Munich_University; Napoli_CeSMA(550); Napoli_CeSMA; OHP_OBSERVATOIRE(3180); OHP_OBSERVATOIRE; Oostende(1810); Oostende; Oxford(334); Oxford; Palaiseau(3177); Palaiseau; Palencia(3306); Palencia; Paris(2471); Paris; Poprad-Ganovce(692); Poprad-Ganovce; Porquerolles(737); Porquerolles; Raciborz(683); Raciborz; Rame_Head(662); Rame_Head; Rome_La_Sapienza(386); Rome_La_Sapienza; Rome_Tor_Vergata(3617); Rome_Tor_Vergata; SMHI(368); SMHI; Sevastopol(1784); Sevastopol; Seysses(737); Seysses; Sirmione_Museo_GC(571); Sirmione_Museo_GC; Sodankyla(886); Sodankyla; Strzyzow(871); Strzyzow; The_Hague(512); The_Hague; Thessaloniki(3175); Thessaloniki; Timisoara(556); Timisoara; Toravere(2628); Toravere; Toulon(2604); Toulon; Toulouse_MF(1070); Toulouse_MF; Valladolid(1668); Valladolid; Venise(1747); Venise; Vienna_UNIVIE(476); Vienna_UNIVIE; Villefranche(2239); Villefranche; Watnall_MO(471); Watnall_MO; Wytham_Woods(646); Wytham_Woods; Xanthi(721); Xanthi; Zaragoza(1565); Zaragoza; Zvenigorod(1315); Zvenigorod
ASIA	Anmyon(1655); Anmyon; Bac_Giang(834); Bac_Giang; Bac_Lieu(1231); Bac_Lieu; Baengnyeong(895); Baengnyeong; Bahrain(1126); Bahrain; Beijing(3714); Beijing; Beijing-CAMS(1382); Beijing-CAMS; Bhola(873); Bhola; Chen-Kung_Univ(2494); Chen-Kung_Univ; Chiang_Mai_Met_Sta(2156); Chiang_Mai_Met_Sta; Chiayi(931); Chiayi; Chiba_University(657); Chiba_University; Dhabi(803); Dhabi; Dhadnah(1533); Dhadnah; Dhaka_University(1304); Dhaka_University; Dongsha_Island(754); Dongsha_Island; Dushanbe(1626); Dushanbe; EPA-NCU(1541); EPA-NCU; Fukuoka(1393); Fukuoka; Gandhi_College(1702); Gandhi_College; Gangneung_WNU(1242); Gangneung_WNU; Gosan_SNU(1279); Gosan_SNU; Gual_Pahari(390); Gual_Pahari; Gwangju_GIST(2152); Gwangju_GIST; Hamim(865); Hamim; Hankuk_UFS(851); Hankuk_UFS; Hokkaido_University(614); Hokkaido_University; Hong_Kong_PolyU(1382); Hong_Kong_PolyU; Hong_Kong_Sheung(501); Hong_Kong_Sheung; Irkutsk(1347); Irkutsk; Jaipur(1905); Jaipur; Kaashidhoo(475); Kaashidhoo; Kanpur(4087); Kanpur; Kaohsiung(325); Kaohsiung; Karachi(1558); Karachi; Kuching(619); Kuching; Kuwait_University(422); Kuwait_University; Lahore(1546); Lahore; Luang_Namtha(1113); Luang_Namtha; Lumbini(508); Lumbini; MALE(325); MALE; MCO-Hanimaadhoo(1763); MCO-Hanimaadhoo; Manila_Observatory(1440); Manila_Observatory; Masdar_Institute(1324); Masdar_Institute; Mezaira(2245); Mezaira; Mukdahan(1339); Mukdahan; Mussafa(887); Mussafa; NCU_Taiwan(1290); NCU_Taiwan; NCU_Taiwan; NGHIA_DO(705); NGHIA_DO; NGHIA_DO; NhaTrang(877); NhaTrang; NhaTrang; Niigata(490); Niigata; Nong_Khai(475); Nong_Khai; Noto(1323); Noto; Osaka(3427); Osaka; Pantnagar(365); Pantnagar; Pimai(738); Pimai; Pokhara(2060); Pokhara; Pontianak(1092); Pontianak; Pune(1424); Pune; Pusan_NU(519); Pusan_NU; Seoul_SNU(1448); Seoul_SNU; Shirahama(3032); Shirahama; Silpakorn_Univ(2184); Silpakorn_Univ; Singapore(2281); Singapore; Solar_Village(3925); Solar_Village; Son_La(368); Son_La; Songkhla_Met_Sta(1381); Songkhla_Met_Sta; Tai_Ping(461); Tai_Ping; Taihu(1422); Taihu; Taipei_CWB(1894); Taipei_CWB; Tomsk(1453); Tomsk; Tomsk_22(891); Tomsk_22; USM_Penang(1260); USM_Penang; Ubon_Ratchathani(1139); Ubon_Ratchathani; Ussuriysk(1863); Ussuriysk; Vientiane(328); Vientiane; XiangHe(3250); XiangHe; Xinglong(1293); Xinglong; Yekaterinburg(1599); Yekaterinburg; Yonsei_University(2073); Yonsei_University
NAMERICA	ARM_Oliktok_AK(324); ARM_Oliktok_AK; Ames(2080); Ames; Appledore_Island(403); Appledore_Island; BONDVILLE(3970); BONDVILLE; Bakersfield(881); Bakersfield; Bermuda(999); Bermuda; Billerica(2869); Billerica; Bonanza_Creek(2090); Bonanza_Creek; Bratts_Lake(3021); Bratts_Lake; Brookhaven(813); Brookhaven; CARTEL(3322); CARTEL; CCNY(2678); CCNY; COVE(1723); COVE; CalTech(1192); CalTech; Camaguey(1196); Camaguey; Chapais(1542); Chapais; Chequamegon(569); Chequamegon; Churchill(1300); Churchill; Columbia_SC(526); Columbia_SC; Dayton(1064); Dayton; Dry_Tortugas(1140); Dry_Tortugas; EPA-Res_Triangle_Pk(1217); EPA-Res_Triangle_Pk; Easton-MDE(886); Easton-MDE; Easton_Airport(711); Easton_Airport; Egbert(3819); Egbert; El_Segundo(1276); El_Segundo; Fort_McKay(844); Fort_McKay; Fort_McMurray(2079); Fort_McMurray; Frenchman_Flat(1759); Frenchman_Flat; Fresno(1999); Fresno; Fresno_2(1424); Fresno_2; GISS(430); GISS; GSFC(6316); GSFC; Georgia_Tech(1235); Georgia_Tech; Grand_Forks(891); Grand_Forks; HJAndrews(1848); HJAndrews; Halifax(2885); Halifax; Harvard_Forest(1744); Harvard_Forest; Hermosillo(735); Hermosillo; Howland(1618); Howland; IMPROVE-MammothCave(1087); IMPROVE-MammothCave; Iqaluit(546); Iqaluit; Iqaluit; KONZA_EDC(2450); KONZA_EDC; Kangerlussuaq(1153); Kangerlussuaq; Kellogg_LTER(1214); Kellogg_LTER; Kelowna_UAS(2350); Kelowna_UAS; Key_Biscayne(1840); Key_Biscayne; Key_Biscayne2(1246); Key_Biscayne2; Kuujjuarapik(616); Kuujjuarapik; La_Jolla(1927); La_Jolla; MD_Science_Center(4440); MD_Science_Center; Maricopa(2052); Maricopa; Mingo(721); Mingo; Missoula(2889); Missoula; Modesto(526); Modesto; Monterey(1179); Monterey; NASA_KSC(474); NASA_KSC; NASA_LaRC(1595); NASA_LaRC; NEON-Disney(827); NEON-Disney; NEON_CLBJ(539); NEON_CLBJ; NEON_GRSM(486); NEON_GRSM; NEON_HEAL(329); NEON_HEAL; NEON_Harvard(835); NEON_Harvard