



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

# Air quality status of Nepal 2016-2020

Volume XVI

Simara air quality monitoring station



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## 1. Simara Air Quality Monitoring Station

- Address : Simara, Bara (ward no.)
- Location: 27.156708 latitude, 84.997761 longitude
- Surrounding of the station
  - East: Green field
  - North: Green field
  - South: Green field
  - West: Green field
- Establish year: 2018 (2074)
- Brief introduction of the instruments installed in the station (should include-brief specification; number of instrument)
  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 Simara station (2017-2020)

### 2.1. Air quality status, 2018

#### 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 of the Simara monitoring station for 2018 could not be calculated due to the availability of Data was calculated.

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

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

Histogram of hourly average PM<sub>1</sub> is shown in the figure below.

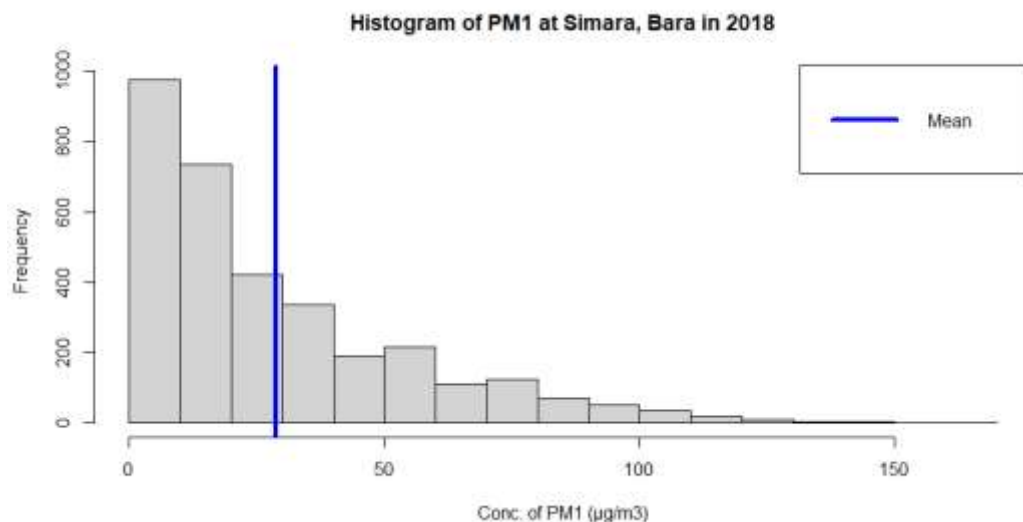


Figure 1: Histogram for the ambient concentration of PM<sub>1</sub>

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



Daily average concentration of PM<sub>1</sub> was found to be high during December and low during July.

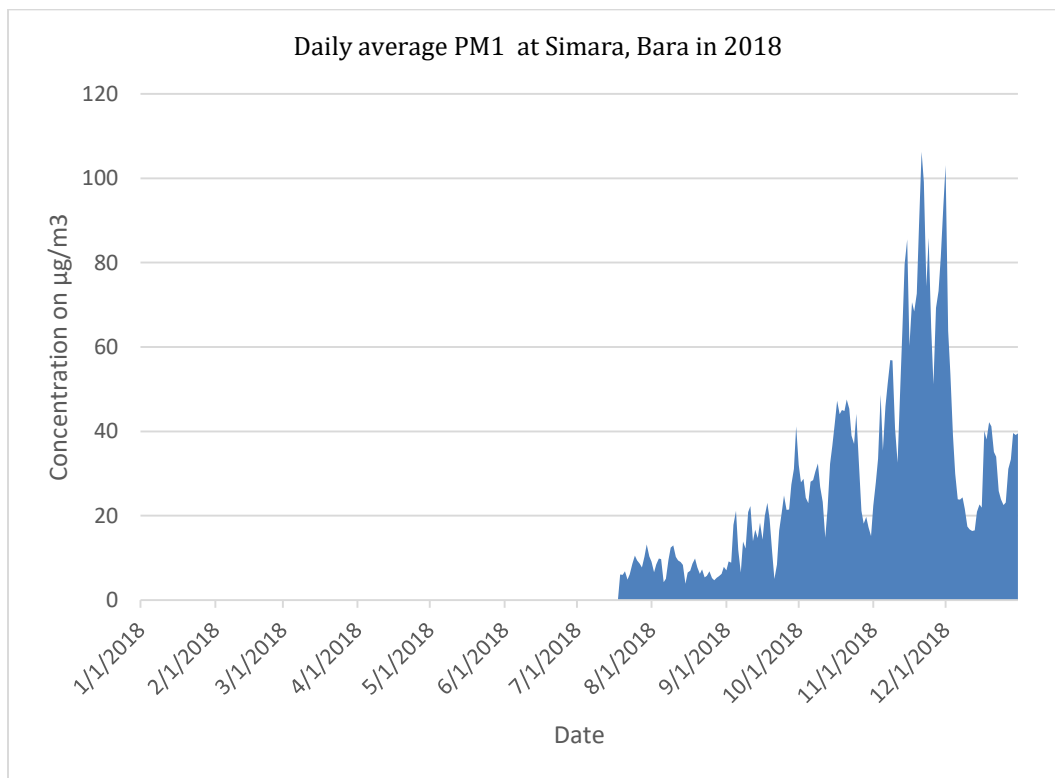


Figure 2: Daily average of PM<sub>1</sub> in 2018

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

The highest and the lowest concentration of PM<sub>1</sub> was found during November (62.95 µg/m<sup>3</sup>) and August (7.6 µg/m<sup>3</sup>) respectively from the available data.

