



Government of Nepal  
Ministry of Forest and Environment  
Department of Environment  
Babarmahal, Kathmandu

# Air quality status of Nepal 2016- 2020

Volume XXII

Dhangadhi air quality monitoring station



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## Table of Contents

1. Dhangadhi Air Quality Monitoring Station.....	1
2. Air Quality Status of Dhangadhi Station (2000).....	1
2.1 Air quality status, 2000 .....	1
2.1.1 Annual average of PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> and TSP .....	1
2.1.2 Temporal variation of PM <sub>1</sub> .....	2
2.1.3 Temporal variation of PM <sub>2.5</sub> .....	5
2.1.4 Temporal variation of PM <sub>10</sub> .....	9
2.1.5 Temporal variation of TSP .....	12
Annex.....	16

## List of Figures

Figure 1: Annual average of PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> and TSP .....	2
Figure 2 : Histogram of PM <sub>1</sub> .....	2
Figure 3: Daily average of PM <sub>1</sub> .....	3
Figure 4: Monthly Average of PM <sub>1</sub> .....	3
Figure 5: Monthly Variation of PM <sub>1</sub> .....	4
Figure 6: Seasonal Variation of PM <sub>1</sub> .....	4
Figure 7: Diurnal Variation of PM <sub>1</sub> .....	5
Figure 8 : Histogram of PM <sub>2.5</sub> .....	5
Figure 9: Daily average of PM <sub>2.5</sub> .....	6
Figure 10: Monthly Average of PM <sub>2.5</sub> .....	6
Figure 11: Monthly Variation of PM <sub>2.5</sub> .....	7
Figure 12: Seasonal Variation of PM <sub>2.5</sub> .....	7

Figure 13: Diurnal Variation of PM <sub>2.5</sub> .....	8
Figure 14: Compliance status of PM <sub>2.5</sub> .....	8
Figure 15 : Histogram of PM <sub>10</sub> .....	9
Figure 16: Daily average of PM <sub>10</sub> .....	9
Figure 17: Monthly Average of PM <sub>10</sub> .....	10
Figure 18: Monthly Variation of PM <sub>10</sub> .....	10
Figure 19: Seasonal Variation of PM <sub>10</sub> .....	11
Figure 20: Diurnal Variation of PM <sub>10</sub> .....	11
Figure 21: Compliance status of PM <sub>10</sub> .....	12
Figure 22 : Histogram of TSP.....	12
Figure 23: Daily average of TSP.....	13
Figure 24: Monthly Average of TSP.....	13
Figure 25: Monthly Variation of TSP .....	14
Figure 26: Seasonal Variation of TSP .....	14
Figure 27: Diurnal Variation of TSP.....	15
Figure 28: Compliance status of TSP .....	15

## 1. Dhangadhi Air Quality Monitoring Station

- Address: Old Airport (now Khulla Manch)
- Location: 28.704133 latitude, 80.5945 longitude
- Surrounding of the station
  - East: Homeless shelter (Sukumbasi basti)
  - West: Khulla Manch
  - North: Sahidgate, Campus Road (Metallic Road)
  - South: Homeless shelter (Sukumbasi basti)
- Establish year: 2020 (2077)
- Brief introduction of the instruments installed in the station
  1. PM instrument- GRIMM EDM 180
  2. Met sensor luffth WS 700
  3. Data logging and data transmission and power backup system

## 2. Air Quality Status of Dhangadhi Station (2000)

### 2.1 Air quality status, 2000

#### 2.1.1 Annual average of PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> and TSP

The annual average of PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> and TSP for the Dhangadhi station is shown in the figure below.

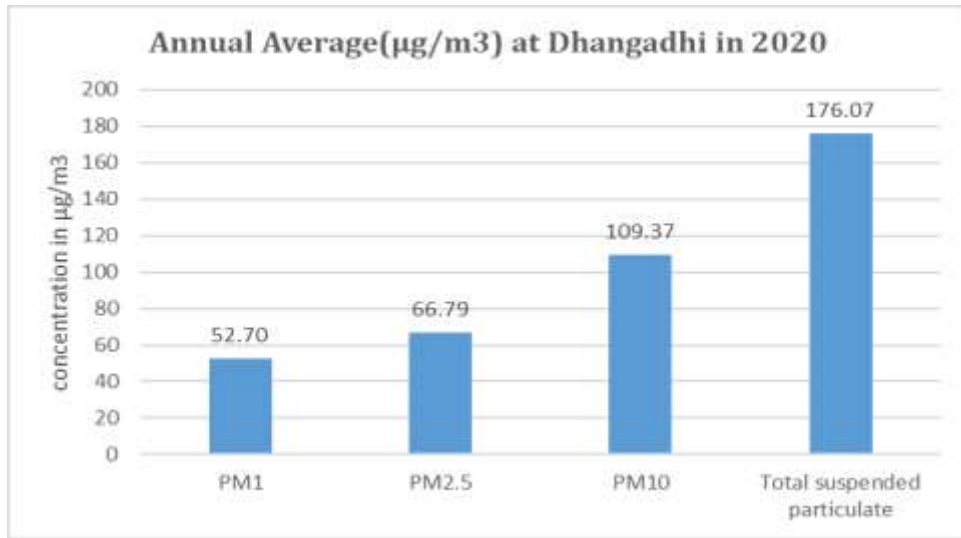


Figure 1: Annual average of PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> and TSP

### 2.1.2 Temporal variation of PM<sub>1</sub>

#### Annual average of PM<sub>1</sub>

Annual PM<sub>1</sub> average for Dhangadhi Station was observed to be 52.7  $\mu\text{g}/\text{m}^3$ . Histogram of hourly average PM<sub>1</sub> is shown in the figure below.

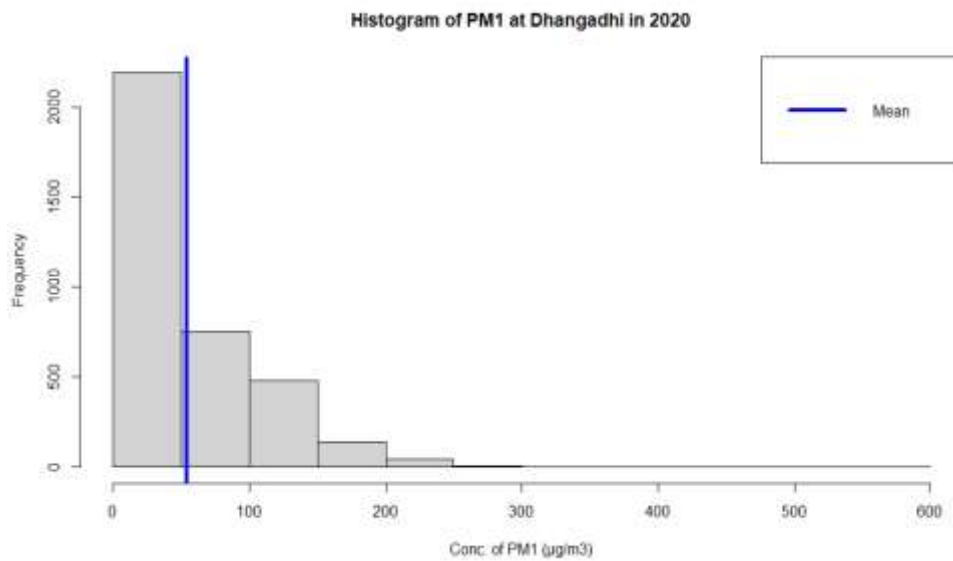


Figure 2 : Histogram of PM<sub>1</sub>

### Daily average of PM<sub>1</sub>

Daily average concentration of PM<sub>1</sub> was high during December and low during July-August.

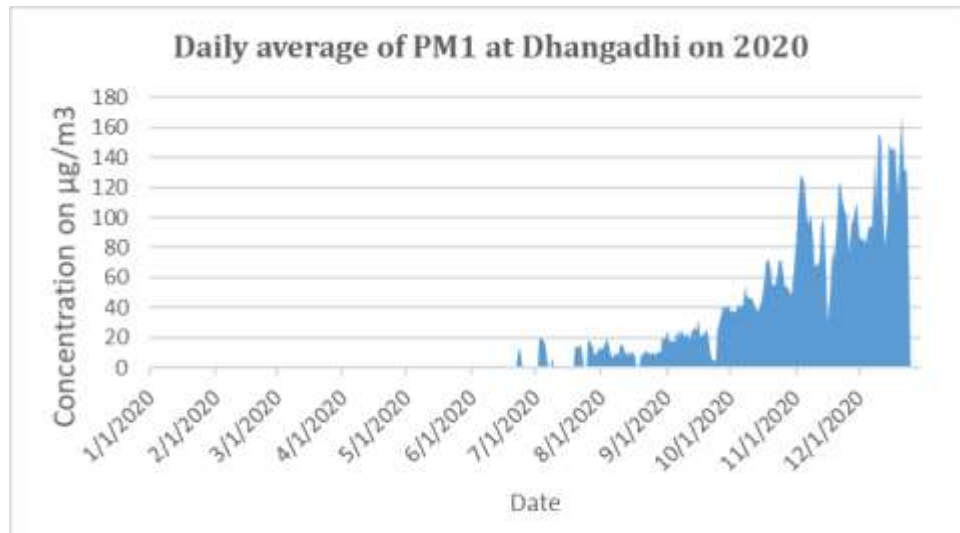


Figure 3: Daily average of PM<sub>1</sub>

### Monthly average of PM<sub>1</sub>

The highest and the lowest monthly average of PM<sub>1</sub> was found during December (119.04 µg/m<sup>3</sup>) and August (11.12 µg/m<sup>3</sup>) respectively.