; NEON_KONZ(721); NEON_KONZ; NEON_OAES(896); NEON_OAES; NEON_ORNL(898); NEON_ORNL; NEON_OSBS(891); NEON_OSBS; NEON_SCBI(798); NEON_SCBI; NEON_SERC(665); NEON_SERC; NEON_TALL(930); NEON_TALL; NEON_UKFS(702); NEON_UKFS; NEON_UNDE(746); NEON_UNDE; NEON_WOOD(488); NEON_WOOD; OPAL(747); OPAL; Oyster(344); Oyster; PNNL(398); PNNL; Pickle_Lake(2016); Pickle_Lake; Resolute_Bay(740); Resolute_Bay; Rimrock(3613); Rimrock; Rogers_Dry_Lake(1572); Rogers_Dry_Lake; SDSU_IPLab(326); SDSU_IPLab; SEARCH-Centreville(749); SEARCH-Centreville; SEARCH-OLF(847); SEARCH-OLF; SEARCH-Yorkville(604); SEARCH-Yorkville; SERC(3062); SERC; SP_Bayboro(1122); SP_Bayboro; Sable_Island(490); Sable_Island; San_Nicolas(1179); San_Nicolas; Santa_Monica_Colg(1456); Santa_Monica_Colg; Saturn_Island(2725); Saturn_Island; Sigma_Space_Corp(466); Sigma_Space_Corp; Sioux_Falls(2719); Sioux_Falls; St_Louis_University(969); St_Louis_University; Stennis(734); Stennis; Tallahassee(1102); Tallahassee; Thompson(559); Thompson; Thompson_Farm(2321); Thompson_Farm; Thule(1216); Thule; Toronto(2501); Toronto; Trinidad_Head(1918); Trinidad_Head; Tucson(2161); Tucson; Tudor_Hill(1061); Tudor_Hill; UAHuntsville(668); UAHuntsville; UCLA(670); UCLA; UCSB(2452); UCSB; UH_Coastal_Center(647); UH_Coastal_Center; UMBC(1585); UMBC; U_of_Wisconsin_SSEC(1054); U_of_Wisconsin_SSEC; Univ_of_Houston(2446); Univ_of_Houston; Univ_of_Lethbridge(1388); Univ_of_Lethbridge; Walker_Branch(1861); Walker_Branch; Wallops(3832); Wallops; Waskesiu(1656); Waskesiu; Yellowknife_Aurora(982); Yellowknife_Aurora; Yuma(862); Yuma
SAMERICA	Abracos_Hill(1120); Abracos_Hill; Alta_Floresta(3666); Alta_Floresta; Amazon_ATTO_Tower(468); Amazon_ATTO_Tower; Arica(3783); Arica; Balbina(514); Balbina; Barbados(519); Barbados; Belterra(876); Belterra; CEILAP-BA(4209); CEILAP-BA; CEILAP-Bariloche(752); CEILAP-Bariloche; CEILAP-Comodoro(993); CEILAP-Comodoro; CEILAP-Neuquen(966); CEILAP-Neuquen; CEILAP-RG(2401); CEILAP-RG; CUIABA-MIRANDA(3233); CUIABA-MIRANDA; Campo_Grande_SONDA(1670); Campo_Grande_SONDA; Cape_San_Juan(1627); Cape_San_Juan; Cordoba-CETT(1999); Cordoba-CETT; Guadeloup(2319); Guadeloup; Itajuba(482); Itajuba; Ji_Parana_SE(1857); Ji_Parana_SE; La_Parguera(3943); La_Parguera; Manaus_EMBRAPA(966); Manaus_EMBRAPA; NEON_GUAN(420); NEON_GUAN; Petrolina_SONDA(1327); Petrolina_SONDA; Pilar_Cordoba(354); Pilar_Cordoba; Puerto_Madryn(423); Puerto_Madryn; Ragged_Point(2235); Ragged_Point; Rio_Branco(2901); Rio_Branco; SANTA_CRUZ(713); SANTA_CRUZ; SANTA_CRUZ_UTEPSA(1425); SANTA_CRUZ_UTEPSA; San_Cristobal_USFQ(418); San_Cristobal_USFQ; Santiago_Beauchef(628); Santiago_Beauchef; Sao_Martinho_SONDA(875); Sao_Martinho_SONDA; Sao_Paulo(2253); Sao_Paulo; Surinam(353); Surinam; Trelew(2861); Trelew; Tuxtla_Gutierrez(1054); Tuxtla_Gutierrez; UPC-GEAB-Valledupar(380); UPC-GEAB-Valledupar; UPRM_Lidar_Lab(614); UPRM_Lidar_Lab; UdeConcepcion-CEFOP(400); UdeConcepcion-CEFOP
NAFRICA	ATHENS-NOA(1954); ATHENS-NOA; AgiaMarina_Xyliatou(1079); AgiaMarina_Xyliatou; Agoufou(2105); Agoufou; Badajoz(733); Badajoz; Banizoumbou(5715); Banizoumbou; Ben_Salem(1382); Ben_Salem; Bidi_Bahn(374); Bidi_Bahn; Blida(1639); Blida; Burjassot(3044); Burjassot; CUT-TEPAK(1611); CUT-TEPAK; Cabo_da_Roca(2277); Cabo_da_Roca; Caceres(1602); Caceres; Cairo_EMA_2(2222); Cairo_EMA_2; DMN_Maine_Soroa(1094); DMN_Maine_Soroa; Dahkla(639); Dahkla; Dakar(4117); Dakar; Djougou(692); Djougou; ETNA(1287); ETNA; Eilat(2124); Eilat; El_Arenosillo(3420); El_Arenosillo; El_Farafra(1292); El_Farafra; Evora(3630); Evora; FORTH_CRETE(2785); FORTH_CRETE; Gozo(497); Gozo; Granada(497); Granada; Hada_El-Sham(385); Hada_El-Sham; Huelva(1451); Huelva; IER_Cinzana(3826); IER_Cinzana; IMC_Oristano(905); IMC_Oristano; IMS-METU-ERDEMLI(3627); IMS-METU-ERDEMLI; Ilorin(3231); Ilorin; KAUST_Campus(868); KAUST_Campus; Koforidua_ANUC(533); Koforidua_ANUC; Kuwait_University(422); Kuwait_University; LAMTO-STATION(422); LAMTO-STATION; La_Laguna(1777); La_Laguna; Lamezia_Terme(567); Lamezia_Terme; Lampedusa(2243); Lampedusa; Malaga(1715); Malaga; Medenine-IRA(1216); Medenine-IRA; Messina(1965); Messina; Murcia(1966); Murcia; Nes_Ziona(3168); Nes_Ziona; Ouagadougou(2039); Ouagadougou; Oujda(1027); Oujda; Palma_de_Mallorca(2001); Palma_de_Mallorca; Ras_El_Ain(420); Ras_El_Ain; SAGRES(309); SAGRES; SEDE_BOKER(6046); SEDE_BOKER; Saada(2974); Saada; Santa_Cruz_Tenerife(3639); Santa_Cruz_Tenerife; Solar_Village(3925); Solar_Village; TUBITAK_UZAY_Ankara(468); TUBITAK_UZAY_Ankara; Tabernas_PSA-DLR(1225); Tabernas_PSA-DLR; Technion_Haifa_IL(574); Technion_Haifa_IL; Tizi_Ouzou(868); Tizi_Ouzou; Tunis_Carthage(1054); Tunis_Carthage; Weizmann_Institute(939); Weizmann_Institute; Zinder_Airport(2278); Zinder_Airport
AUSTRALIA	ARM_Darwin(966); ARM_Darwin; Birdsville(2369); Birdsville; Brisbane-Uni_of_QLD(510); Brisbane-Uni_of_QLD; Canberra(3229); Canberra; Darwin(706); Darwin; Fowlers_Gap(1044); Fowlers_Gap; Jabiru(3002); Jabiru; Lake_Argyle(3212); Lake_Argyle; Lake_Lefroy(1179); Lake_Lefroy; Rottnest_Island(484); Rottnest_Island; Tinga_Tingana(1599); Tinga_Tingana

Table S1. List of observation stations (and number of measurements) used for the computation of AOD and AE regional time series.