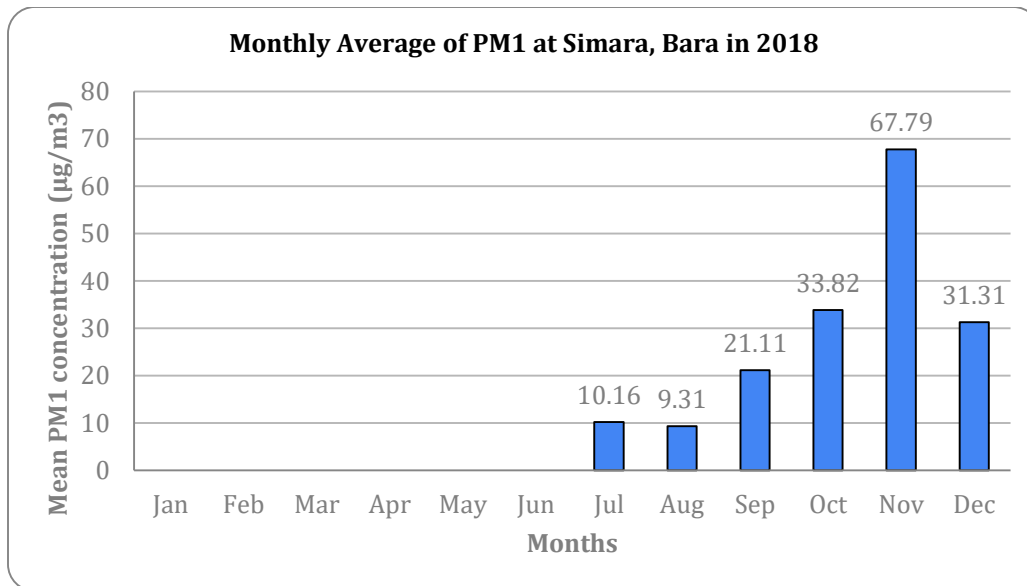


Figure 3: Monthly average of PM<sub>1</sub> in 2018

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

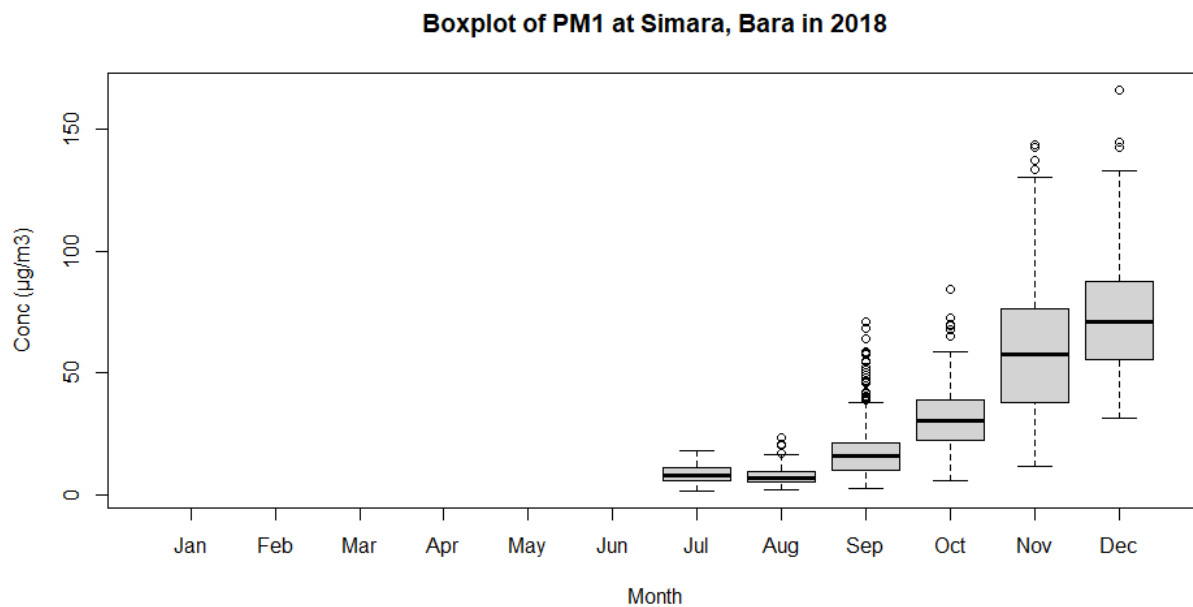


Figure 4: Monthly Variation of PM<sub>1</sub> in 2018

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

Ambient concentration of average PM<sub>1</sub> only for post-monsoon (October-November) can be shown in the figure below.