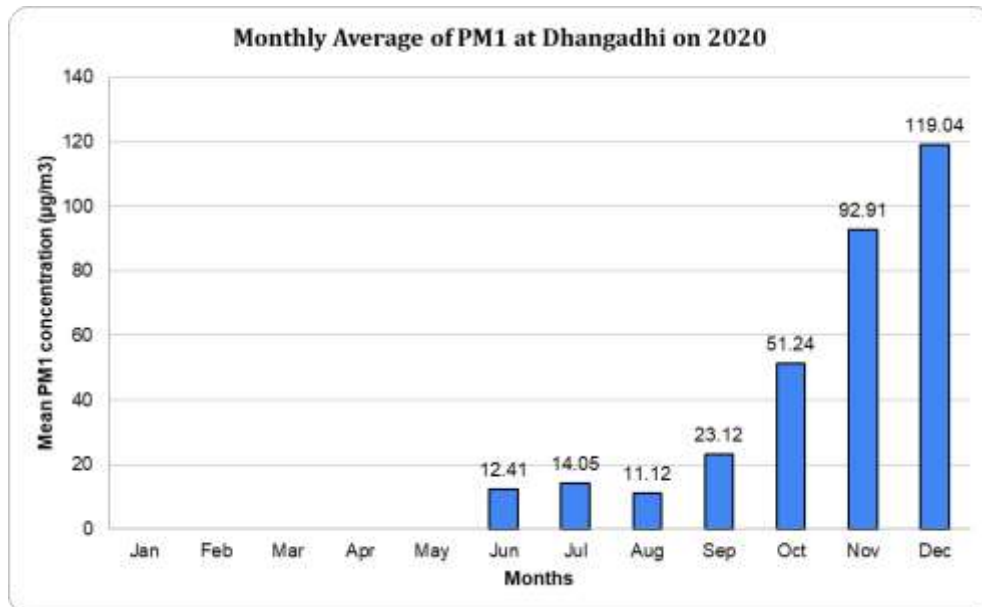


Figure 4: Monthly Average of PM<sub>1</sub>

## Monthly variation of PM<sub>1</sub>

Variation in concentration of PM<sub>1</sub> was found more during December and low during June.

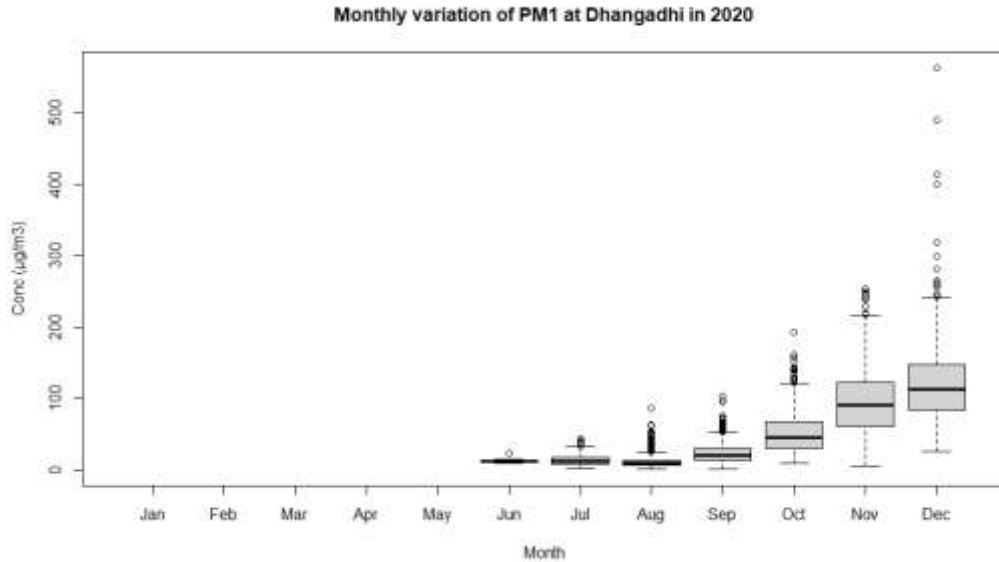


Figure 5: Monthly Variation of PM<sub>1</sub>

## Seasonal variation of PM<sub>1</sub>

Ambient concentration of average PM<sub>1</sub> during monsoon (June-September), and post-monsoon (October-November) is shown in the figure below. The concentration of PM<sub>1</sub> was found higher during post monsoon (55.76 µg/m<sup>3</sup>) than monsoon season (12.53 µg/m<sup>3</sup>) )Error! Reference source not found..



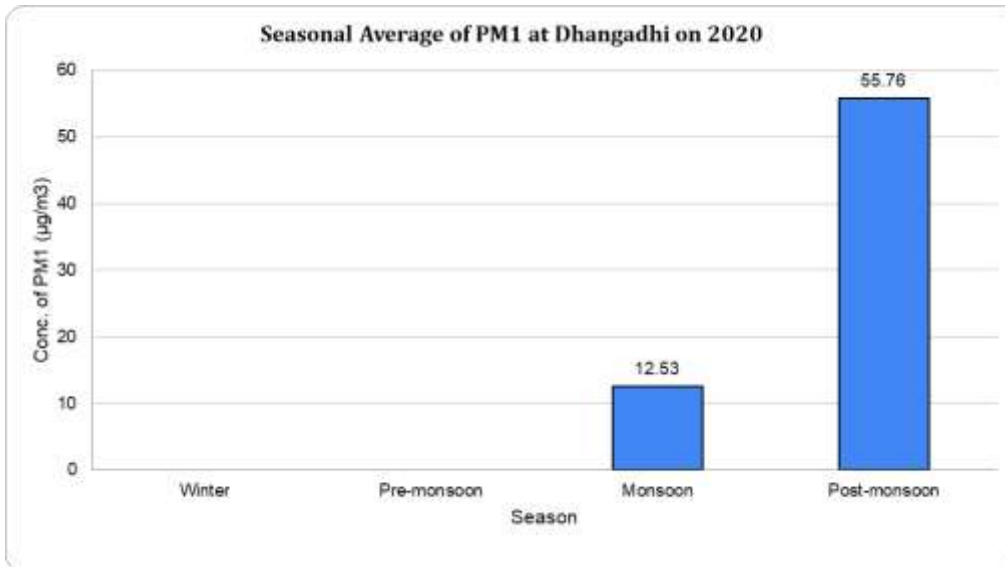


Figure 6: Seasonal Variation of PM<sub>1</sub>

### Diurnal variation of PM<sub>1</sub>

The diurnal variation of average PM<sub>1</sub> concentrations can be shown in the figure. The variation in PM<sub>1</sub> concentration was high at around 6 pm and low at 2 pm.

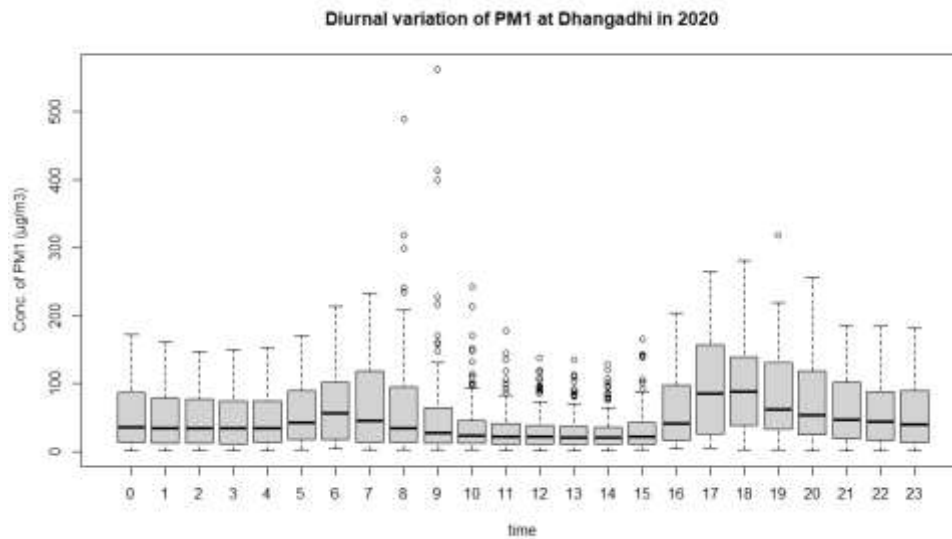


Figure 7: Diurnal Variation of PM<sub>1</sub>

### 2.1.3 Temporal variation of PM<sub>2.5</sub>

#### Annual average of PM<sub>2.5</sub>

The annual average of PM<sub>2.5</sub> at Dhangadhi station was found to be 66.79 µg/m<sup>3</sup>. Histogram of hourly average PM<sub>2.5</sub> is shown in the figure below.

