

## SUPPLEMENTARY MATERIAL

### **Estimating Daily PM<sub>2.5</sub> Concentrations Using Extreme Gradient Boosting Model Based on VIIRS Aerosol Products over Southeastern Europe**

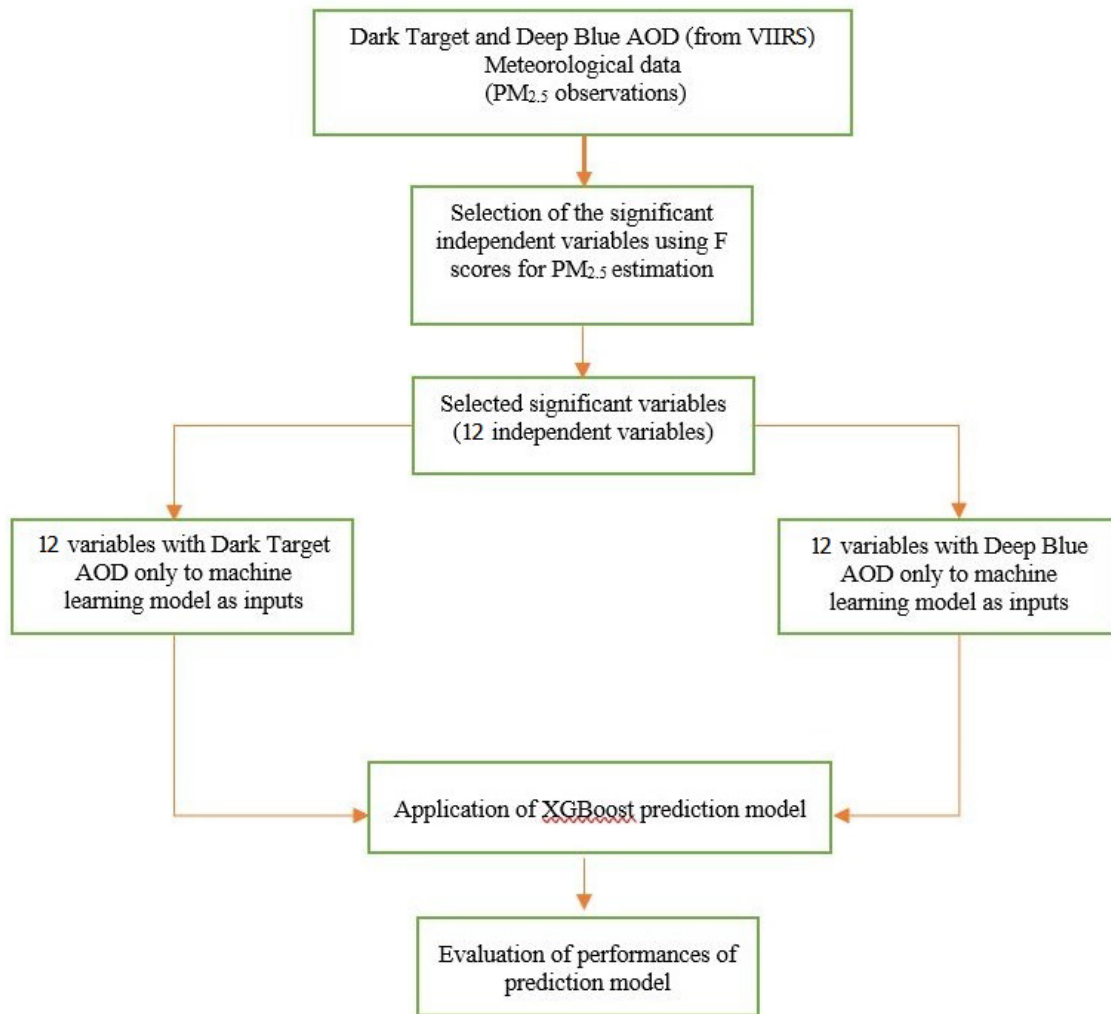
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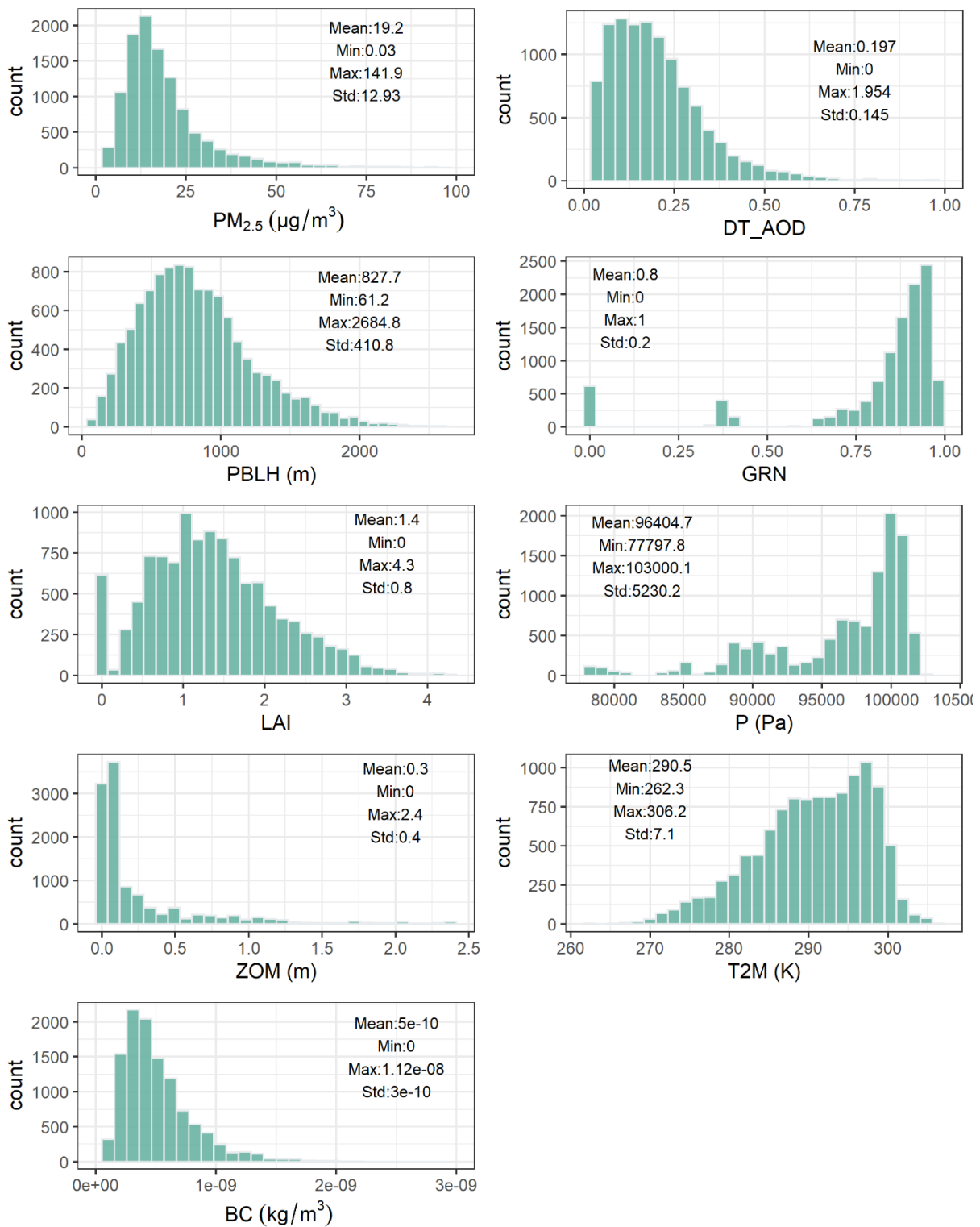
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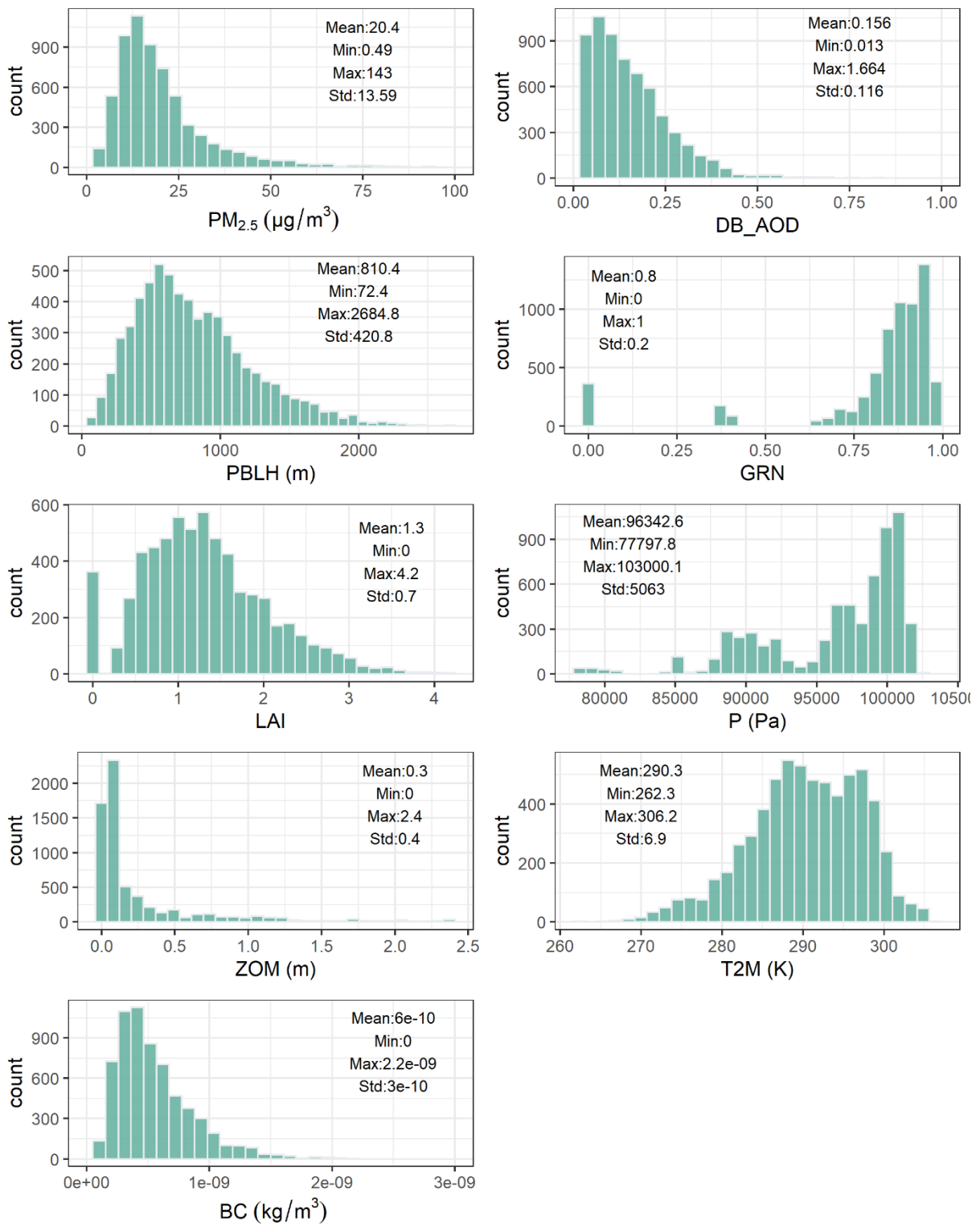
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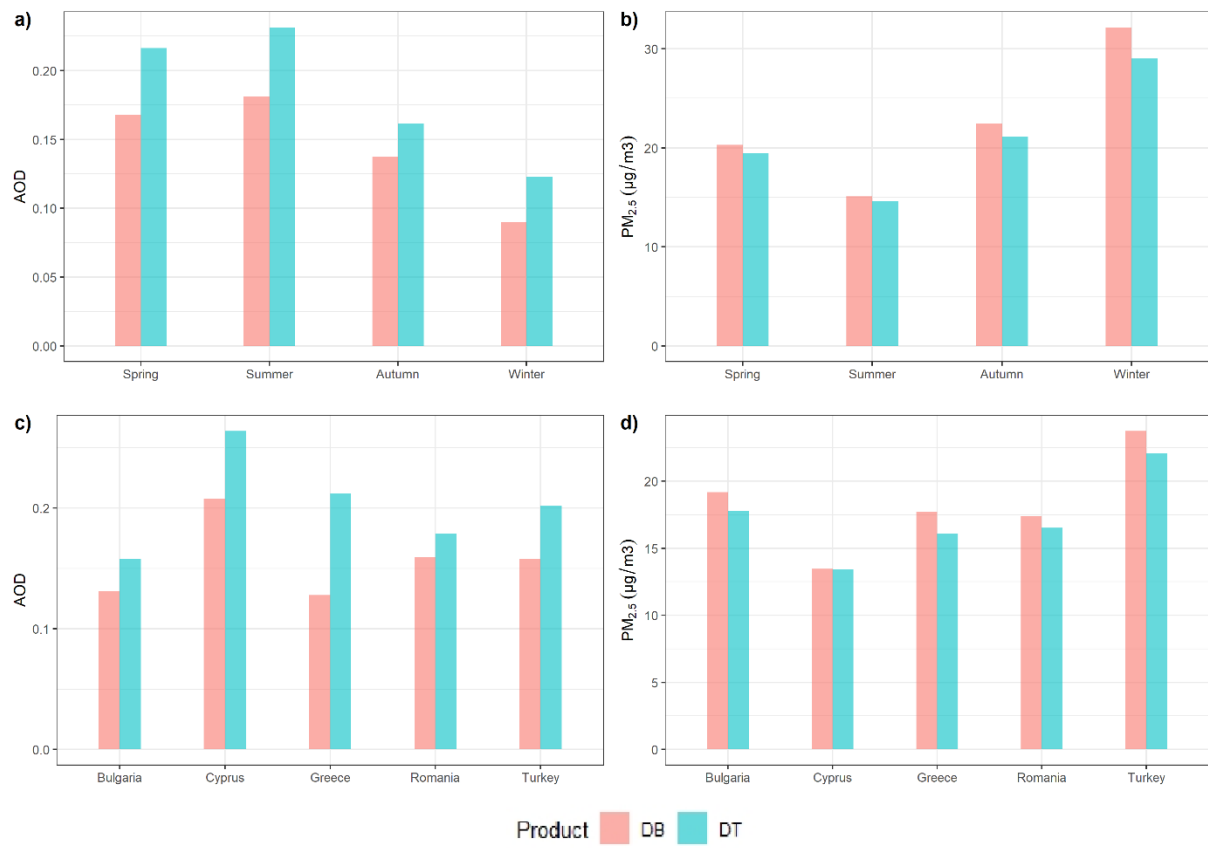
**Fig S1.** The flow chart of the methodology in this study



**Fig S2.** Histograms and descriptive statistics, including mean, median, and standard deviation (SD) for daily PM<sub>2.5</sub> and all of the parameters used for PM<sub>2.5</sub> estimation with DT AOD dataset



**Fig S3.** Histograms and descriptive statistics, including mean, median, and standard deviation (SD) for daily PM<sub>2.5</sub> and all of the parameters used for PM<sub>2.5</sub> estimation with DB AOD dataset



**Fig S4.** A summary of country level and seasonal measured PM<sub>2.5</sub> and AOD for DB and DT datasets

**Table S1.** List of the stations and summary information

Country	Air Quality Station Code	Lon	Lat	Data Number	mean	min	max	std
Bulgaria	STA-BG0020A	25.60	43.07	314	21.16	0.90	103.00	15.30