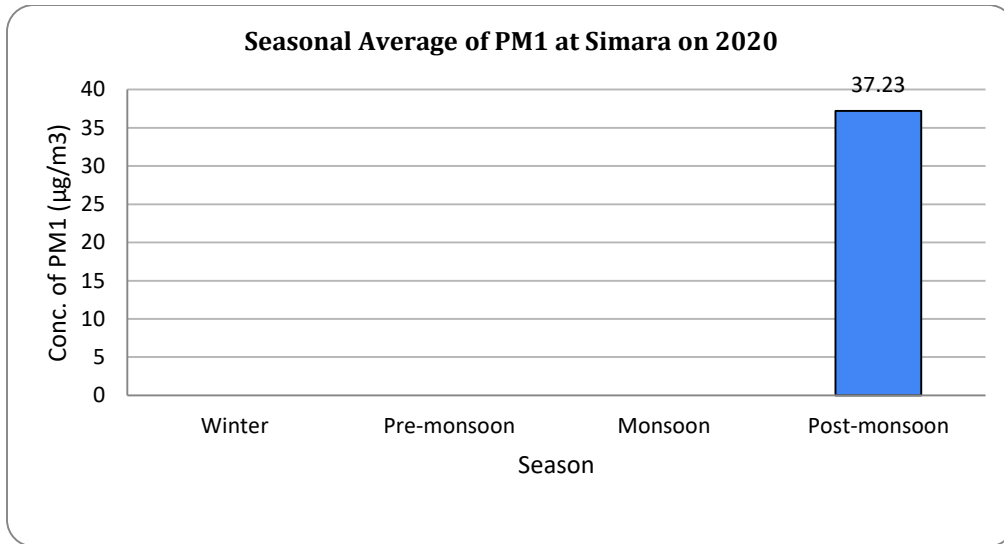


Figure 5: Seasonal variation of PM<sub>1</sub> in 2018

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

The diurnal variation of average PM<sub>1</sub> concentration can be shown in the figure 5. The variation in PM<sub>1</sub> concentration was higher around 5 pm and lower around 10 am.

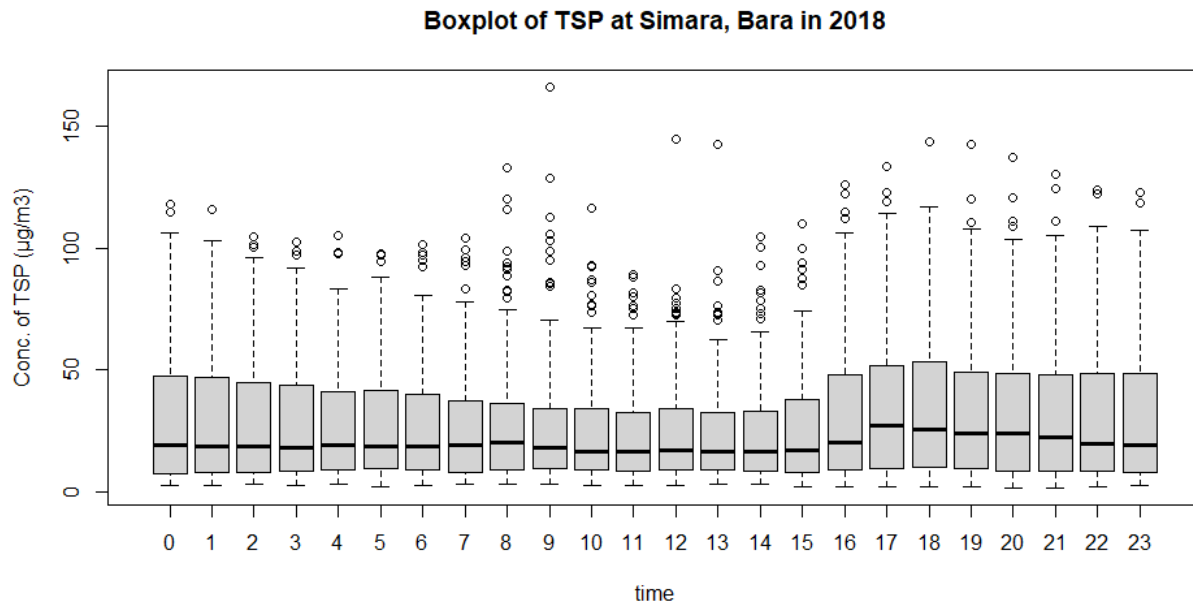


Figure 6: Diurnal variation of average PM<sub>1</sub> concentration

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

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

Most of the data for PM<sub>2.5</sub> was found to be less than the NAAQS.