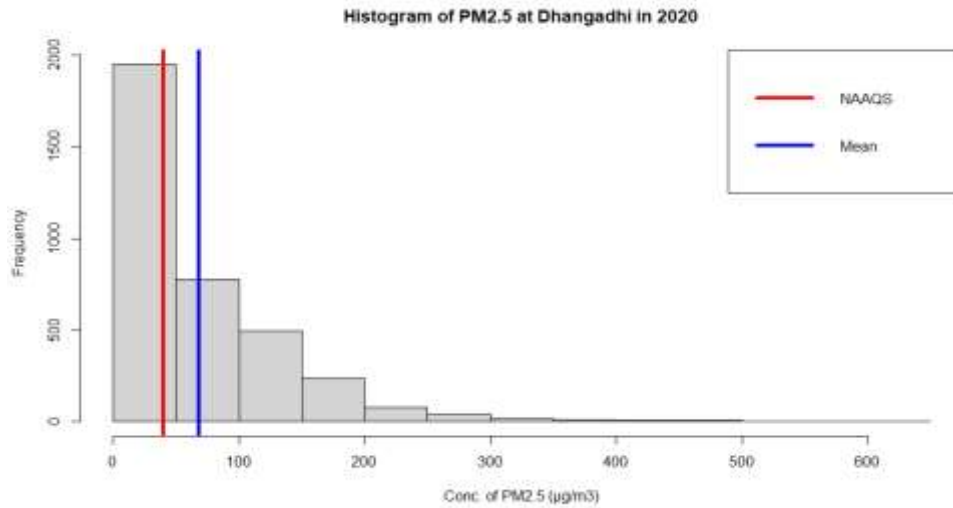


Figure 8 : Histogram of PM<sub>2.5</sub>.

### Daily average of PM<sub>2.5</sub>

Daily average concentration of PM<sub>2.5</sub> was high during December and was found low during August.

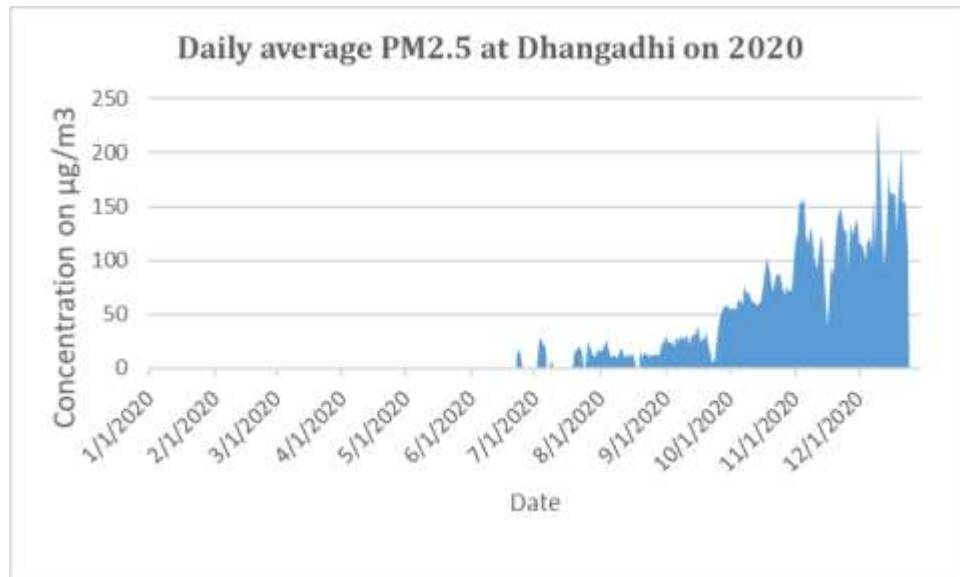


Figure 9: Daily average of PM<sub>2.5</sub>

### Monthly average of PM<sub>2.5</sub>

The highest and the lowest monthly average of PM<sub>2.5</sub> was found during December (142.19  $\mu\text{g}/\text{m}^3$ ) and August (14.42  $\mu\text{g}/\text{m}^3$ ) respectively.

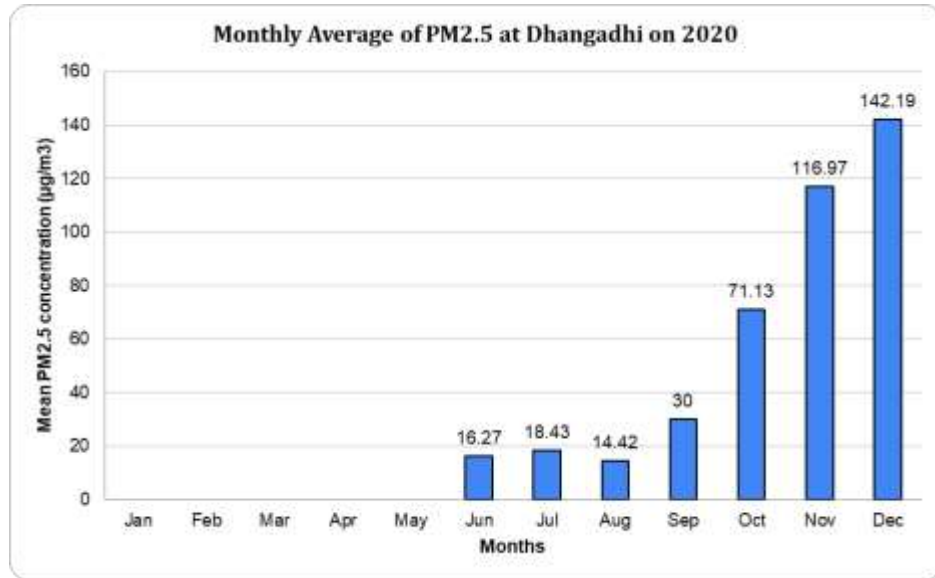


Figure 10: Monthly Average of PM<sub>2.5</sub>

### Monthly variation of PM<sub>2.5</sub>

Variation in concentration of PM<sub>2.5</sub> was found more during December whereas low during June.

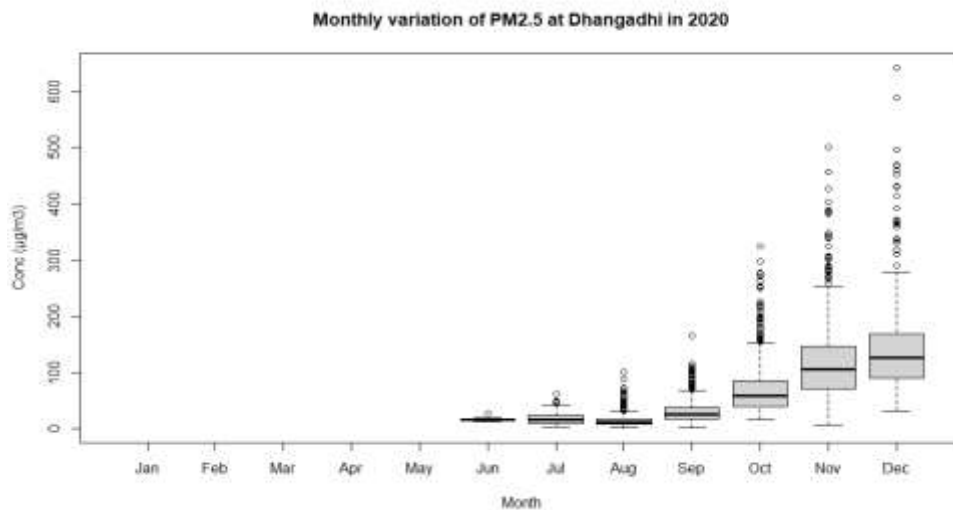


Figure 11: Monthly Variation of PM<sub>2.5</sub>

### Seasonal variation of PM<sub>2.5</sub>

Ambient concentration of average PM<sub>2.5</sub> with monsoon (June-September) and post-monsoon (October-November) can be shown in the figure below. The highest concentration of PM<sub>2.5</sub> was found during post-monsoon (72.7  $\mu\text{g}/\text{m}^3$ ) and the lowest concentration was found during monsoon (16.37  $\mu\text{g}/\text{m}^3$ ).

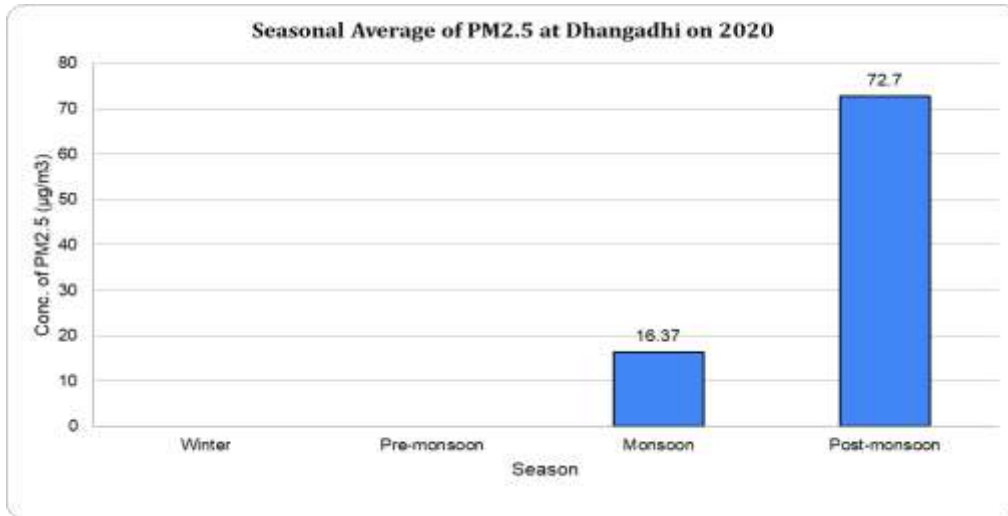


Figure 12: Seasonal Variation of PM<sub>2.5</sub>

### Diurnal variation of PM<sub>2.5</sub>

The diurnal variation of average PM<sub>2.5</sub> concentrations can be shown in the