Region	Sites
EUROPE	Andenes(920); Andenes; Arcachon(674); Arcachon; Aubiere_LAMP(1166); Aubiere_LAMP; Autilla(1710); Autilla; Bari_University(431); Bari_University; Bayfordbury(784); Bayfordbury; Belsk(2521); Belsk; Berlin_FUB(349); Berlin_FUB; Birkenes(1159); Birkenes; Brno_Airport(352); Brno_Airport; Brussels(1667); Brussels; Bucharest_Inoe(1322); Bucharest_Inoe; Bure_OPE(978); Bure_OPE; CENER(1121); CENER; CLUJ_UBB(1401); CLUJ_UBB; Camborne_MO(328); Camborne_MO; Carpentras(3778); Carpentras; Chilbolton(1873); Chilbolton; Coruna(1378); Coruna; Dunkerque(2084); Dunkerque; Edinburgh(639); Edinburgh; Eforie(1193); Eforie; Ersa(1202); Ersa; FZJ-JOYCE(1107); FZJ-JOYCE; Fontainebleau(1010); Fontainebleau; Frioul(1054); Frioul; Galata_Platform(1057); Galata_Platform; Gloria(1867); Gloria; Gotland(510); Gotland; Gustav_Dalen_Tower(1439); Gustav_Dalen_Tower; Hamburg(2153); Hamburg; Helgoland(1128); Helgoland; Helsinki(1353); Helsinki; Helsinki_Lighthouse(1127); Helsinki_Lighthouse; HohenpeissenbergDWD(1169); HohenpeissenbergDWD; Hyytiala(1147); Hyytiala; IMAA_Potenza(2195); IMAA_Potenza; ISDGM_CNR(920); ISDGM_CNR; Iasi_LOASL(1002); Iasi_LOASL; Ispra(3888); Ispra; Karlsruhe(1412); Karlsruhe; Kuopio(1413); Kuopio; Kyiv(1192); Kyiv; LAQUILA_Coppito(904); LAQUILA_Coppito; Laegeren(1468); Laegeren; Lecce_University(3462); Lecce_University; Leipzig(2872); Leipzig; Lille(2403); Lille; Loftus_MO(406); Loftus_MO; Madrid(2048); Madrid; Magurele_Inoe(893); Magurele_Inoe; Mainz(2385); Mainz; Martova(868); Martova; MetObs_Lindenberg(663); MetObs_Lindenberg; Minsk(1065); Minsk; Modena(786); Modena; Moldova(3759); Moldova; Moscow_MSU_MO(2881); Moscow_MSU_MO; Munich_University(2180); Munich_University; Napoli_CeSMA(550); Napoli_CeSMA; OHP_OBSERVATOIRE(2073); OHP_OBSERVATOIRE; Oostende(1747); Oostende; Oxford(333); Oxford; Palaiseau(2068); Palaiseau; Palencia(2145); Palencia; Palgrunden(1096); Palgrunden; Paris(2251); Paris; Poprad-Ganovce(690); Poprad-Ganovce; Raciborz(682); Raciborz; Rame_Head(601); Rame_Head; Rome_La_Sapienza(376); Rome_La_Sapienza; Rome_Tor_Vergata(1647); Rome_Tor_Vergata; SMHI(354); SMHI; Sevastopol(1701); Sevastopol; Sirmione_Museo_GC(569); Sirmione_Museo_GC; Sodankyla(884); Sodankyla; Strzyzow(870); Strzyzow; Thessaloniki(2363); Thessaloniki; Thornton_C-power(576); Thornton_C-power; Timisoara(555); Timisoara; Toravere(2619); Toravere; Toulon(636); Toulon; Toulouse_MF(1069); Toulouse_MF; Valladolid(1663); Valladolid; Venise(4471); Venise; Vienna_UNIVIE(476); Vienna_UNIVIE; Watnall_MO(470); Watnall_MO; Wytham_Woods(646); Wytham_Woods; Xanthi(709); Xanthi; Zaragoza(1565); Zaragoza; Zeebrugge-MOW1(305); Zeebrugge-MOW1; Zvenigorod(1293); Zvenigorod
ASIA	Abu_Al_Bukhoosh(598); Abu_Al_Bukhoosh; Anmyon(1639); Anmyon; Bac_Giang(814); Bac_Giang; Bac_Lieu(1225); Bac_Lieu; Baengnyeong(894); Baengnyeong; Bahrain(1120); Bahrain; Beijing(658); Beijing; Beijing-CAMS(1345); Beijing-CAMS; Bhola(858); Bhola; Chen-Kung_Univ(2451); Chen-Kung_Univ; Chiang_Mai_Met_Sta(2151); Chiang_Mai_Met_Sta; Chiayi(928); Chiayi; Chiba_University(654); Chiba_University; Dhabi(752); Dhabi; Dhadnah(1524); Dhadnah; Dhaka_University(1297); Dhaka_University; Dongsha_Island(747); Dongsha_Island; Dushanbe(1606); Dushanbe; EPA-NCU(1501); EPA-NCU; Fukuoka(1431); Fukuoka; GOT_Seaprism(605); GOT_Seaprism; Gandhi_College(1685); Gandhi_College; Gangneung_WNU(1237); Gangneung_WNU; Gosan_SNU(950); Gosan_SNU; Gual_Pahari(389); Gual_Pahari; Gwangju_GIST(1740); Gwangju_GIST; Hamim(851); Hamim; Hankuk_UFS(848); Hankuk_UFS; Hokkaido_University(610); Hokkaido_University; Hong_Kong_PolyU(1361); Hong_Kong_PolyU; Hong_Kong_Sheung(488); Hong_Kong_Sheung; Ieodo_Station(381); Ieodo_Station; Irkutsk(1334); Irkutsk; Jaipur(1899); Jaipur; Kaashidhoo(441); Kaashidhoo; Kanpur(3860); Kanpur; Kaohsiung(323); Kaohsiung; Karachi(1430); Karachi; Kuching(605); Kuching; Kuwait_University(421); Kuwait_University; Lahore(1529); Lahore; Luang_Namtha(1103); Luang_Namtha; Lumbini(501); Lumbini; MALE(318); MALE; MCO-Hanimaadhoo(1682); MCO-Hanimaadhoo; Manila_Observatory(1421); Manila_Observatory; Masdar_Institute(1323); Masdar_Institute; Mezaira(2108); Mezaira; Mukdahan(1285); Mukdahan; Mussafa(884); Mussafa; NCU_Taiwan(601); NCU_Taiwan; ND_Marbel_Univ(1188); ND_Marbel_Univ; NGHIA_DO(693); NGHIA_DO; NhaTrang(875); NhaTrang; Niigata(488); Niigata; Nong_Khai(473); Nong_Khai; Noto(886); Noto; Osaka(2328); Osaka; Pantnagar(365); Pantnagar; Pimai(735); Pimai; Pokhara(1879); Pokhara; Pontianak(1087); Pontianak; Pusan_NU(516); Pusan_NU; Seoul_SNU(1273); Seoul_SNU; Shirahama(2908); Shirahama; Silpakorn_Univ(2165); Silpakorn_Univ; Singapore(2223); Singapore; Socheongcho(548); Socheongcho; Solar_Village(3856); Solar_Village; Son_La(356); Son_La; Songkhla_Met_Sta(1379); Songkhla_Met_Sta; Tai_Ping(370); Tai_Ping; Taihu(1370); Taihu; Taipei_CWB(1806); Taipei_CWB; Tomsk(1436); Tomsk; Tomsk_22(887); Tomsk_22; USM_Penang(1174); USM_Penang; Ubon_Ratchathani(833); Ubon_Ratchathani; Ussuriysk(1698); Ussuriysk; Vientiane(328); Vientiane; XiangHe(3185); XiangHe; Yekaterinburg(1556); Yekaterinburg; Yonsei_University(2051); Yonsei_University