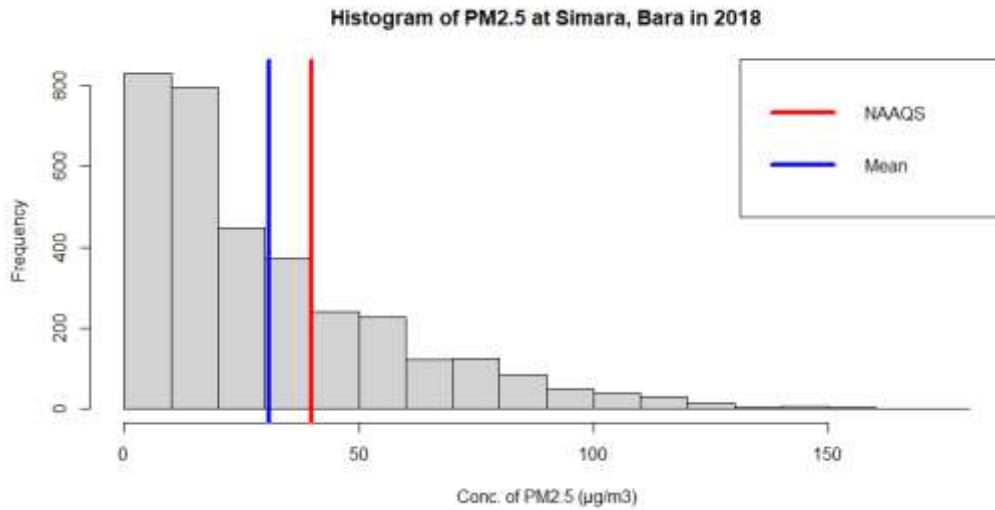


Figure 7: Histogram of PM<sub>2.5</sub>

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

Daily average concentration of PM<sub>2.5</sub> was higher during November according to the available data .

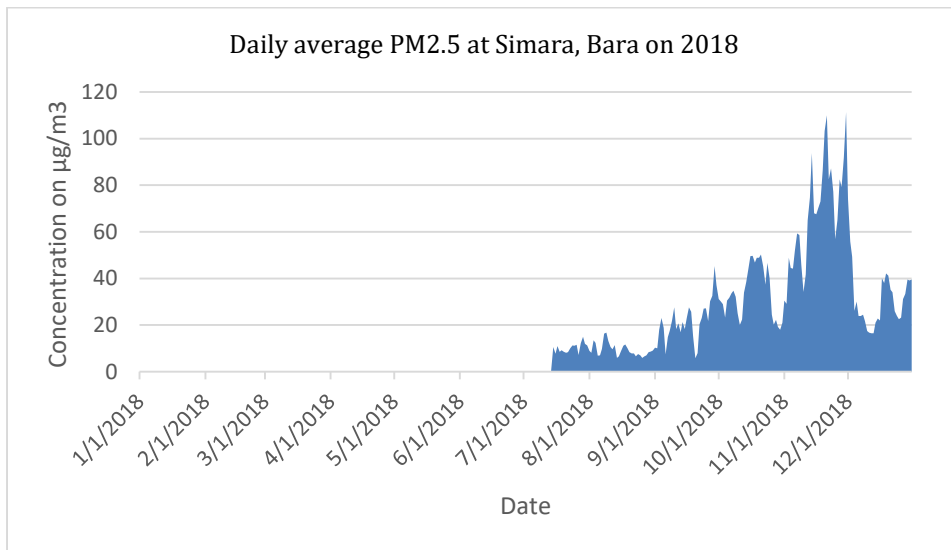


Figure 8: Daily average of PM<sub>2.5</sub>

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

The highest and the lowest concentration of PM<sub>2.5</sub> was found during November and August respectively. The mean value for those months were found to be 67.79 and 9.31 µg/m<sup>3</sup> respectively.

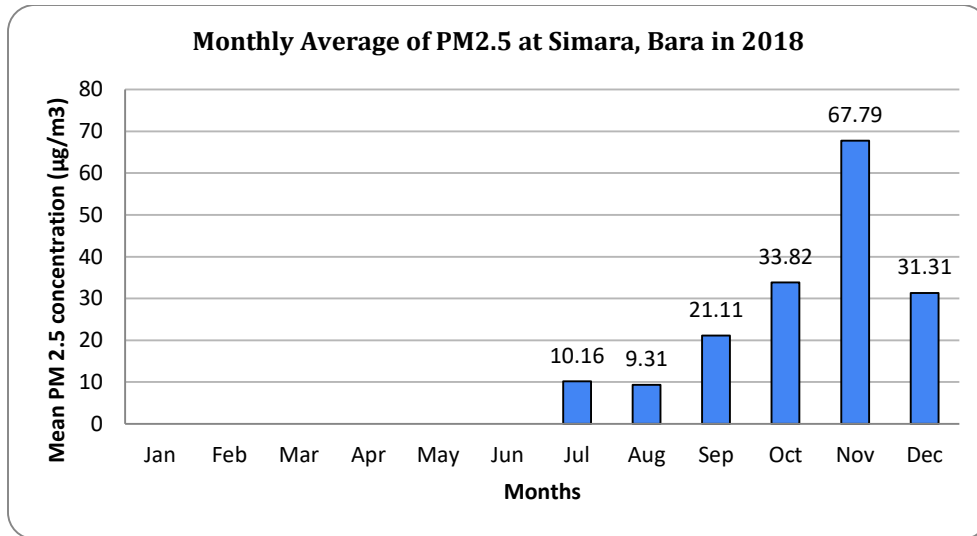


Figure 9: Monthly Average of PM<sub>2.5</sub>

Variation in concentration of PM<sub>2.5</sub> was found more during November whereas low during July based on the available data. The mean value of PM<sub>2.5</sub> was found the highest in during November and the lowest during July.