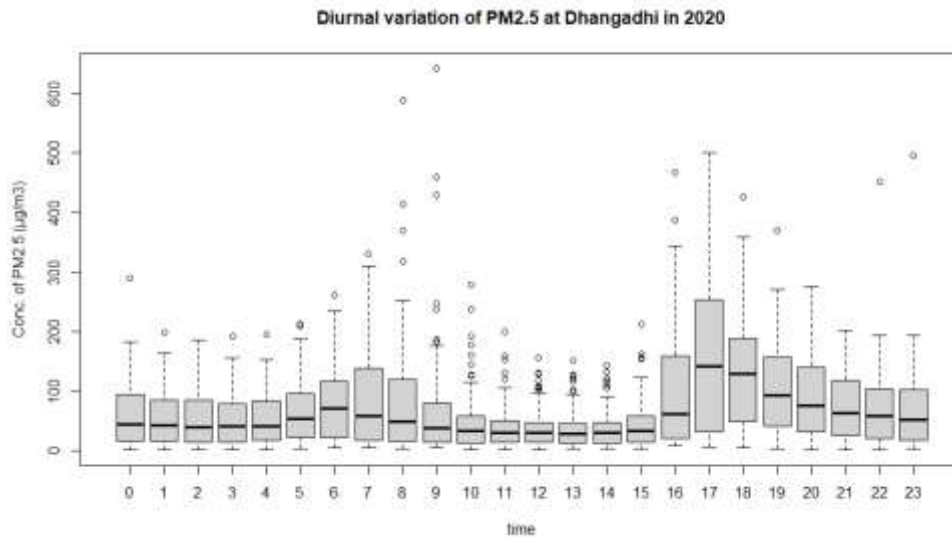
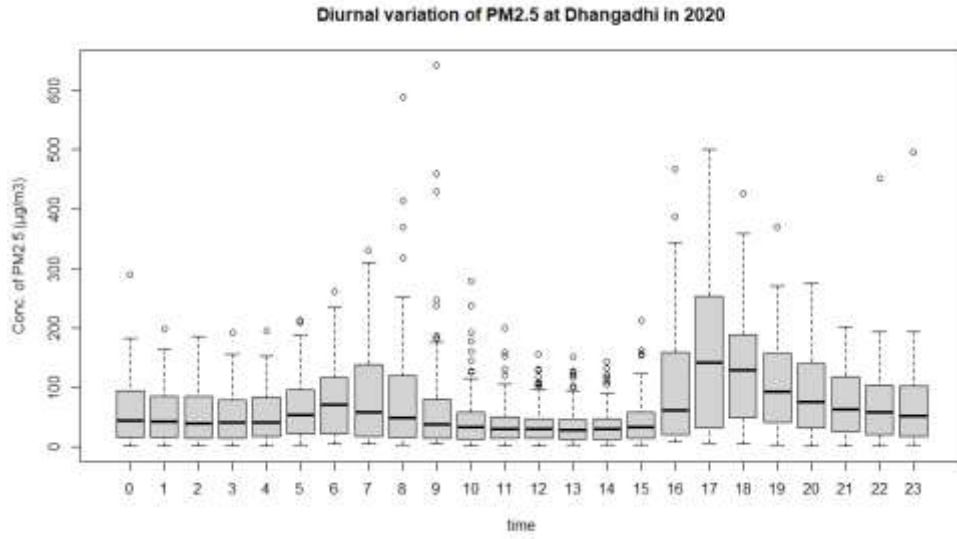


Figure 13 below. The variation in PM<sub>2.5</sub> concentration was high at around 7 pm and low at 1pm (



Figure

13).

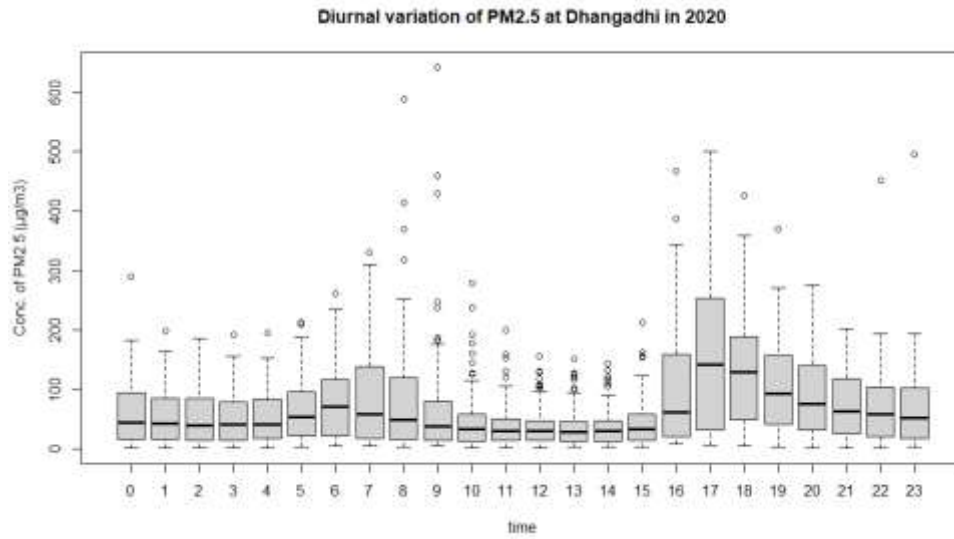


Figure 13: Diurnal Variation of PM<sub>2.5</sub>

### Compliance status of PM<sub>2.5</sub>

The total days of PM<sub>2.5</sub> monitored in the year 2020 counts 161, of which 88 days exceeded the NAAQS guideline.

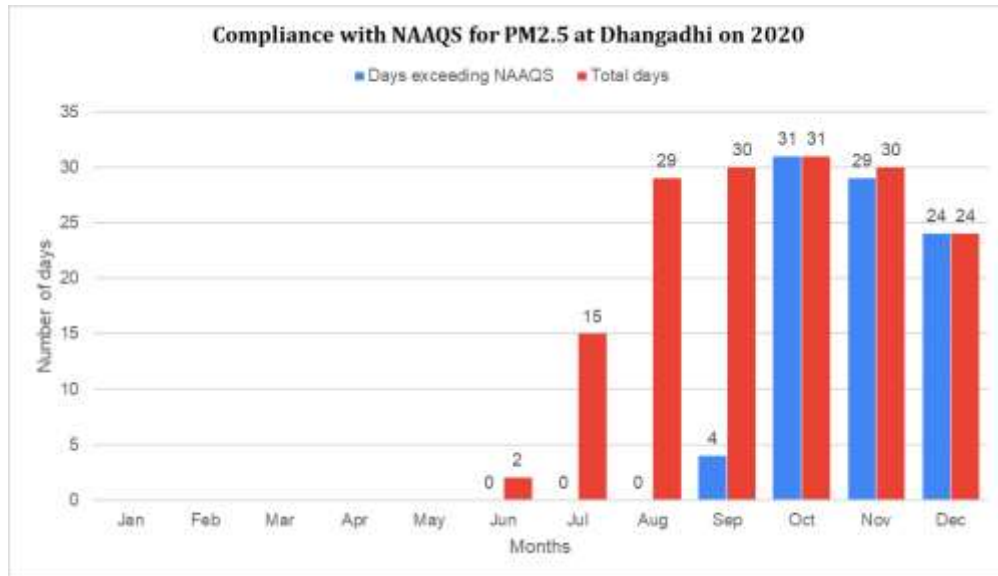


Figure 14: Compliance status of PM<sub>2.5</sub>

#### 2.1.4 Temporal variation of PM<sub>10</sub>

##### Annual average of PM<sub>10</sub>

The annual average of PM<sub>10</sub> at Dhangadhi station was found to be 109.37 µg/m<sup>3</sup>. Histogram of hourly average PM<sub>10</sub> is shown in the figure below.

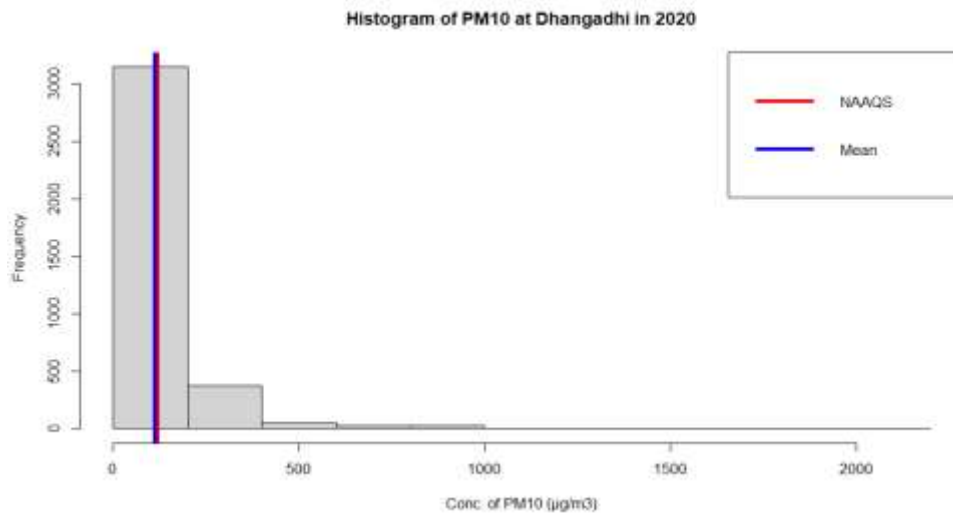


Figure 15 : Histogram of PM<sub>10</sub>.