NAMERICA	ARM_Oliktok_AK(322); ARM_Oliktok_AK; Ames(2069); Ames; Appledore_Island(403); Appledore_Island; BONDVILLE(3920); BONDVILLE; Bakersfield(845); Bakersfield; Bermuda(855); Bermuda; Billerica(1437); Billerica; Bonanza_Creek(2045); Bonanza_Creek; Bratts_Lake(2904); Bratts_Lake; Brookhaven(706); Brookhaven; CARTEL(3241); CARTEL; CCNY(2449); CCNY; COVE(1706); COVE; COVE_SEAPRISM(1340); COVE_SEAPRISM; CalTech(1183); CalTech; Camaguey(1196); Camaguey; Chapais(1512); Chapais; Chequamegon(432); Chequamegon; Churchill(1287); Churchill; Columbia_SC(506); Columbia_SC; Dayton(1060); Dayton; Dry_Tortugas(1045); Dry_Tortugas; EPA-Res_Triangle_Pk(1059); EPA-Res_Triangle_Pk; Easton-MDE(856); Easton-MDE; Easton_Airport(711); Easton_Airport; Egbert(3542); Egbert; El_Segundo(1228); El_Segundo; Fort_McKay(826); Fort_McKay; Fort_McMurray(2003); Fort_McMurray; Frenchman_Flat(1693); Frenchman_Flat; Fresno(1912); Fresno; Fresno_2(1421); Fresno_2; GSFC(6195); GSFC; Georgia_Tech(1233); Georgia_Tech; Grand_Forks(889); Grand_Forks; HJAndrews(1763); HJAndrews; Halifax(2832); Halifax; Harvard_Forest(1573); Harvard_Forest; Hermosillo(603); Hermosillo; Howland(1586); Howland; IMPROVE-MammothCave(1083); IMPROVE-MammothCave; Iqaluit(533); Iqaluit; KONZA_EDC(2405); KONZA_EDC; Kangerlussuaq(1149); Kangerlussuaq; Kellogg_LTER(1415); Kellogg_LTER; Kelowna_UAS(2171); Kelowna_UAS; Key_Biscayne(1786); Key_Biscayne; Key_Biscayne2(1245); Key_Biscayne2; Kuujjuarapik(610); Kuujjuarapik; LISCO(1659); LISCO; La_Jolla(1872); La_Jolla; MD_Science_Center(4370); MD_Science_Center; MVCO(1799); MVCO; Maricopa(2005); Maricopa; Mingo(720); Mingo; Missoula(2881); Missoula; Modesto(525); Modesto; Monterey(2028); Monterey; NASA_KSC(472); NASA_KSC; NASA_LaRC(1582); NASA_LaRC; NEON-Disney(826); NEON-Disney; NEON_CLBJ(538); NEON_CLBJ; NEON_GRSM(486); NEON_GRSM; NEON_HEAL(326); NEON_HEAL; NEON_Harvard(830); NEON_Harvard; NEON_KONZ(721); NEON_KONZ; NEON_OAES(893); NEON_OAES; NEON_ORNL(897); NEON_ORNL; NEON_OSBS(890); NEON_OSBS; NEON_SCBI(796); NEON_SCBI; NEON_SERC(665); NEON_SERC; NEON_TALL(929); NEON_TALL; NEON_UKFS(700); NEON_UKFS; NEON_UNDE(741); NEON_UNDE; NEON_WOOD(487); NEON_WOOD; OPAL(720); OPAL; PNNL(394); PNNL; Pickle_Lake(2003); Pickle_Lake; Resolute_Bay(738); Resolute_Bay; Rimrock(3587); Rimrock; Rogers_Dry_Lake(1556); Rogers_Dry_Lake; SDSU_IPLab(326); SDSU_IPLab; SEARCH-Centreville(729); SEARCH-Centreville; SEARCH-OLF(845); SEARCH-OLF; SEARCH-Yorkville(604); SEARCH-Yorkville; SERC(3014); SERC; SP_Bayboro(1120); SP_Bayboro; Sable_Island(488); Sable_Island; San_Nicolas(1158); San_Nicolas; Santa_Monica_Colg(1454); Santa_Monica_Colg; Saturn_Island(2712); Saturn_Island; Sigma_Space_Corp(441); Sigma_Space_Corp; Sioux_Falls(2389); Sioux_Falls; St_Louis_University(961); St_Louis_University; Stennis(710); Stennis; Tallahassee(1022); Tallahassee; Thompson(512); Thompson; Thompson_Farm(2309); Thompson_Farm; Thule(1212); Thule; Toronto(2316); Toronto; Trinidad_Head(1844); Trinidad_Head; Tucson(2127); Tucson; Tudor_Hill(1038); Tudor_Hill; UAHuntsville(667); UAHuntsville; UCLA(669); UCLA; UCSB(2428); UCSB; UH_Coastal_Center(647); UH_Coastal_Center; UMBC(1582); UMBC; USC_SEAPRISM(1106); USC_SEAPRISM; USC_SEAPRISM_2(305); USC_SEAPRISM_2; U_of_Wisconsin_SSEC(1041); U_of_Wisconsin_SSEC; Univ_of_Houston(2443); Univ_of_Houston; Univ_of_Lethbridge(1370); Univ_of_Lethbridge; Walker_Branch(1824); Walker_Branch; Wallops(3299); Wallops; Waskesiu(1630); Waskesiu; WaveCIS_Site_CSI_6(1857); WaveCIS_Site_CSI_6; Yellowknife_Aurora(975); Yellowknife_Aurora; Yuma(861); Yuma
SAMERICA	Abracos_Hill(1089); Abracos_Hill; Alta_Floresta(3369); Alta_Floresta; Amazon_ATTO_Tower(456); Amazon_ATTO_Tower; Arica(3745); Arica; Balbina(483); Balbina; Belterra(839); Belterra; CEILAP-BA(4008); CEILAP-BA; CEILAP-Bariloche(630); CEILAP-Bariloche; CEILAP-Comodoro(990); CEILAP-Comodoro; CEILAP-Neuquen(966); CEILAP-Neuquen; CEILAP-RG(2272); CEILAP-RG; CUIABA-MIRANDA(3120); CUIABA-MIRANDA; Campo_Grande_SONDA(1657); Campo_Grande_SONDA; Cape_San_Juan(1430); Cape_San_Juan; Cordoba-CETT(1968); Cordoba-CETT; Guadeloup(1456); Guadeloup; Itajuba(478); Itajuba; Ji_Parana_SE(1709); Ji_Parana_SE; La_Parguera(3168); La_Parguera; Manaus_EMBRAPA(945); Manaus_EMBRAPA; NEON_GUAN(420); NEON_GUAN; Petrolina_SONDA(1316); Petrolina_SONDA; Pilar_Cordoba(344); Pilar_Cordoba; Puerto_Madryn(375); Puerto_Madryn; Ragged_Point(2220); Ragged_Point; Rio_Branco(2826); Rio_Branco; SANTA_CRUZ(673); SANTA_CRUZ; SANTA_CRUZ_UTEPSA(1260); SANTA_CRUZ_UTEPSA; San_Cristobal_USFQ(415); San_Cristobal_USFQ; Santiago_Beauchef(627); Santiago_Beauchef; Sao_Martinho_SONDA(701); Sao_Martinho_SONDA; Sao_Paulo(2440); Sao_Paulo; Trelew(2681); Trelew; Tuxtla_Gutierrez(991); Tuxtla_Gutierrez; UPC-GEAB-Valledupar(380); UPC-GEAB-Valledupar; UPRM_Lidar_Lab(564); UPRM_Lidar_Lab; UdeConcepcion-CEFOP(392); UdeConcepcion-CEFOP
NAFRICA	ATHENS-NOA(1603); ATHENS-NOA; AgiaMarina_Xyliatou(461); AgiaMarina_Xyliatou; Badajoz(733); Badajoz; Ben_Salem(608); Ben_Salem; Blida(1637); Blida; Burjassot(2713); Burjassot; CUT-TEPAK(1519); CUT-TEPAK; Cabo_da_Roca(1598); Cabo_da_Roca; Caceres(1578); Caceres; Cairo_EMA_2(2219); Cairo_EMA_2; Dahkla(636); Dahkla; Dakar(1973); Dakar; ETNA(1287); ETNA; Eilat(2075); Eilat; El_Arenosillo(1084); El_Arenosillo; El_Farafra(325); El_Farafra; Evora(2320); Evora; FORTH_CRETE(2703); FORTH_CRETE; Gozo(493); Gozo; Granada(3007); Granada; Hada_El-Sham(373); Hada_El-Sham; IMS-METU-ERDEMLI(2869); IMS-METU-ERDEMLI; Ilorin(3202); Ilorin; KAUST_Campus(1664); KAUST_Campus; Koforidua_ANUC(531); Koforidua_ANUC; Kuwait_University(421); Kuwait_University; La_Laguna(1764); La_Laguna; Lamezia_Terme(567); Lamezia_Terme; Lampedusa(1446); Lampedusa; Malaga(1714); Malaga; Murcia(1963); Murcia; Nes_Ziona(3080); Nes_Ziona; Oujda(1021); Oujda; Palma_de_Mallorca(1998); Palma_de_Mallorca; SAGRES(511); SAGRES; SEDE_BOKER(5988); SEDE_BOKER; Santa_Cruz_Tenerife(3504); Santa_Cruz_Tenerife; Solar_Village(3856); Solar_Village; TUBITAK_UZAY_Ankara(466); TUBITAK_UZAY_Ankara; Tabernas_PSA-DLR(1223); Tabernas_PSA-DLR; Technion_Haifa_IL(571); Technion_Haifa_IL; Tizi_Ouzou(868); Tizi_Ouzou; Tunis_Carthage(1054); Tunis_Carthage; Weizmann_Institute(935); Weizmann_Institute
AUSTRALIA	ARM_Darwin(953); ARM_Darwin; Birdsville(2330); Birdsville; Brisbane-Uni_of_QLD(502); Brisbane-Uni_of_QLD; Canberra(3155); Canberra; Darwin(691); Darwin; Fowlers_Gap(1025); Fowlers_Gap; Jabiru(2674); Jabiru; Lake_Argyle(3107); Lake_Argyle; Lake_Lefroy(932); Lake_Lefroy; Lucinda(932); Lucinda; Rottnest_Island(473); Rottnest_Island; Tinga_Tingana(1102); Tinga_Tingana

Table S2. Same as Table S1 for AOD<1μm and AOD>1μm.