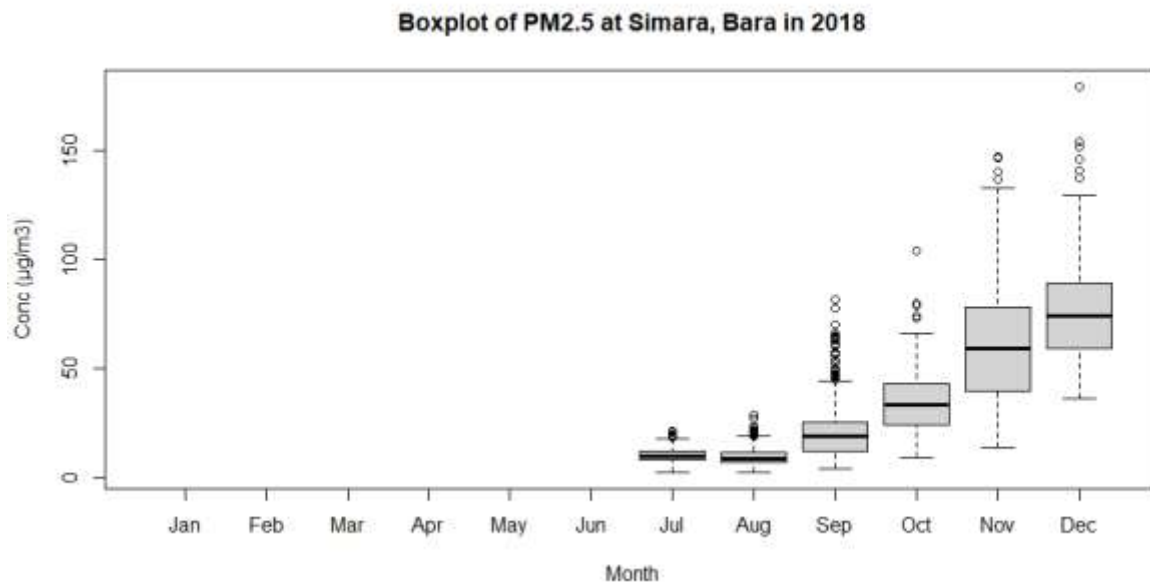


Figure 10: Monthly Variation of PM<sub>2.5</sub>

Diurnal variation of average PM<sub>2.5</sub> concentration

The diurnal variation of average PM<sub>2.5</sub> concentrations can be shown in the **Error! Reference source not found.**2 below. The variation in PM<sub>2.5</sub> concentration was high at around 5 to 6 pm and low at 8 to 9 am. Additionally, mean concentration of PM<sub>2.5</sub> was high and low at 4 pm and 11 am respectively.

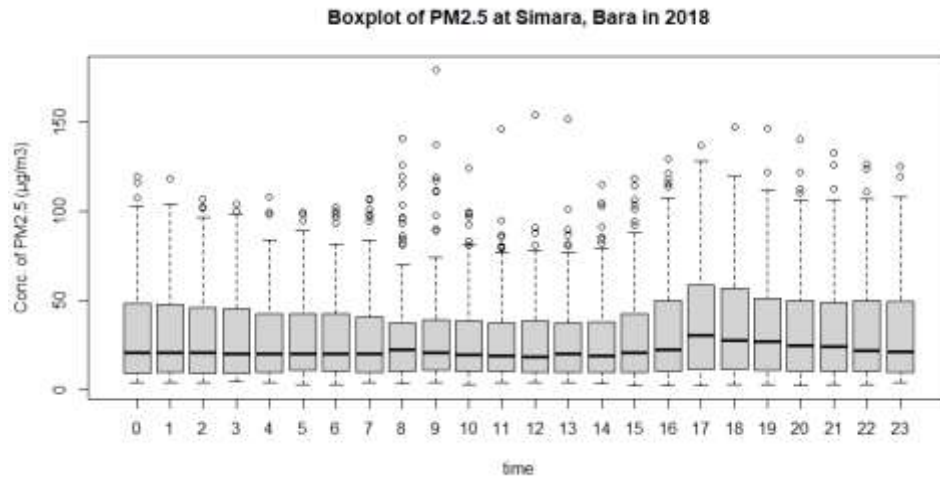


Figure 11: Diurnal variation of PM<sub>2.5</sub>

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

The total days of PM<sub>2.5</sub> monitored in the year 2018 counts 170, of which 44 days exceed the NAAQS guideline. November and December were the months having maximum number of days exceeding the NAAQS guideline. From June to August, none of the days exceeded NAAQS guideline value as shown in

Figure 12: Compliance status of PM<sub>2.5</sub>

Figure 12: Compliance status of PM<sub>2.5</sub>

### 2.1.4. For PM<sub>10</sub>

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

Most of the data for PM<sub>10</sub> was found to be less than the NAAQS.