	STA-BG0039A	25.63	42.43	365	21.28	1.11	50.70	7.04
	STA-BG0045A	25.96	43.85	344	24.14	4.54	96.67	15.19
	STA-BG0046A	23.11	42.58	284	30.75	7.80	160.70	26.30
	STA-BG0050A	23.30	42.68	247	27.86	4.61	199.77	32.71
	STA-BG0051A	24.77	42.14	362	19.17	2.60	143.00	15.18
	STA-BG0053R	24.74	41.69	292	5.23	0.20	19.00	3.73
	STA-BG0070A	23.24	42.64	263	9.64	1.10	34.90	5.55
Cyprus	STA-BG0075A	27.92	43.22	338	15.94	1.13	39.97	8.04
	STA-CY0002R	33.06	35.04	335	11.41	0.50	61.20	6.82
	STA-CY0005A	33.02	34.68	337	13.64	2.30	65.60	5.99
	STA-CY0006A	33.33	35.13	338	14.87	4.20	42.50	5.44
Greece	STA-CY0008A	32.44	34.78	337	14.44	3.30	69.20	6.25
	STA-GR0001A	22.94	39.37	365	19.09	4.00	80.00	12.06
	STA-GR0003A	23.73	37.99	347	19.10	5.78	73.79	9.78
	STA-GR0018A	22.95	40.63	180	22.07	7.50	70.58	11.13
	STA-GR0030A	23.73	37.99	357	18.09	5.17	56.29	8.79
	STA-GR0035A	23.78	38.07	311	15.35	4.17	56.43	7.72
	STA-GR0037A	23.76	38.14	344	13.44	5.75	57.83	5.10
	STA-GR0038A	23.54	38.05	326	17.92	4.60	46.70	7.30
	STA-GR0039A	23.82	38.00	356	11.59	3.81	57.22	5.14
	STA-GR0047A	23.03	40.59	196	11.82	2.83	42.13	5.69
Romania	STA-GR0048A	21.74	38.25	339	18.69	5.38	95.71	11.65
	STA-GR0110R	23.11	38.38	196	12.28	2.33	45.91	6.01
	STA-RO0065A	23.78	38.07	357	21.30	0.59	82.03	13.54