Region	Sites
EUROPE	Aspvreten(6389); Aspvreten; Auchencorth Moss(4315); Auchencorth Moss; Bilthoven(360); Bilthoven; Birkenes II(604); Birkenes II; Bredkälen(2751); Bredkälen; Cabauw Wielsekade(2024); Cabauw Wielsekade; Cabauw Zijdeweg(786); Cabauw Zijdeweg; Cabo de Creus(5076); Cabo de Creus; Chilbolton Observatory(1033); Chilbolton Observatory; De Zilk(3116); De Zilk; Deuselbach(1390); Deuselbach; Diabla Gora(3152); Diabla Gora; Els Torms(5223); Els Torms; Farkasfa(764); Farkasfa; Guipry(1366); Guipry; Harwell(5462); Harwell; Hurdal(431); Hurdal; Hyytiälä(285); Hyytiälä; Illmitz(6289); Illmitz; Iskrba(4629); Iskrba; Ispra(5041); Ispra; K-puszta(1993); K-puszta; Kollumerwaard(3120); Kollumerwaard; Kosetice (NOAK)(515); Kosetice (NOAK); Kårvatn(438); Kårvatn; La Coulonche(2243); La Coulonche; La Tardière(3093); La Tardière; Lahemaa(3379); Lahemaa; Lecce (ECO)(1287); Lecce (ECO); Lille Valby(673); Lille Valby; Lista(146); Lista; Mace Head(1149); Mace Head; Melpitz(4265); Melpitz; Montelibretti(973); Montelibretti; Montseny(647); Montseny; Morvan(1351); Morvan; Neuglobsow(2705); Neuglobsow; Niembro(5586); Niembro; Norunda Stenen(322); Norunda Stenen; O Saviñao(4707); O Saviñao; Pallas (Matorova)(1707); Pallas (Matorova); Payerne(4898); Payerne; Penausende(5292); Penausende; Peyrusse Vieille(2478); Peyrusse Vieille; Revin(3292); Revin; Rucava(2947); Rucava; Råö(3481); Råö; Saint-Nazaire-le-Désert(1445); Saint-Nazaire-le-Désert; Schmücke(2664); Schmücke; Utö(2128); Utö; Vavihill(4115); Vavihill; Verneuil(1430); Verneuil; Vilsandi(3375); Vilsandi; Vindeln(501); Vindeln; Virolahti II(1590); Virolahti II; Virolahti III(1090); Virolahti III; Vredepeel(3267); Vredepeel; Waldhof(6663); Waldhof; Zielonka(1032); Zielonka; Zoebelboden(689); Zoebelboden; Zoseni(844); Zoseni
NAMERICA	Acadia National Park-McFarland Hill (ME98)(1079); Acadia National Park-McFarland Hill (ME98); Addison Pinnacle(325); Addison Pinnacle; Agua Tibia(724); Agua Tibia; Arendtsville (PA00)(350); Arendtsville (PA00); Atlanta(41); Atlanta; Badlands NP(1071); Badlands NP; Baltimore(78); Baltimore; Birmingham(444); Birmingham; Blue Mounds(493); Blue Mounds; Bondville(560); Bondville; Boundary Waters Canoe Area(851); Boundary Waters Canoe Area; Breton(132); Breton; Breton Island(276); Breton Island; Bridgton (ME02)(551); Bridgton (ME02); Brigantine NWR(873); Brigantine NWR; Cadiz(339); Cadiz; Caney Creek(631); Caney Creek; Cape Cod(542); Cape Cod; Cape Romain National Wildlife Refuge(781); Cape Romain National Wildlife Refuge; Casco Bay-Wolfe's Neck Farm (ME96)(547); Casco Bay-Wolfe's Neck Farm (ME96); Cedar Bluff(519); Cedar Bluff; Chassahowitzka National Wildlife Refuge (FL05)(735); Chassahowitzka National Wildlife Refuge (FL05); Cherokee Nation(277); Cherokee Nation; Chicago(41); Chicago; Cohutta(516); Cohutta; Columbia Gorge 1(448); Columbia Gorge 1; Columbia River Gorge(784); Columbia River Gorge; Connecticut Hill(169); Connecticut Hill; Death Valley NP(686); Death Valley NP; Denali National Park-Mt. McKinley (AK03)(1067); Denali National Park-Mt. McKinley (AK03); Detroit(37); Detroit; Dome Lands Wilderness(576); Dome Lands Wilderness; Dome Lands Wilderness - code reserved pre 2014(74); Dome Lands Wilderness - code reserved pre 2014; Egbert(468); Egbert; El Dorado Springs(455); El Dorado Springs; Ellis(447); Ellis; Everglades National Park-Research Center (FL11)(983); Everglades National Park-Research Center (FL11); Forest County Potawatomi Community(53); Forest County Potawatomi Community; Fort Peck (IMPROVE)(536); Fort Peck (IMPROVE); Fresno(479); Fresno; Frostberg Reservoir (Big Piney Run)(440); Frostberg Reservoir (Big Piney Run); Glacier National Park-Fire Weather Station (MT05)(1072); Glacier National Park-Fire Weather Station (MT05); Great Gulf Wilderness(674); Great Gulf Wilderness; Great River Bluffs(536); Great River Bluffs; Great Smoky Mountains NP(1076); Great Smoky Mountains NP; Hells Canyon(665); Hells Canyon; Hercules-Glades(546); Hercules-Glades; Houston(69); Houston; Isle Royale NP(576); Isle Royale NP; Isle Royale NP - code reserved pre 2014(92); Isle Royale NP - code reserved pre 2014; James River Face Wilderness(570); James River Face Wilderness; Jefferson NF(223); Jefferson NF; Kalmiopsis(571); Kalmiopsis; Lake Sugema 1(96); Lake Sugema 1; Lake Sugema 2(415); Lake Sugema 2; Linville Gorge(612); Linville Gorge; Livonia(353); Livonia; Londonderry(256); Londonderry; Lostwood(585); Lostwood; Lye Brook Wilderness (IMPROVE)(206); Lye Brook Wilderness (IMPROVE); Lynden(33); Lynden; M.K. Goddard(351); M.K. Goddard; Makah Tribe Site 2(207); Makah Tribe Site 2; Mammoth Cave National Park-Houchin Meadow(893); Mammoth Cave National Park-Houchin Meadow; Martha's Vineyard(511); Martha's Vineyard; Meadview(576); Meadview; Medicine Lake(661); Medicine Lake; Mingo(611); Mingo; Mohawk Mt.(536); Mohawk Mt.; Moosehorn NWR(761); Moosehorn NWR; Mount Rainier National Park-Tahoma Woods (WA99)(1056); Mount Rainier National Park-Tahoma Woods (WA99); Nebraska NF(498); Nebraska NF; New York City(202); New York City; North Cascades(616); North Cascades; Okefenokee National Wildlife Refuge (GA09)(886); Okefenokee National Wildlife Refuge (GA09); Old Town(194); Old Town; Olympic(515); Olympic; Omaha(195); Omaha; Organ Pipe Cactus National Monument(518); Organ Pipe Cactus National Monument; Pack Monadnock Summit(322); Pack Monadnock Summit; Penobscot(458); Penobscot; Petersburg(210); Petersburg; Phoenix(551); Phoenix; Phoenix Colocated Sampler(436); Phoenix Colocated Sampler; Pinnacles National Monument-Bear Valley (CA66)(1125); Pinnacles National Monument-Bear Valley (CA66); Pittsburgh(29); Pittsburgh; Point Reyes National Seashore(1104); Point Reyes National Seashore; Presque Isle(564); Presque Isle; Proctor Maple R. F.(647); Proctor Maple R. F.; Puget Sound(623); Puget Sound; Quabbin Summit(498); Quabbin Summit; Quaker City(521); Quaker City; Queen Valley(499); Queen Valley; Redwood NP(1107); Redwood NP; Rubidoux(47); Rubidoux; Sac and Fox(312); Sac and Fox; Saguaro NM(781); Saguaro NM; Saguaro West(517); Saguaro West; San Rafael(547); San Rafael; Seney(626); Seney; Sequoia NP(861); Sequoia NP; Sikes(343); Sikes; Sipsy Wilderness(980); Sipsy Wilderness; Spokane Res.(135); Spokane Res.; St. Marks(555); St. Marks; Stilwell (IMPROVE)(246); Stilwell (IMPROVE); Swanquarter(539); Swanquarter; Tallgrass(520); Tallgrass; Theodore Roosevelt National Park-Painted Canyon(552); Theodore Roosevelt National Park-Painted Canyon; Three Sisters Wilderness(870); Three Sisters Wilderness; Tonto NM(1028); Tonto NM; UL Bend(553); UL Bend; Upper Buffalo Wilderness(856); Upper Buffalo Wilderness; Viking Lake(570); Viking Lake; Voyageurs NP 1(230); Voyageurs NP 1; Voyageurs NP 2(605); Voyageurs NP 2; Washington D.C.(870); Washington D.C.; Wichita Mountains(661); Wichita Mountains

Table S3. Same as Table S1 for PM2.5

Region	Sites