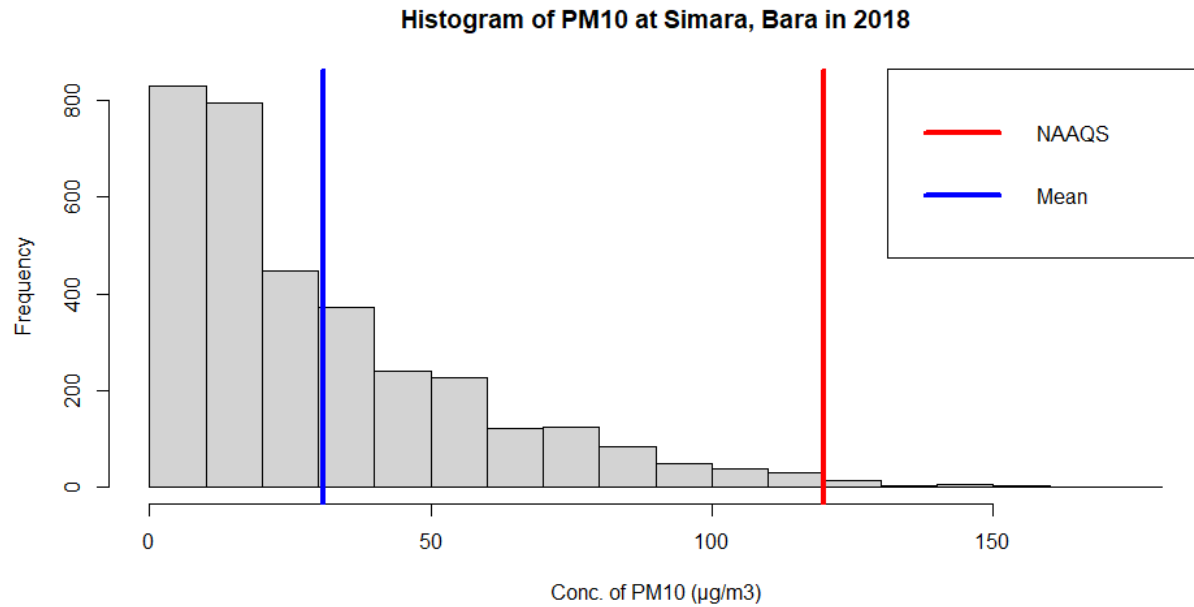


Figure 13: Histogram for the ambient concentration of PM<sub>10</sub>.

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 August and September based on the available data.

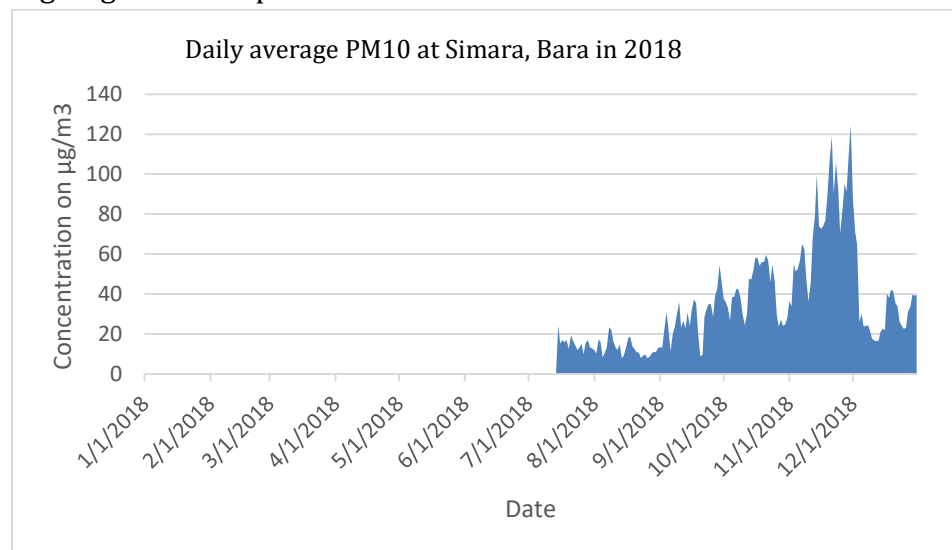


Figure 14: Daily average of PM<sub>10</sub>

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

The highest and the lowest concentration of PM<sub>10</sub> was found during November and August respectively. The mean value for those months were found to be 75.49 and 12.62 µg/m<sup>3</sup> respectively.