	STA-RO0069A	26.03	44.42	314	19.06	0.17	70.52	11.11
	STA-RO0070A	26.10	44.44	315	21.61	4.09	87.76	10.78
	STA-RO0071A	26.03	44.35	293	18.90	2.26	91.90	11.47
	STA-RO0074A	23.60	46.78	264	21.25	3.00	49.00	9.17
	STA-RO0079A	23.80	44.32	115	22.21	4.31	52.90	9.43
	STA-RO0084A	27.58	47.15	333	27.01	2.02	111.60	15.19
	STA-RO0096A	21.30	46.19	288	17.87	1.32	68.66	9.95
	STA-RO0099A	24.87	44.86	137	21.34	4.28	76.62	13.43
	STA-RO0104A	26.91	46.56	227	14.59	4.28	43.79	6.25
	STA-RO0107A	21.93	47.07	301	17.44	0.94	88.13	14.84
	STA-RO0112A	26.66	47.74	332	14.83	1.47	48.40	8.13
	STA-RO0114A	27.97	45.26	205	12.52	1.28	37.02	7.04
	STA-RO0119A	25.60	45.65	315	21.34	5.64	198.31	19.99
	STA-RO0123A	26.82	45.15	125	11.80	1.10	109.37	14.76
STA-RO0132A	28.65	44.18	296	12.43	2.20	46.33	6.63	
STA-RO0142A	28.05	45.43	235	13.09	2.73	27.57	4.56	
STA-RO0153A	25.81	46.33	209	15.15	0.72	128.30	16.93	

	STA-RO0162A	23.57	47.65	51	12.46	4.44	48.49	7.79
	STA-RO0166A	22.66	44.63	70	18.22	5.10	71.20	11.51
	STA-RO0167A	24.56	46.54	249	15.13	1.03	81.13	11.79
	STA-RO0171A	26.39	46.93	195	13.72	2.55	80.59	9.45
	STA-RO0176A	26.03	44.94	291	19.39	8.17	71.73	9.28
	STA-RO0182A	22.88	47.80	214	13.23	0.25	60.80	10.15
	STA-RO0184A	24.15	45.79	190	16.06	3.45	55.13	8.23
	STA-RO0188A	26.25	47.65	197	16.85	4.01	40.15	7.75