EUROPE	Aspvreten(663); Aspvreten; Auchencorth Moss(3434); Auchencorth Moss; Beromünster(900); Beromünster; Birkenes II(628); Birkenes II; Braganca(49); Braganca; Bredkälen(3149); Bredkälen; CEH Edingburgh(49); CEH Edingburgh; Cabauw Wielsekade(2050); Cabauw Wielsekade; Cabo de Creus(5190); Cabo de Creus; Chilbolton Observatory(1018); Chilbolton Observatory; De Zilk(3994); De Zilk; Deuselbach(1947); Deuselbach; Diabla Gora(4190); Diabla Gora; Eibergen(4715); Eibergen; Els Torms(5029); Els Torms; Farkasfa(732); Farkasfa; Guipry(1433); Guipry; Harwell(4875); Harwell; Hohenpeissenberg(3689); Hohenpeissenberg; Hurdal(434); Hurdal; Hyytiälä(285); Hyytiälä; ISAC Bologna(50); ISAC Bologna; Illmitz(917); Illmitz; Iskrba(4699); Iskrba; Ispra(209); Ispra; K-puszta(2666); K-puszta; Kamenicki vis(1149); Kamenicki vis; Karpdalen(39); Karpdalen; Keldsnor(2465); Keldsnor; Kollumerwaard(524); Kollumerwaard; Kosetice (NOAK)(618); Kosetice (NOAK); Kårvatn(438); Kårvatn; La Coulonche(2345); La Coulonche; La Tardière(3250); La Tardière; Lahemaa(465); Lahemaa; Lecce (ECO)(1265); Lecce (ECO); Leova II(1700); Leova II; Liesek(193); Liesek; Lille Valby(372); Lille Valby; Lough Navar(7587); Lough Navar; Mace Head(59); Mace Head; Melpitz(5480); Melpitz; Montandon(2340); Montandon; Montelibretti(4267); Montelibretti; Montseny(599); Montseny; Morvan(2020); Morvan; Narberth(6880); Narberth; Neuglobsow(6860); Neuglobsow; Niembro(5612); Niembro; Noia(2616); Noia; Norunda Stenen(326); Norunda Stenen; O Saviñao(4969); O Saviñao; Pallas (Sammaltunturi)(364); Pallas (Sammaltunturi); Payerne(7926); Payerne; Penausende(5012); Penausende; Peyrusse Vieille(3264); Peyrusse Vieille; Poiana Stampei(1439); Poiana Stampei; Revin(3515); Revin; Risoe(699); Risoe; Rucava(3251); Rucava; Råö(3472); Råö; Saint-Nazaire-le-Désert(1447); Saint-Nazaire-le-Désert; Schmücke(6246); Schmücke; St. Koloman(1238); St. Koloman; Starina(471); Starina; Stará Lesná(502); Stará Lesná; Svanvik(48); Svanvik; Svratouch(394); Svratouch; Topolniky(300); Topolniky; Tänikon(7965); Tänikon; University of Gent(52); University of Gent; Vavihill(5079); Vavihill; Vindeln(2265); Vindeln; Virolahti II(179); Virolahti II; Virolahti III(1079); Virolahti III; Vredepeel(4722); Vredepeel; Waldhof(6829); Waldhof; Westerland(6357); Westerland; Zielonka(1380); Zielonka; Zingst(6199); Zingst; Zoebelboden(3636); Zoebelboden; Zoseni(807); Zoseni
NAMERICA	Acadia National Park-McFarland Hill (ME98)(1086); Acadia National Park-McFarland Hill (ME98); Addison Pinnacle(322); Addison Pinnacle; Agua Tibia(719); Agua Tibia; Arendtsville (PA00)(351); Arendtsville (PA00); Atlanta(41); Atlanta; Badlands NP(1121); Badlands NP; Baltimore(78); Baltimore; Birmingham(445); Birmingham; Blue Mounds(509); Blue Mounds; Bondville(565); Bondville; Boundary Waters Canoe Area(812); Boundary Waters Canoe Area; Breton(131); Breton; Breton Island(245); Breton Island; Bridgton (ME02)(549); Bridgton (ME02); Brigantine NWR(830); Brigantine NWR; Cadiz(330); Cadiz; Caney Creek(575); Caney Creek; Cape Cod(528); Cape Cod; Cape Romain National Wildlife Refuge(780); Cape Romain National Wildlife Refuge; Casco Bay-Wolfe's Neck Farm (ME96)(578); Casco Bay-Wolfe's Neck Farm (ME96); Cedar Bluff(516); Cedar Bluff; Chassahowitzka National Wildlife Refuge (FL05)(820); Chassahowitzka National Wildlife Refuge (FL05); Cherokee Nation(279); Cherokee Nation; Chicago(34); Chicago; Cohutta(507); Cohutta; Columbia Gorge 1(386); Columbia Gorge 1; Columbia River Gorge(805); Columbia River Gorge; Connecticut Hill(167); Connecticut Hill; Death Valley NP(681); Death Valley NP; Denali National Park-Mt. McKinley (AK03)(1081); Denali National Park-Mt. McKinley (AK03); Detroit(61); Detroit; Dome Lands Wilderness(573); Dome Lands Wilderness; Egbert(466); Egbert; El Dorado Springs(451); El Dorado Springs; Ellis(445); Ellis; Everglades National Park-Research Center (FL11)(678); Everglades National Park-Research Center (FL11); Forest County Potawatomi Community(53); Forest County Potawatomi Community; Fort Peck (IMPROVE)(528); Fort Peck (IMPROVE); Fresno(475); Fresno; Frostberg Reservoir (Big Piney Run)(492); Frostberg Reservoir (Big Piney Run); Glacier National Park-Fire Weather Station (MT05)(1065); Glacier National Park-Fire Weather Station (MT05); Great Gulf Wilderness(663); Great Gulf Wilderness; Great River Bluffs(472); Great River Bluffs; Great Smoky Mountains NP(1051); Great Smoky Mountains NP; Hells Canyon(663); Hells Canyon; Hercules-Glades(561); Hercules-Glades; Houston(68); Houston; Isle Royale NP(579); Isle Royale NP; Isle Royale NP - code reserved pre 2014(91); Isle Royale NP - code reserved pre 2014; James River Face Wilderness(571); James River Face Wilderness; Jefferson NF(220); Jefferson NF; Kalmiopsis(570); Kalmiopsis; Lake Sugema 1(96); Lake Sugema 1; Lake Sugema 2(410); Lake Sugema 2; Linville Gorge(559); Linville Gorge; Livonia(354); Livonia; Londonderry(255); Londonderry; Lostwood(599); Lostwood; Lye Brook Wilderness (IMPROVE)(206); Lye Brook Wilderness (IMPROVE); M.K. Goddard(352); M.K. Goddard; Makah Tribe Site 2(196); Makah Tribe Site 2; Mammoth Cave National Park-Houchin Meadow(883); Mammoth Cave National Park-Houchin Meadow; Martha's Vineyard(518); Martha's Vineyard; Meadview(569); Meadview; Medicine Lake(660); Medicine Lake; Mingo(600); Mingo; Mohawk Mt.(515); Mohawk Mt.; Moosehorn NWR(758); Moosehorn NWR; Mount Rainier National Park-Tahoma Woods (WA99)(1048); Mount Rainier National Park-Tahoma Woods (WA99); Nebraska NF(506); Nebraska NF; New York City(201); New York City; North Cascades(628); North Cascades; Okefenokee National Wildlife Refuge (GA09)(885); Okefenokee National Wildlife Refuge (GA09); Old Town(191); Old Town; Olympic(538); Olympic; Omaha(195); Omaha; Organ Pipe Cactus National Monument(523); Organ Pipe Cactus National Monument; Pack Monadnock Summit(321); Pack Monadnock Summit; Penobscot(460); Penobscot; Petersburg(209); Petersburg; Phoenix(540); Phoenix; Phoenix Colocated Sampler(429); Phoenix Colocated Sampler; Pinnacles National Monument-Bear Valley (CA66)(1058); Pinnacles National Monument-Bear Valley (CA66); Pittsburgh(29); Pittsburgh; Point Reyes National Seashore(1194); Point Reyes National Seashore; Presque Isle(561); Presque Isle; Proctor Maple R. F.(555); Proctor Maple R. F.; Puget Sound(514); Puget Sound; Quabbin Summit(484); Quabbin Summit; Quaker City(572); Quaker City; Queen Valley(493); Queen Valley; Redwood NP(1102); Redwood NP; Rubidoux(45); Rubidoux; Sac and Fox(335); Sac and Fox; Saguaro NM(722); Saguaro NM; Saguaro West(518); Saguaro West; San Rafael(548); San Rafael; Seney(575); Seney; Sequoia NP(814); Sequoia NP; Sikes(343); Sikes; Sipsy Wilderness(957); Sipsy Wilderness; Spokane Res.(135); Spokane Res.; St. Marks(585); St. Marks; Stilwell (IMPROVE)(246); Stilwell (IMPROVE); Swanquarter(559); Swanquarter; Tallgrass(517); Tallgrass; Theodore Roosevelt National Park-Painted Canyon(557); Theodore Roosevelt National Park-Painted Canyon; Three Sisters Wilderness(804); Three Sisters Wilderness; Tonto NM(1022); Tonto NM; UL Bend(561); UL Bend; Upper Buffalo Wilderness(831); Upper Buffalo Wilderness; Viking Lake(569); Viking Lake; Voyageurs NP 1(197); Voyageurs NP 1; Voyageurs NP 2(605); Voyageurs NP 2; Washington D.C.(903); Washington D.C.; Wichita Mountains(605); Wichita Mountains