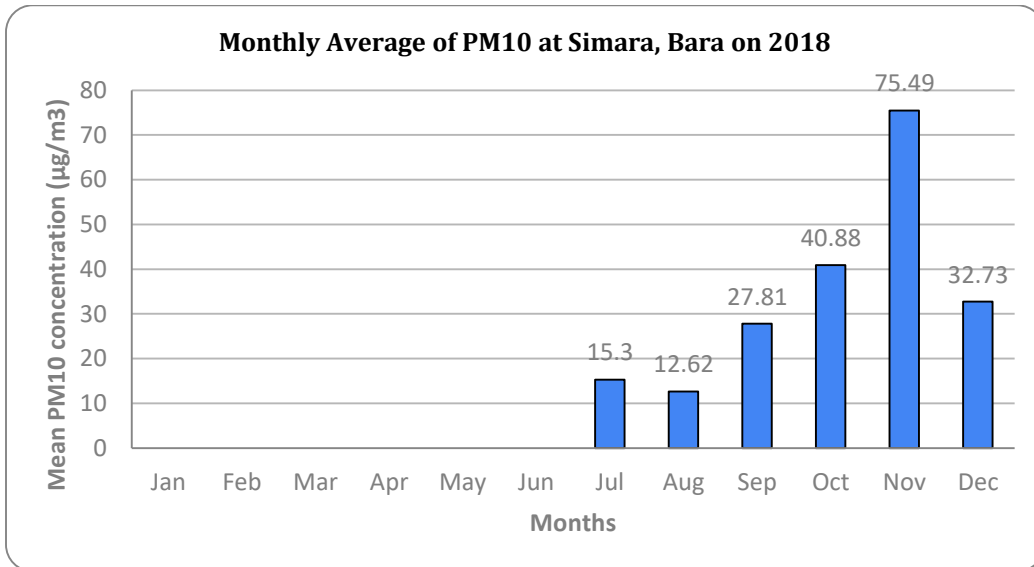


Figure 15: Monthly average of PM<sub>10</sub>

Variation in concentration of PM<sub>10</sub> was found more during November and low during August. The mean value of PM<sub>10</sub> was found the highest in February and the lowest in August.

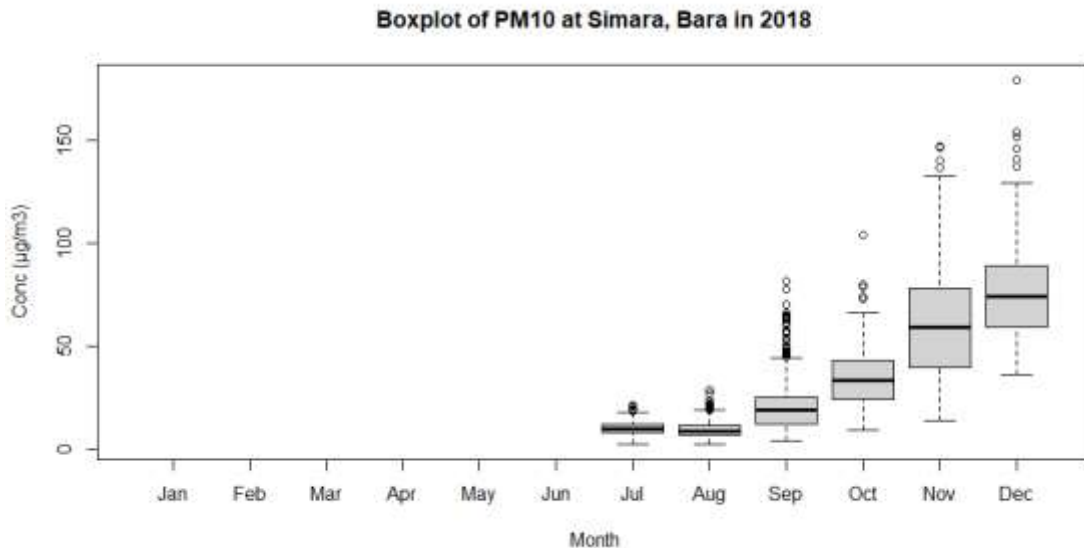


Figure 16: Monthly Variation of PM<sub>10</sub>

Seasonal variation of average PM<sub>10</sub> concentration:

Ambient concentration of average PM<sub>10</sub> was available only for post-monsoon (October-November) shown in the figure below .



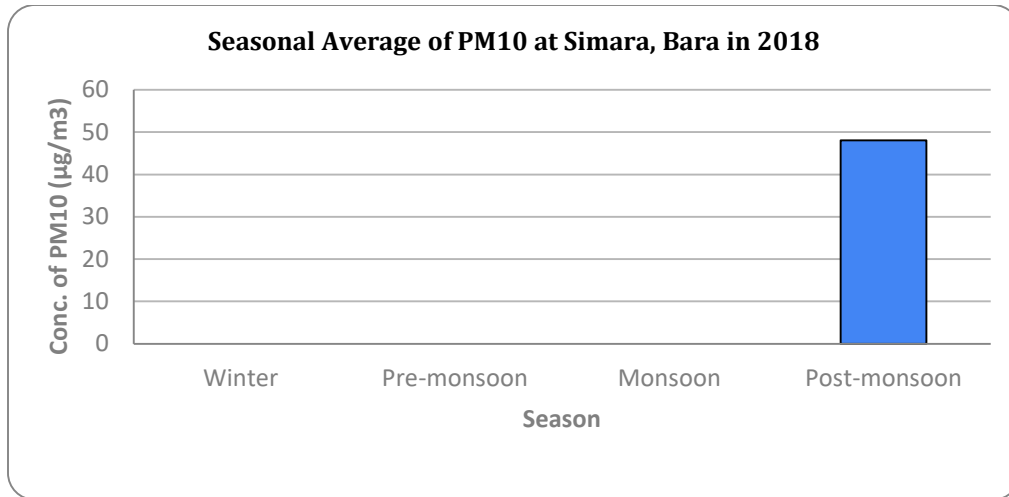


Figure 17: Seasonal variation of PM<sub>10</sub>.