	STA-RO0194A	21.23	45.75	296	18.57	3.65	52.22	9.08
	STA-RO0203A	24.37	45.08	285	13.96	0.91	65.24	12.17
	STA-RO0210A	26.04	43.96	285	16.83	1.60	55.20	8.14
	STA-RO0215A	24.87	43.75	57	8.01	3.38	14.96	2.60
Turkey	STA-TR050431	35.84	40.66	344	33.79	8.13	90.87	18.80
	STA-TR060141	32.82	39.92	251	19.64	1.85	67.80	12.34
	STA-TR0601721	32.91	39.96	316	21.02	0.74	90.72	10.58
	STA-TR0602041	32.80	39.97	291	16.13	1.64	58.31	9.70
	STA-TR060441	32.80	39.97	145	28.19	4.57	74.33	14.50
	STA-TR060831	32.86	39.93	225	27.68	3.27	74.28	12.38
	STA-TR060941	32.59	39.97	145	13.62	0.71	51.64	10.68
	STA-TR080213	41.49	41.47	360	15.76	2.18	46.13	7.73
	STA-TR100141	27.90	39.63	71	42.08	3.32	173.35	31.58
	STA-TR110141	29.98	40.14	71	20.23	4.20	47.00	9.65
	STA-TR110241	30.05	39.90	79	25.21	2.55	50.86	12.93
	STA-TR140441	31.60	40.73	257	18.00	0.61	103.99	14.76
	STA-TR160141	29.04	40.23	70	45.85	6.41	111.05	25.90
	STA-TR160512	29.05	40.20	73	46.11	6.01	128.31	28.32
	STA-TR160613	28.87	40.22	365	27.08	5.21	92.62	14.65
	STA-TR170141	26.41	40.14	71	17.52	5.79	35.12	7.75
	STA-TR170313	26.77	40.40	354	18.25	4.80	52.16	9.11
	STA-TR180141	33.62	40.60	244	17.86	0.92	51.86	7.69
	STA-TR190231	34.97	40.55	346	28.28	1.84	162.27	23.57
	STA-TR190321	34.94	40.53	364	21.85	3.25	74.14	13.28