NAFRICA	Agia Marina Xyliatou ; Cyprus Atmospheric Observatory(5271); Agia Marina Xyliatou ; Cyprus Atmospheric Observatory; Aliartos(218); Aliartos; Barcarrota(5004); Barcarrota; Cairo(1717); Cairo; Can Llompart(17); Can Llompart; Doñana(2591); Doñana; Finokalia(1313); Finokalia; Hurghada(784); Hurghada; Lamezia Terme(625); Lamezia Terme; Mahón(2331); Mahón; San Pablo de los Montes(2860); San Pablo de los Montes; Zarra(5211); Zarra

Table S4. Same as Table S1 for PM10

Region	Sites
EUROPE	Anholt(323); Anholt; Barcombe Mills(275); Barcombe Mills; Birkenes I and II(432); Birkenes I and II; Bredkälen(428); Bredkälen; Cabo de Creus(204); Cabo de Creus; Chopok(416); Chopok; Danki(196); Danki; Diabla Gora(273); Diabla Gora; Donon(216); Donon; Els Torms(171); Els Torms; Eskdalemuir(338); Eskdalemuir; Glen Dye(176); Glen Dye; High Muffles(225); High Muffles; Hoburgen(336); Hoburgen; Iraty(213); Iraty; Iskrba(234); Iskrba; Ispra(238); Ispra; Janiskoski(279); Janiskoski; Jarczew(358); Jarczew; K-puszta(419); K-puszta; Kollumerwaard(216); Kollumerwaard; Kosetice(258); Kosetice; Kårvatn(432); Kårvatn; La Crouzille(228); La Crouzille; Leba(269); Leba; Logroño(156); Logroño; Lough Navar(286); Lough Navar; Melpitz(184); Melpitz; Montelibretti(313); Montelibretti; Morvan(214); Morvan; Niembro(198); Niembro; O Saviñao(166); O Saviñao; Osen(196); Osen; Oulanka(305); Oulanka; Pallas (Matorova)(240); Pallas (Matorova); Payerne(425); Payerne; Penausende(173); Penausende; Peyrusse Vieille(180); Peyrusse Vieille; Preila(404); Preila; Rucava(308); Rucava; Rörvik-Råö(432); Rörvik-Råö; Sniezka(297); Sniezka; Strath Vaich Dam(174); Strath Vaich Dam; Svratouch(218); Svratouch; Tange(423); Tange; Tustervatn(430); Tustervatn; Utö(418); Utö; Vavihill(369); Vavihill; Virolahti(296); Virolahti; Virolahti II(12); Virolahti II; Vredepeel(252); Vredepeel; Yarner Wood(241); Yarner Wood; Ähtäri I-II(432); Ähtäri I-II
ASIA	Baengnyeong_Island(32); Baengnyeong_Island; Cheju(148); Cheju; Chiang Mai (Mae Hia)(153); Chiang Mai (Mae Hia); Hoa Binh(188); Hoa Binh; Imsil(147); Imsil; Kanghwa(148); Kanghwa; Khanchanaburi (Vachiralongkorn Dam)(31); Khanchanaburi (Vachiralongkorn Dam); Listvyanka(191); Listvyanka; Mondy(177); Mondy; Oki(162); Oki; Primorskaya(169); Primorskaya; Rishiri(152); Rishiri; Tanah Rata(188); Tanah Rata; Terelj(138); Terelj
NAMERICA	Abington(251); Abington; Acadia NP(203); Acadia NP; Acadia_NP(312); Acadia_NP; Addison_Pinnacle(111); Addison_Pinnacle; Agua_Tibia(175); Agua_Tibia; Algoma(335); Algoma; Alhambra(318); Alhambra; Ann Arbor(305); Ann Arbor; Arches_NP(27); Arches_NP; Arendtsville(327); Arendtsville; Ashland(309); Ashland; Badlands_NP(311); Badlands_NP; Bandelier_NM(302); Bandelier_NM; Barrier_Lake(58); Barrier_Lake; Beaufort(254); Beaufort; Beltsville(288); Beltsville; Big Bend NP(235); Big Bend NP; Big_Bend_NP(305); Big_Bend_NP; Blackwater NWR(229); Blackwater NWR; Bliss_SP_(TRPA)(275); Bliss_SP_(TRPA); Blue_Mounds(160); Blue_Mounds; Bondville(317); Bondville; Bosque_del_Apache(183); Bosque_del_Apache; Boulder_Lake(76); Boulder_Lake; Boundary_Waters_Canoe_Area(273); Boundary_Waters_Canoe_Area; Breton(51); Breton; Breton_Island(93); Breton_Island; Bridger_Wilderness(310); Bridger_Wilderness; Bridgton(176); Bridgton; Brigantine_NWR(286); Brigantine_NWR; Brooklyn_Lake(101); Brooklyn_Lake; Bryce_Canyon_NP(306); Bryce_Canyon_NP; Cabinet_Mountains(184); Cabinet_Mountains; Caddo Valley(302); Caddo Valley; Cadiz(226); Cadiz; Candor(291); Candor; Caney_Creek(183); Caney_Creek; Canyonlands NP(248); Canyonlands NP; Canyonlands_NP(307); Canyonlands_NP; Cape_Cod(173); Cape_Cod; Cape_Romain_NWR(252); Cape_Romain_NWR; Capitol_Reef_NP(178); Capitol_Reef_NP; Casco_Bay(177); Casco_Bay; Cedar Creek(323); Cedar Creek; Cedar_Bluff(163); Cedar_Bluff; Centennial(312); Centennial; Chalk River(312); Chalk River; Chapais(286); Chapais; Chassahowitzka_NWR(272); Chassahowitzka_NWR; Cherokee_Nation(91); Cherokee_Nation; Chiricahua NM(309); Chiricahua NM; Chiricahua_NM(309); Chiricahua_NM; Claryville(241); Claryville; Cloud_Peak(155); Cloud_Peak; Coffeeville(299); Coffeeville; Cohutta(176); Cohutta; Columbia_Gorge_1(152); Columbia_Gorge_1; Columbia_River_Gorge(265); Columbia_River_Gorge; Connecticut Hill(321); Connecticut Hill; Connecticut_Hill(63); Connecticut_Hill; Coweeta(329); Coweeta; Cranberry(313); Cranberry; Crater_Lake_NP(296); Crater_Lake_NP; Craters_of_the_Moon_NM(244); Craters_of_the_Moon_NM; Crescent_Lake(161); Crescent_Lake; Crockett(242); Crockett; Death_Valley_NP(215); Death_Valley_NP; Deer Creek(313); Deer Creek; Denali NP(207); Denali NP; Denali_NP(312); Denali_NP; Dolly_Sods_Wilderness(288); Dolly_Sods_Wilderness; Dome_Lands_Wilderness(190); Dome_Lands_Wilderness; Douglas(137); Douglas; E.L.A.(316); E.L.A.; Edgar Evins(313); Edgar Evins; Egbert(323); Egbert; El_Dorado_Springs(161); El_Dorado_Springs; Ellis(159); Ellis; Everglades NP(180); Everglades NP; Everglades_NP(249); Everglades_NP; Flat_Tops(50); Flat_Tops; Flathead(161); Flathead; Fort_Peck(158); Fort_Peck; Frostberg_Reservoir_(Big_Piney_Run)(140); Frostberg_Reservoir_(Big_Piney_Run); Gates_of_the_Mountains(177); Gates_of_the_Mountains; Georgia Station(311); Georgia Station; Gila_Wilderness(257); Gila_Wilderness; Glacier NP(312); Glacier NP; Glacier_NP(310); Glacier_NP; Gothic(309); Gothic; Grand Canyon NP(305); Grand Canyon NP; Great Basin NP(235); Great Basin NP; Great Smoky NP - Look Rock(194); Great Smoky NP - Look Rock; Great_Basin_NP(282); Great_Basin_NP; Great_Gulf_Wilderness(200); Great_Gulf_Wilderness; Great_River_Bluffs(160); Great_River_Bluffs; Great_Sand_Dunes_NM(312); Great_Sand_Dunes_NM; Great_Smoky_Mountains(309); Great_Smoky_Mountains_NP; Guadalupe_Mountains_NP(306); Guadalupe_Mountains_NP; Hance_Camp_at_Grand_Canyon_NP(305); Hance_Camp_at_Grand_Canyon_NP; Hells_Canyon(184); Hells_Canyon; Hercules-Glades(178); Hercules-Glades; Hillside(49); Hillside; Hoover(169); Hoover; Hopi_Point_1(99); Hopi_Point_1; Horton Station(328); Horton Station; Howland(216); Howland; Hoxeyville(174); Hoxeyville; Ike's_Backbone(187); Ike's_Backbone; Indian_Gardens(238); Indian_Gardens; Isle_Royale_NP(199); Isle_Royale_NP; James_River_Face_Wilderness(187); James_River_Face_Wilderness; Jarbidge_Wilderness(297); Jarbidge_Wilderness; Jefferson_NF(64); Jefferson_NF; Joshua Tree NP(244); Joshua Tree NP; Joshua_Tree_NP(198); Joshua_Tree_NP; Kaiser(176); Kaiser; Kalmiopsis(189); Kalmiopsis; Kane Exp. Forest(297); Kane Exp. Forest; Kejimkujik(312); Kejimkujik; Lake_Sugema(163); Lake_Sugema; Lake_Tahoe_Community_College(22); Lake_Tahoe_Community_College; Lassen Volcanic NP(236); Lassen Volcanic NP; Lassen_Volcanic_NP(299); Lassen_Volcanic_NP; Laurel Hill(310); Laurel Hill; Lava_Beds_NM(189); Lava_Beds_NM; Linville_Gorge(186); Linville_Gorge; Livonia(118); Livonia; Londonderry(60); Londonderry; Lone_Peak_Wilderness(83); Lone_Peak_Wilderness; Longwoods(335); Longwoods; Lostwood(186); Lostwood; Lye_Brook_Wilderness(279); Lye_Brook_Wilderness; Lykens(239); Lykens; Lynden(8); Lynden; M.K._Goddard(321); M.K._Goddard; M.K._Goddard(116); M.K._Goddard; Mackville(279); Mackville; Mackville Collocated(262); Mackville Collocated; Makah_Tribe(50); Makah_Tribe; Makah_Tribe_Site_2(62); Makah_Tribe_Site_2; Mammoth_Cave_NP(288); Mammoth_Cave_NP; Martha's_Vineyard(155); Martha's_Vineyard; Meadview(157); Meadview; Medicine_Lake(190); Medicine_Lake; Mesa Verde NP(236); Mesa Verde NP; Mesa_Verde_NP(307); Mesa_Verde_NP; Mingo(184); Mingo; Mohawk_Mt.