##### Daily average of PM<sub>10</sub>

Daily average concentration of PM<sub>10</sub> was high during November and December and was found low during July and August.

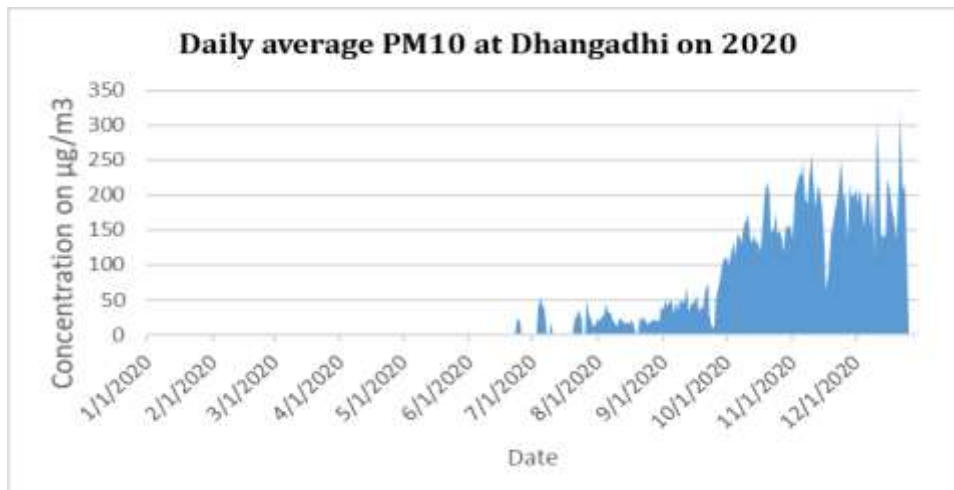


Figure 16: Daily average of PM<sub>10</sub>

### Monthly average of PM<sub>10</sub>

The highest and the lowest monthly average of PM<sub>10</sub> was found during November (191.9 µg/m<sup>3</sup>) and June (21.91 µg/m<sup>3</sup>) respectively.

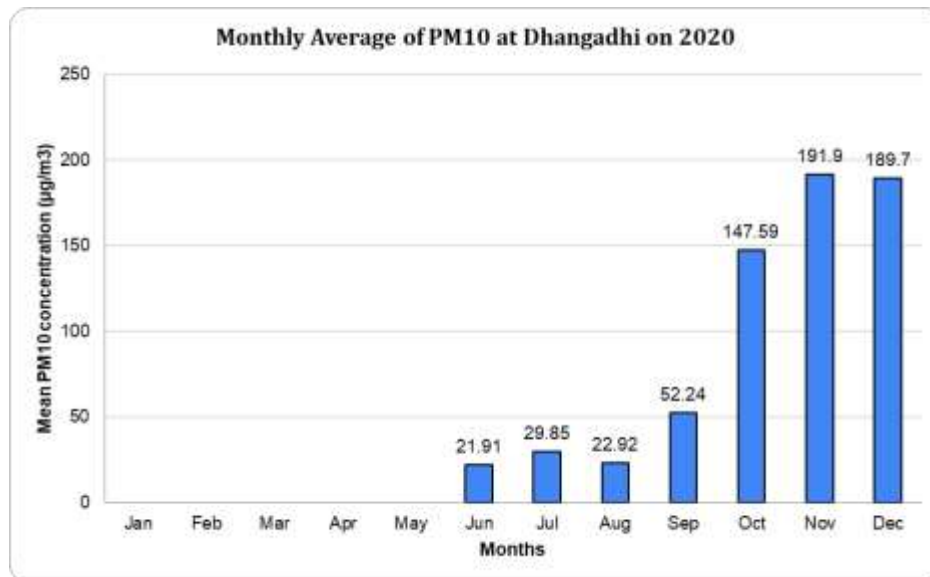


Figure 17: Monthly Average of PM<sub>10</sub>

### Monthly variation of PM<sub>10</sub>

Variation in concentration of PM<sub>10</sub> was found more during November and low during June.

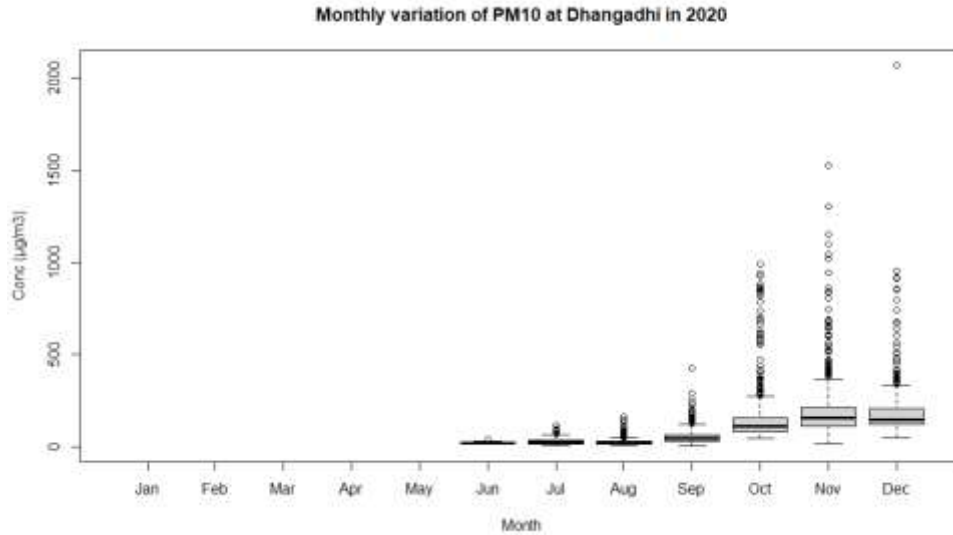


Figure 18: Monthly Variation of PM<sub>10</sub>

### Seasonal variation of PM<sub>10</sub>

Ambient concentration of average PM<sub>10</sub> with monsoon (June-September), and post-monsoon (October-November) can be shown in the figure below. The highest concentration of PM<sub>10</sub> was found in the post- monsoon (130.58 µg/m<sup>3</sup>) and that of lowest was found in monsoon season (24.89 µg/m<sup>3</sup>).

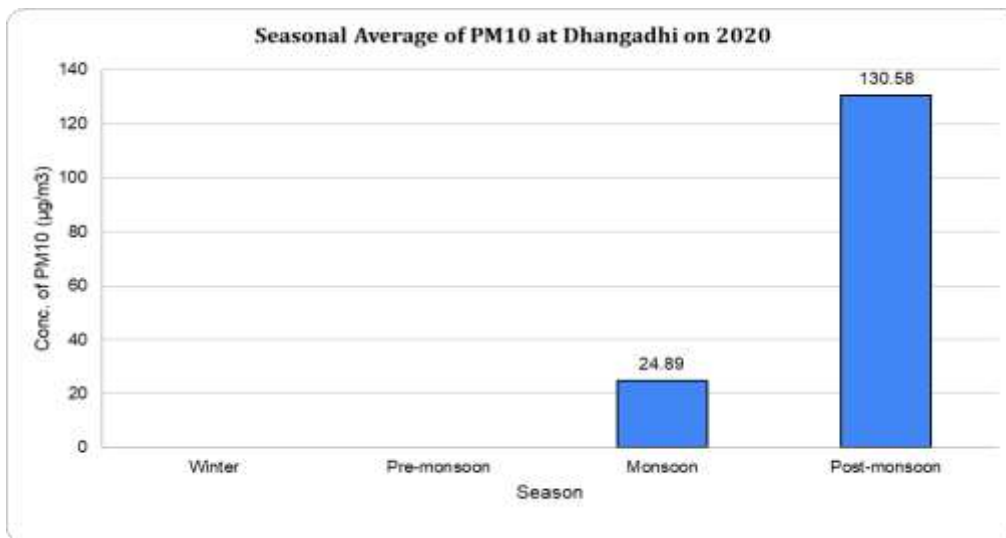


Figure 19: Seasonal Variation of PM<sub>10</sub>

### Diurnal variation of PM<sub>10</sub>



The diurnal variation of average PM<sub>10</sub> concentrations can be shown in the figure below. The variation in PM<sub>10</sub> concentration was high at around 5 pm and low at 4 am.

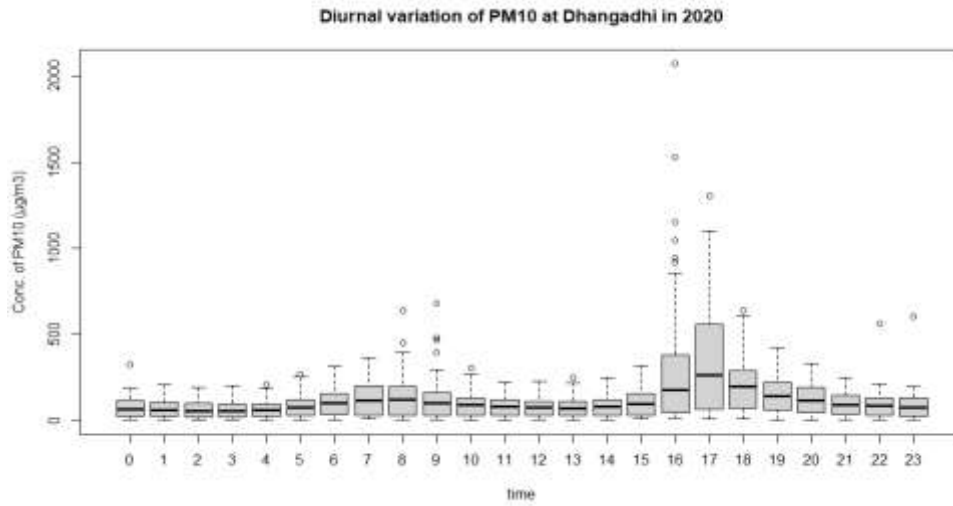


Figure 20: Diurnal Variation of PM<sub>10</sub>

### Compliance status of PM<sub>10</sub>

The total days of PM<sub>10</sub> monitored in the year 2020 counts 161 of which 77 days exceed the NAAQS guideline.