	STA-TR220141	26.59	41.66	69	27.29	7.41	90.45	17.03
	STA-TR220213	26.54	41.66	365	14.68	2.89	65.34	9.28
	STA-TR220341	26.64	40.85	362	40.05	12.91	163.72	26.03
	STA-TR240231	39.50	39.75	338	29.13	6.84	109.63	17.83
	STA-TR250531	41.27	39.91	365	42.57	10.60	318.61	39.10
	STA-TR260441	30.56	39.76	62	18.40	6.86	63.89	11.21
	STA-TR280241	38.40	40.91	302	13.86	0.27	80.95	10.51
	STA-TR340341	28.97	41.09	363	23.38	5.74	97.42	13.71
	STA-TR340611	28.26	41.07	365	17.80	4.62	60.97	8.76
	STA-TR341131	29.10	41.02	353	24.29	8.38	61.69	9.99
	STA-TR341431	28.95	41.01	321	28.93	1.60	105.69	15.18
	STA-TR341641	29.01	41.05	354	22.46	4.60	55.86	10.41
STA-TR341841	28.89	41.04	333	25.80	3.40	74.67	13.87	
STA-TR342041	29.03	40.99	352	25.41	5.51	113.32	15.98	

STA-TR342141	28.98	41.09	255	26.76	4.63	119.57	19.20
STA-TR342541	29.16	41.01	330	21.27	1.84	70.21	12.31
STA-TR360231	43.10	40.60	270	22.82	3.55	94.12	16.71
STA-TR370141	33.76	41.37	186	24.58	6.48	104.29	13.39
STA-TR390141	27.21	41.72	42	20.97	0.03	52.92	10.76
STA-TR400141	29.95	40.77	286	13.97	2.81	58.85	10.97
STA-TR4101322	29.43	40.85	365	22.37	5.85	76.47	9.82
STA-TR410141	29.95	40.77	74	27.48	3.85	64.67	14.52
STA-TR410741	29.79	40.73	365	21.04	1.50	73.19	12.57
STA-TR410913	30.01	41.13	360	13.85	2.75	45.74	7.43