(170); Mohawk_Mt.; Monture(188); Monture; Mooshorn_NWR(250); Mooshorn_NWR; Mount Rainier NP(196); Mount Rainier NP; Mount_Baldy(181); Mount_Baldy; Mount_Hood(190); Mount_Hood; Mount_Rainier_NP(307); Mount_Rainier_NP; Mount_Zirkel_Wilderness(247); Mount_Zirkel_Wilderness; Nebraska_NF(159); Nebraska_NF; North_Absaroka(191); North_Absaroka; North_Cascades(191); North_Cascades; Northern_Cheyenne(161); Northern_Cheyenne; Okefenokee_NWR(287); Okefenokee_NWR; Old_Town(58); Old_Town; Olympic(173); Olympic; Omaha(58); Omaha; Organ_Pipe(156); Organ_Pipe; Owens_Valley(30); Owens_Valley; Oxford(335); Oxford; Pack_Monadnock_Summit(98); Pack_Monadnock_Summit; Parsons(325); Parsons; Pasayten(178); Pasayten; Penn State(341); Penn State; Penobscot(119); Penobscot; Perkinstown(314); Perkinstown; Petersburg(62); Petersburg; Petrified_Forest_NP(300); Petrified_Forest_NP; Pinedale(297); Pinedale; Pinnacles NM(238); Pinnacles NM; Pinnacles_NM(309); Pinnacles_NM; Point_Reyes_National_Seashore(301); Point_Reyes_National_Seashore; Presque_Isle(178); Presque_Isle; Prince Edward(294); Prince Edward; Proctor_Maple_R._F.(179); Proctor_Maple_R._F.; Quabbin_Summit(175); Quabbin_Summit; Quaker City(225); Quaker City; Quaker_City(175); Quaker_City; Queen_Valley(176); Queen_Valley; Redwood_NP(309); Redwood_NP; Ripple_Creek(9); Ripple_Creek; Rocky Mtn NP(242); Rocky Mtn NP; Rocky_Mountain_NP(299); Rocky_Mountain_NP; Rocky_Mountain_NP_HQ(8); Rocky_Mountain_NP_HQ; Sac_and_Fox(108); Sac_and_Fox; Saguaro_NM(217); Saguaro_NM; Saguaro_West(168); Saguaro_West; Salamonie Reservoir(300); Salamonie Reservoir; Salmon_NF(53); Salmon_NF; Salt_Creek(187); Salt_Creek; San_Andres(25); San_Andres; San_Gabriel(143); San_Gabriel; San_Gorgonio_Wilderness(293); San_Gorgonio_Wilderness; San_Pedro_Parks(180); San_Pedro_Parks; San_Rafael(184); San_Rafael; Sand Mountain(296); Sand Mountain; Saturna(270); Saturna; Sawtooth_NF(244); Sawtooth_NF; Scoville(56); Scoville; Seney(193); Seney; Sequoia_NP(284); Sequoia_NP; Shamrock_Mine(137); Shamrock_Mine; Shenandoah NP - Big Meadows(311); Shenandoah NP - Big Meadows; Shenandoah_NP(307); Shenandoah_NP; Shining_Rock_Wilderness(239); Shining_Rock_Wilderness; Sierra_Ancha(180); Sierra_Ancha; Sikes(116); Sikes; Sipsey_Wilderness(269); Sipsey_Wilderness; Snoqualmie_Pass(255); Snoqualmie_Pass; South_Lake_Tahoe(80); South_Lake_Tahoe; Speedwell(298); Speedwell; Spokane_Res.(44); Spokane_Res.; St._Marks(179); St._Marks; Starkey(189); Starkey; Stilwell(68); Stilwell; Stockton(239); Stockton; Storm_Peak(8); Storm_Peak; Sula_Peak(243); Sula_Peak; Sumatra(308); Sumatra; Swanquarter(184); Swanquarter; Sycamore_Canyon(189); Sycamore_Canyon; Tallgrass(158); Tallgrass; Theodore Roosevelt NP(190); Theodore Roosevelt NP; Theodore_Roosevelt(186); Theodore_Roosevelt; Three_Sisters_Wilderness(269); Three_Sisters_Wilderness; Thunder_Basin(150); Thunder_Basin; Tonto_NM(301); Tonto_NM; Trinity(172); Trinity; UL_Bend(190); UL_Bend; Unionville(313); Unionville; Upper_Buffalo_Wilderness(284); Upper_Buffalo_Wilderness; Viking_Lake(162); Viking_Lake; Vincennes(335); Vincennes; Voyageurs(228); Voyageurs NP; Voyageurs_NP_1(40); Voyageurs_NP_1; Voyageurs_NP_2(189); Voyageurs_NP_2; WY(300); WY; Walker_River_Paiute_Tribe(29); Walker_River_Paiute_Tribe; Wash. Crossing(312); Wash. Crossing; Weminuche_Wilderness(304); Weminuche_Wilderness; Wheeler_Peak(174); Wheeler_Peak; White_Mountain(166); White_Mountain; White_Pass(189); White_Pass; White_River_NF(244); White_River_NF; Whiteface Mountain(104); Whiteface Mountain; Wichita_Mountains(178); Wichita_Mountains; Wind_Cave(189); Wind_Cave; Woodstock(317); Woodstock; Wrightwood(36); Wrightwood; Yellowstone NP(228); Yellowstone NP; Yellowstone_NP_1(72); Yellowstone_NP_1; Yellowstone_NP_2(228); Yellowstone_NP_2; Yosemite NP - Turtleback Dome(234); Yosemite NP - Turtleback Dome; Yosemite_NP(310); Yosemite_NP; Zion(52); Zion; Zion_Canyon(149); Zion_Canyon
NAFRICA	Barcarrota(189); Barcarrota; Víznar(240); Víznar; Zarra(192); Zarra

Table S5. Same as Table S1 for SO4 concentration

Region	Sites
EUROPE	Birkenes II(3120); Birkenes II; Cabauw Zijdeweg(1578); Cabauw Zijdeweg; Hohenpeissenberg(4170); Hohenpeissenberg; Hyytiälä(2479); Hyytiälä; Ispra(4046); Ispra; K-puszta(2915); K-puszta; Kosetice (NOAK)(1464); Kosetice (NOAK); Mace Head(4115); Mace Head; Melpitz(1075); Melpitz; Observatoire Perenne de l'Environnement(1330); Observatoire Perenne de l'Environnement; Pallas (Sammaltunturi)(4123); Pallas (Sammaltunturi); SIRTA Atmospheric Research Observatory(588); SIRTA Atmospheric Research Observatory; Vavihill(412); Vavihill
NAMERICA	Acadia National Park-McFarland Hill (ME98)(1352); Acadia National Park-McFarland Hill (ME98); Bondville(6139); Bondville; Boundary Waters Canoe Area(330); Boundary Waters Canoe Area; Cedar Bluff(607); Cedar Bluff; Columbia River Gorge(1780); Columbia River Gorge; Glacier National Park-Fire Weather Station (MT05)(583); Glacier National Park-Fire Weather Station (MT05); Great Gulf Wilderness(524); Great Gulf Wilderness; Great Smoky Mountains NP(1873); Great Smoky Mountains NP; James River Face Wilderness(442); James River Face Wilderness; Mammoth Cave National Park-Houchin Meadow(1490); Mammoth Cave National Park-Houchin Meadow; Mount Rainier National Park-Tahoma Woods (WA99)(959); Mount Rainier National Park-Tahoma Woods (WA99); Okefenokee National Wildlife Refuge (GA09)(404); Okefenokee National Wildlife Refuge (GA09); Organ Pipe Cactus National Monument(2310); Organ Pipe Cactus National Monument; Saguaro NM - Tucson Mountain 1(1352); Saguaro NM - Tucson Mountain 1; Southern Great Plains E13(4514); Southern Great Plains E13; Three Sisters Wilderness(891); Three Sisters Wilderness; Trinidad Head(5176); Trinidad Head; Upper Buffalo Wilderness(787); Upper Buffalo Wilderness; Wichita Mountains(616); Wichita Mountains

Table S6. Same as Table S1 for Scat. Coef.

Region	Sites
EUROPE	Annaberg-Buchholz(686); Annaberg-Buchholz; Aspvreten(817); Aspvreten; Birkenes II(3228); Birkenes II; Bösel(1241); Bösel; Cabauw Zijdeweg(2765); Cabauw Zijdeweg; Harwell(401); Harwell; Hohenpeissenberg(4635); Hohenpeissenberg; Hyytiälä(3781); Hyytiälä; Ispra(4699); Ispra; K-puszta(2577); K-puszta; Kosetice (NOAK)(1316); Kosetice (NOAK); Leipzig(2496); Leipzig; Leipzig-Eisenbahnstrasse(984); Leipzig-Eisenbahnstrasse; Leipzig-West(1328); Leipzig-West; Mace Head(651); Mace Head; Melpitz(4085); Melpitz; Montseny(3186); Montseny; Neuglobsow(1451); Neuglobsow; Observatoire Perenne de l'Environnement(1927); Observatoire Perenne de l'Environnement; Pallas (Sammaltunturi)(3693); Pallas (Sammaltunturi); SIRTA Atmospheric Research Observatory(308); SIRTA Atmospheric Research Observatory; Vavihill(633); Vavihill; Waldhof(2082); Waldhof
NAMERICA	Bondville(6659); Bondville; Sable Island(1176); Sable Island; Southern Great Plains E13(6649); Southern Great Plains E13; Trinidad Head(5049); Trinidad Head

Table S7. Same as Table S1 for Abs. Coef.