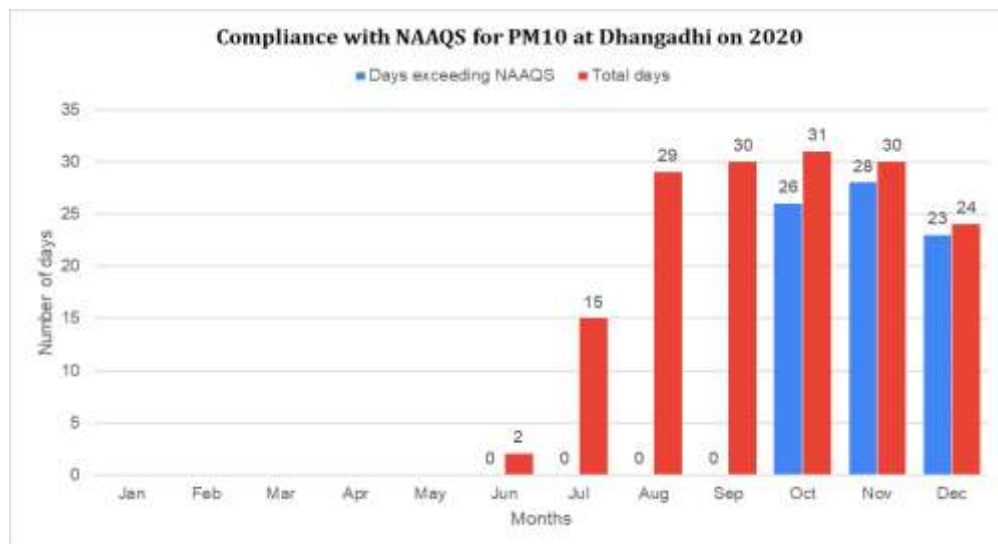


Figure 21: Compliance status of PM<sub>10</sub>

### 2.1.5 Temporal variation of TSP

#### Annual average of TSP

The annual average of TSP at Dhangadhi Station was found to be 176.07  $\mu\text{g}/\text{m}^3$ . Histogram of hourly average TSP is shown in the figure below.

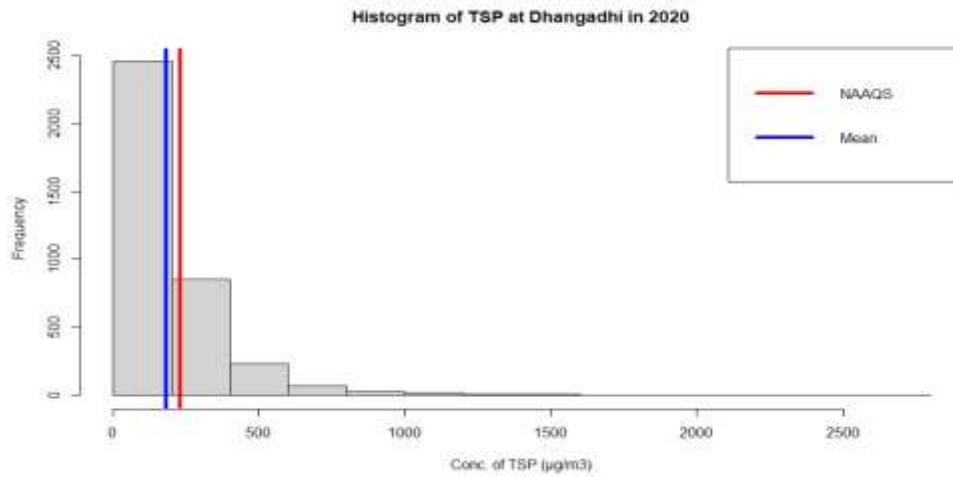


Figure 22 : Histogram of TSP.

#### Daily average of TSP

Daily average concentration of TSP was high during November and was found low during July and August.

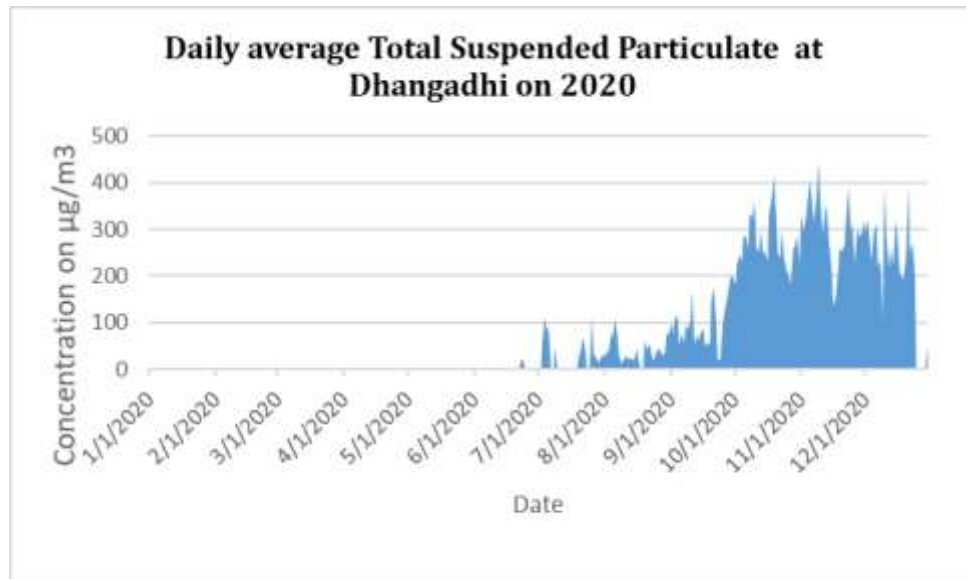


Figure 23: Daily average of TSP

## Monthly average of TSP

The highest and the lowest monthly average of TSP was found during November (300.7  $\mu\text{g}/\text{m}^3$ ) and June (21.76  $\mu\text{g}/\text{m}^3$ ) respectively.

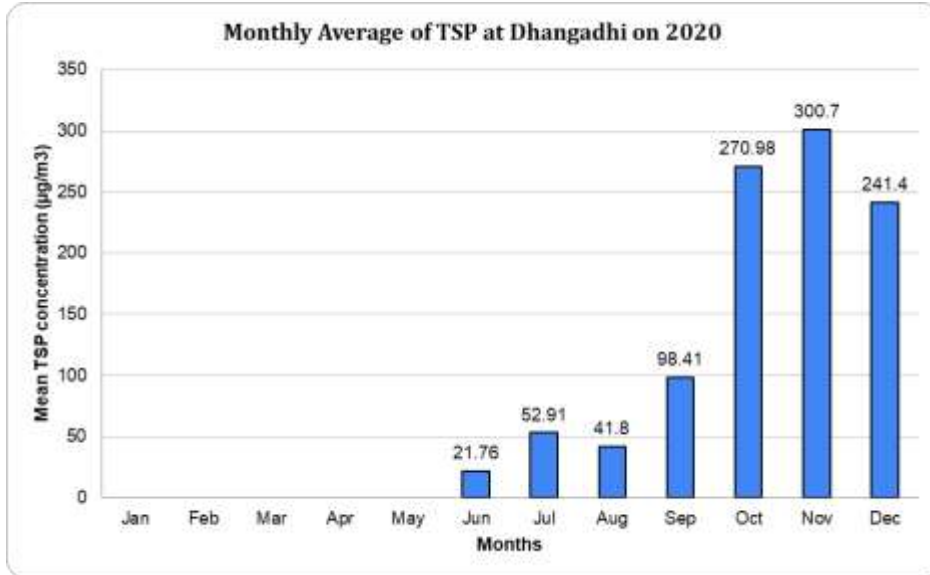


Figure 24: Monthly Average of TSP

## Monthly variation of TSP

Variation in concentration of TSP was found more during November and low during June.