STA-TR411021	29.79	40.75	74	34.33	2.25	123.83	25.22
STA-TR430341	29.97	39.43	182	18.85	0.85	108.02	19.91
STA-TR520341	37.91	40.97	359	16.09	0.30	75.12	10.88
STA-TR530213	41.05	41.13	358	12.01	0.71	102.28	8.59
STA-TR540141	30.39	40.77	74	41.11	6.55	123.76	22.91
STA-TR540331	30.40	40.79	358	28.52	5.37	112.28	18.52
STA-TR540422	30.65	40.75	356	39.61	12.68	187.83	16.57
STA-TR550241	36.30	41.33	327	12.52	3.37	35.94	6.06
STA-TR550631	36.33	41.29	359	14.99	3.05	72.56	11.38
STA-TR580141	37.03	39.75	365	23.93	6.18	73.48	14.41
STA-TR580231	37.01	39.75	347	26.70	6.75	75.51	13.16
STA-TR590141	27.51	40.98	60	24.55	1.04	70.27	14.12
STA-TR590341	27.98	41.32	363	17.47	1.33	100.21	15.28
STA-TR590522	27.82	41.18	361	21.13	3.17	48.41	8.49
STA-TR600331	36.55	40.32	364	24.15	4.32	110.32	17.99
STA-TR610431	39.67	40.99	354	21.15	3.79	58.58	8.66
STA-TR660141	34.81	39.82	280	12.67	3.01	52.06	6.38
STA-TR710141	33.52	39.84	189	12.98	2.64	90.05	8.62
STA-TR740141	32.34	41.63	227	25.33	6.58	122.81	16.80
STA-TR760213	44.62	39.79	357	21.41	2.45	119.12	17.73
STA-TR770141	29.26	40.65	71	18.50	1.63	52.87	11.34
STA-TR770212	29.51	40.70	364	21.19	3.92	73.91	10.30
STA-TR770313	28.78	40.53	347	13.44	3.52	43.77	7.68
STA-TR780141	32.62	41.20	130	34.34	4.45	145.24	29.52
STA-TR810141	31.15	40.85	209	26.04	7.80	101.07	14.39