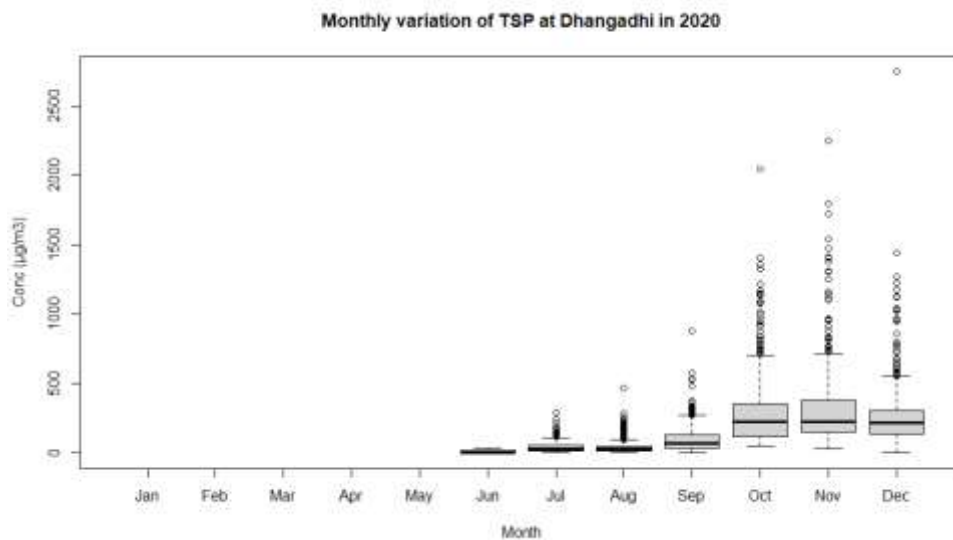


Figure 25: Monthly Variation of TSP

## Seasonal variation of TSP

Ambient concentration of average TSP with monsoon (June-September), and post-monsoon (October-November) can be shown in the figure below. The highest concentration of TSP was found in the post monsoon ( $223.36 \mu\text{g}/\text{m}^3$ ) than monsoon season ( $38.82 \mu\text{g}/\text{m}^3$ ).

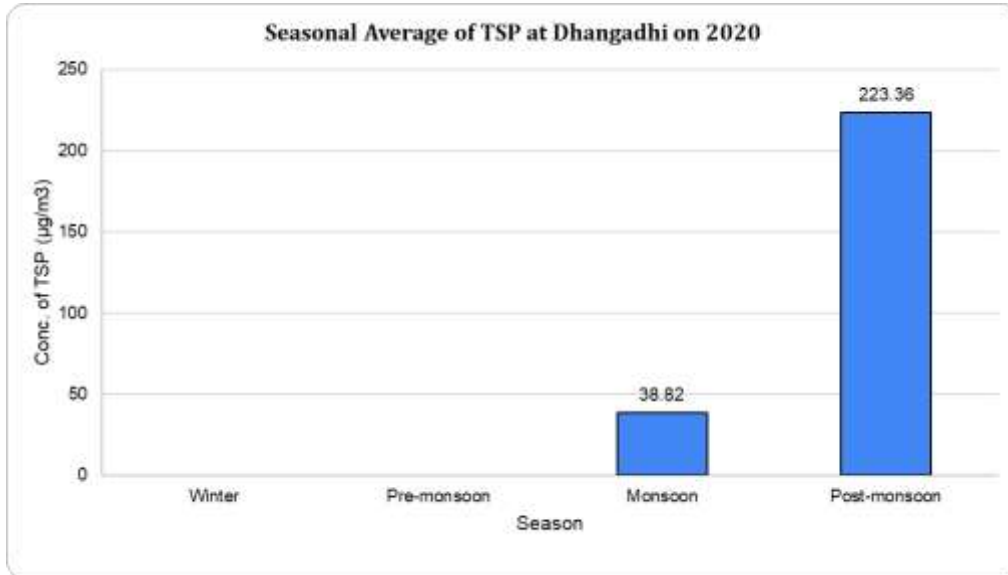


Figure 26: Seasonal Variation of TSP

### Diurnal variation of TSP

The diurnal variation of average TSP concentrations can be shown in the figure below. The variation in TSP concentration was high at around 5 pm and low at 11 pm.

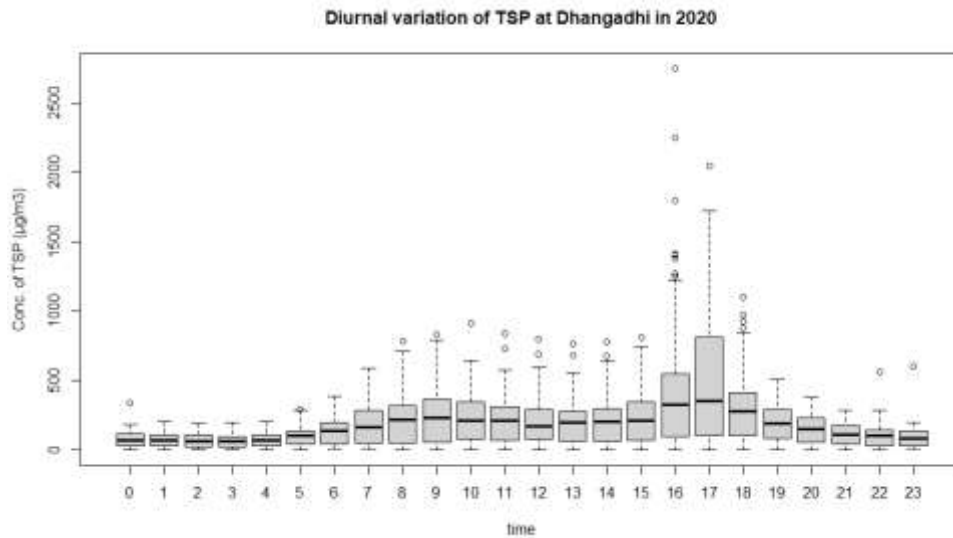


Figure 27: Diurnal Variation of TSP

## Compliance status of TSP

The total days of TSP monitored in the year 2020 counts 162 of which 66 days exceed the NAAQS guideline.

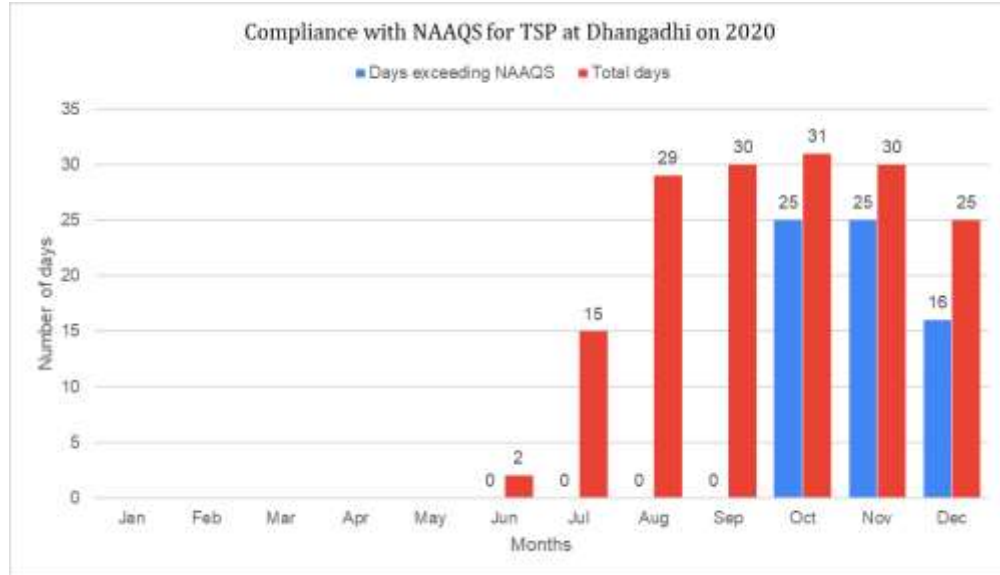


Figure 28: Compliance status of TSP

## Annex

Date	PM1	PM2.5	PM10	TSP
1/1/2020				
1/2/2020				
1/3/2020				
1/4/2020				
1/5/2020				
1/6/2020				
1/7/2020				
1/8/2020				
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6/20/2020				
6/21/2020				
6/22/2020				
6/23/2020	13.23734	17.51122		22.74294
6/24/2020	11.58058	15.02334	23.89896	20.7763
6/25/2020			19.92268	
6/26/2020				
6/27/2020				
6/28/2020				
6/29/2020				

6/30/2020				
7/1/2020				
7/2/2020				
7/3/2020	18.73767	24.66167		52.198
7/4/2020	19.5531	27.78274	36.31367	111.728
7/5/2020	17.0685	22.67638	53.63464	79.66225
7/6/2020	13.28673	19.59291	38.2112	90.9996
7/7/2020			39.31197	
7/8/2020				
7/9/2020	6.660115	8.399291		46.48683
7/10/2020			19.00178	
7/11/2020				
7/12/2020				
7/13/2020				
7/14/2020				
7/15/2020				
7/16/2020				
7/17/2020				
7/18/2020				
7/19/2020				
7/20/2020	14.19037	17.63386		30.38761
7/21/2020	12.67354	16.27991	24.69961	37.82078
7/22/2020	15.27667	20.97472	24.82917	69.38285
7/23/2020	12.87969	16.3946	36.65147	33.11843
7/24/2020			23.41368	
7/25/2020				
7/26/2020	17.8289	26.51916		117.2302
7/27/2020	17.19429	20.70274	50.49721	36.94357
7/28/2020	13.28639	15.69528	28.98798	24.59069
7/29/2020	8.567014	10.09868	20.42746	13.25312
7/30/2020	9.776875	11.82326	12.39771	18.70389
7/31/2020	13.83986	17.20972	15.71479	31.17
8/1/2020	11.95868	14.91924	23.68243	27.94431
8/2/2020	12.60222	16.10375	20.73764	36.50917
8/3/2020	17.03125	21.26931	24.21861	38.73278
8/4/2020	19.56299	26.58549	30.08864	80.18222
8/5/2020	12.07208	17.18572	44.74181	66.31494
8/6/2020	6.110556	10.54125	31.7175	109.1192
8/7/2020	7.787639	11.27125	32.32573	67.32722
8/8/2020	9.753125	11.92625	22.81382	27.45278
8/9/2020	8.248194	9.510208	17.43688	12.46694

8/10/2020	14.64792	16.85042	11.69507	21.95326
8/11/2020	15.33146	18.24819	20.64625	27.45542
8/12/2020	10.53736	13.01625	23.96278	21.78215
8/13/2020	7.606528	9.868681	18.04507	23.68743
8/14/2020	11.28958	13.7166	14.9236	23.62028
8/15/2020	7.867222	10.07688	18.64826	19.52889
8/16/2020	10.72424	14.48708	14.24806	44.7966
8/17/2020	7.204512	9.803049	23.17292	21.45215
8/18/2020			13.70067	
8/19/2020				
8/20/2020	10.29831	14.95284		64.19958
8/21/2020	7.294157	10.52923	27.77672	42.00854
8/22/2020	10.7291	14.76243	19.93971	55.74417
8/23/2020	10.17757	12.40236	25.24326	22.98472
8/24/2020	8.194653	10.18472	16.88833	20.8216
8/25/2020	9.226042	11.87528	14.48486	36.47847
8/26/2020	9.448333	12.46507	19.05319	43.45319
8/27/2020	8.565241	11.95084	21.63257	40.72763
8/28/2020	10.06764	13.32569	21.20547	28.42604
8/29/2020	9.925278	13.00035	19.44604	37.3775
8/30/2020	20.2809	24.99396	20.84965	71.81361
8/31/2020	17.8491	22.25854	37.75569	77.87069
9/1/2020	24.94382	30.71576	37.30708	98.68688
9/2/2020	18.44437	23.90271	49.99695	75.08
9/3/2020	17.3991	23.95431	39.77736	115.8785
9/4/2020	17.83674	24.06861	47.80549	106.9095
9/5/2020	17.07097	20.42569	46.80257	50.15076
9/6/2020	24.63493	29.75875	30.68389	78.41972
9/7/2020	20.36792	24.15347	46.83382	54.63667
9/8/2020	25.58667	31.17611	35.17222	94.21632
9/9/2020	21.62229	26.99646	50.94431	86.63076
9/10/2020	20.80556	27.06979	44.18931	107.8506
9/11/2020	23.36403	31.36222	50.0221	170.3623
9/12/2020	17.59194	21.52681	70.01715	52.03174
9/13/2020	23.54569	29.01243	32.56083	75.25326
9/14/2020	26.28646	31.36354	45.73891	61.75743
9/15/2020	24.9075	30.92576	44.54771	81.67743
9/16/2020	32.89806	39.67778	48.31563	87.46812
9/17/2020	20.07993	23.86701	57.91771	48.03535
9/18/2020	22.44812	27.20889	33.94418	58.46424
9/19/2020	22.05399	26.8398	39.7409	53.88951

9/20/2020	25.47676	34.0201	37.98627	145.6589
9/21/2020	14.31775	22.95391	65.25175	177.1283
9/22/2020	7.394448	11.99011	72.92829	93.63047
9/23/2020	3.904574	5.980664	30.16116	22.04496
9/24/2020	5.370278	7.446806	10.32603	20.20486
9/25/2020	23.68056	29.9984	11.35263	96.70535
9/26/2020	30.82646	38.98299	49.91722	115.2654
9/27/2020	38.29958	50.45014	66.50521	146.1938
9/28/2020	41.15896	57.33611	85.78176	180.5193
9/29/2020	39.66993	57.18917	102.019	200.779
9/30/2020	41.75917	59.77396	110.3373	196.7755
10/1/2020	37.77062	52.75361	109.6299	182.4424
10/2/2020	37.86451	55.30222	97.43903	222.2095
10/3/2020	36.83743	56.1875	116.8719	245.7908
10/4/2020	38.08833	54.70535	132.9082	231.9358
10/5/2020	42.28826	61.59201	110.9384	283.0242
10/6/2020	40.31958	63.81243	142.6253	286.5601
10/7/2020	41.06033	58.22338	141.561	257.9792
10/8/2020	54.83139	77.26181	129.598	335.1029
10/9/2020	48.30278	70.41667	156.6112	325.2464
10/10/2020	46.4184	70.42924	164.8892	358.6113
10/11/2020	46.32993	64.86653	174.8434	264.1063
10/12/2020	44.70344	61.812	138.5138	250.5053
10/13/2020	39.47507	60.54555	131.6338	297.141
10/14/2020	37.28632	58.48049	146.4542	252.2517
10/15/2020	39.19381	60.70818	127.2919	249.7731
10/16/2020	46.04569	61.57125	135.4357	232.342
10/17/2020	58.62486	76.94264	118.7655	329.6665
10/18/2020	69.24694	95.81097	166.1726	362.257
10/19/2020	72.66618	101.5358	196.9627	415.8318
10/20/2020	65.00868	89.75354	220.2469	362.3795
10/21/2020	54.57576	72.63812	202.3698	247.8991
10/22/2020	54.88313	73.45771	148.4398	239.9608
10/23/2020	62.17562	86.8334	147.7958	300.0406
10/24/2020	70.61056	87.06965	174.3084	237.2838
10/25/2020	71.43799	87.60528	145.5287	209.7606
10/26/2020	59.96757	75.00708	148.8345	206.2541
10/27/2020	54.12104	68.05653	135.7825	182.1527
10/28/2020	53.75014	75.76604	115.8565	261.8853
10/29/2020	49.99375	71.70889	157.9771	257.8959
10/30/2020	48.42174	70.4891	151.8142	287.0618

10/31/2020	66.01396	83.63215	159.9615	224.977
11/1/2020	87.79618	115.6684	136.9712	330.2328
11/2/2020	105.4925	126.5859	203.1738	296.5728
11/3/2020	127.9986	153.4534	209.3531	323.9124
11/4/2020	127.0066	153.5065	228.2701	354.0264
11/5/2020	124.1087	158.2403	229.6963	408.3856
11/6/2020	100.5224	124.3532	245.8161	343.2478
11/7/2020	94.72451	114.6196	194.6365	317.8888
11/8/2020	102.829	131.3837	187.718	365.7387
11/9/2020	85.71576	124.4272	223.619	445.9511
11/10/2020	68.64938	100.7301	259.8839	365.1911
11/11/2020	67.21243	90.71924	225.0783	287.9003
11/12/2020	71.60639	101.8387	181.4342	342.1569
11/13/2020	93.29917	123.8535	212.843	353.5237
11/14/2020	100.1273	119.7374	209.0513	266.888
11/15/2020	67.0475	78.75944	184.2356	215.7848
11/16/2020	30.17181	36.84639	127.0023	136.0165
11/17/2020	46.1884	54.39299	63.17222	152.8156
11/18/2020	79.66944	95.18778	86.46625	208.3347
11/19/2020	71.08736	86.96153	140.602	258.0075
11/20/2020	88.56889	111.6344	151.9391	254.7506
11/21/2020	120.181	140.3443	176.0049	263.4865
11/22/2020	123.8185	148.4847	197.0191	307.1307
11/23/2020	110.5607	145.9183	209.9601	392.171
11/24/2020	103.1978	126.7457	248.7582	294.3398
11/25/2020	101.8334	127.584	190.9856	312.739
11/26/2020	75.97847	90.45018	206.169	225.1735
11/27/2020	98.80805	134.4534	137.1353	302.1257
11/28/2020	96.03833	123.102	218.9032	287.912
11/29/2020	107.8244	129.2915	199.8422	287.7707
11/30/2020	109.234	139.7185	198.1556	320.6832
12/1/2020	88.23264	115.0986	210.0837	291.5558
12/2/2020	84.8607	116.3512	187.4129	321.6269
12/3/2020	86.69458	111.1515	210.1081	266.5827
12/4/2020	83.19931	99.87317	173.021	231.6254
12/5/2020	92.26715	116.7684	153.566	294.1532
12/6/2020	94.61236	121.5566	198.5429	314.0656
12/7/2020	93.42847	109.776	204.5524	218.5688
12/8/2020	140.1858	160.5807	151.9702	237.0724
12/9/2020	107.4144	109.8863	199.7979	113.4533
12/10/2020	156.1539	237.8875	111.6492	390.7759

12/11/2020	151.8313	192.0894	303.1113	273.5638
12/12/2020	109.9418	124.5806	218.9071	215.3208
12/13/2020	80.43814	94.22871	147.1185	260.6836
12/14/2020	102.0697	119.4781	138.7448	219.9351
12/15/2020	149.707	182.5835	147.1868	316.9119
12/16/2020	144.9377	163.7319	223.214	301.8441
12/17/2020	147.1019	160.8317	208.2663	208.8299
12/18/2020	144.8188	161.5278	175.1083	194.7902
12/19/2020	114.7992	124.2701	169.6887	192.8003
12/20/2020	147.6884	169.0021	136.3158	240.3648
12/21/2020	169.6748	205.6737	213.7708	393.4688
12/22/2020	132.0306	152.4228	322.9057	252.0857
12/23/2020	131.2806	154.3214	203.701	269.0234
12/24/2020	103.5186	108.9899	218.3996	201.3834
12/25/2020			135.8045	
12/26/2020				
12/27/2020				
12/28/2020				
12/29/2020				
12/30/2020				55.85
12/31/2020				