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

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 8 am. Additionally, mean concentration of PM<sub>10</sub> was high and low around 5 pm and 4 am respectively.

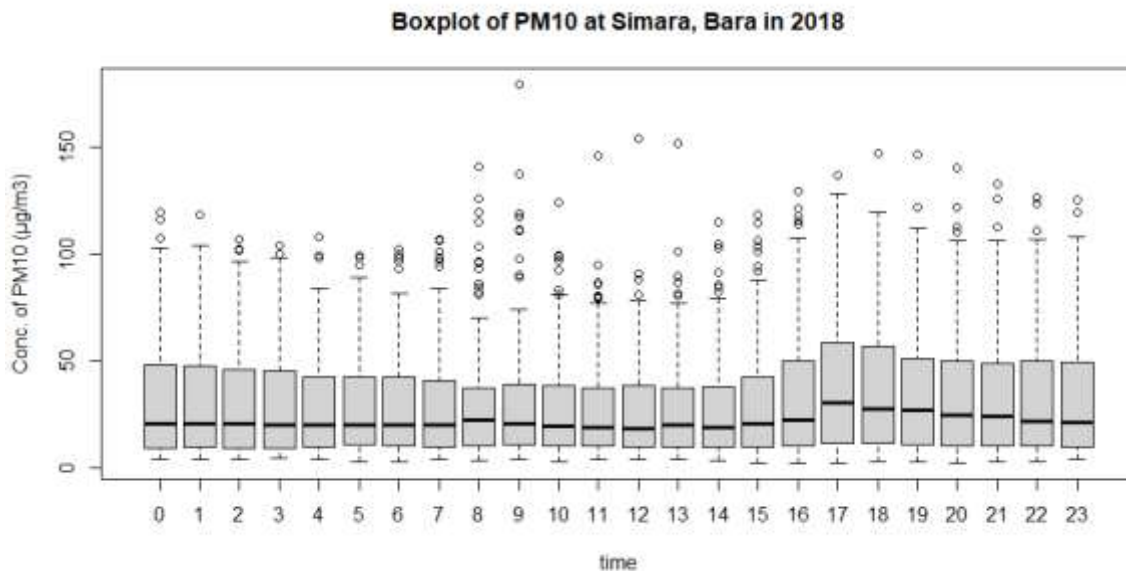


Figure 18: Diurnal variation of PM<sub>10</sub> concentration

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

The total days of PM<sub>10</sub> monitored in the year 2018 counts 170 of which 51 days exceed the NAAQS guideline. November months have maximum number of days exceeding the NAAQS

guideline as shown in

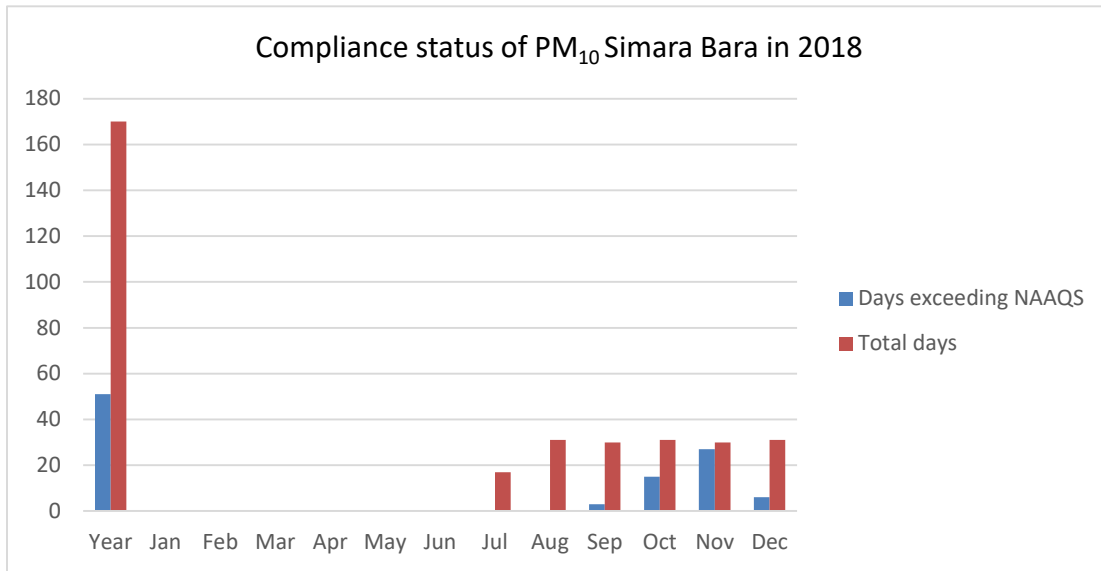


Figure 19: Compliance status of PM10

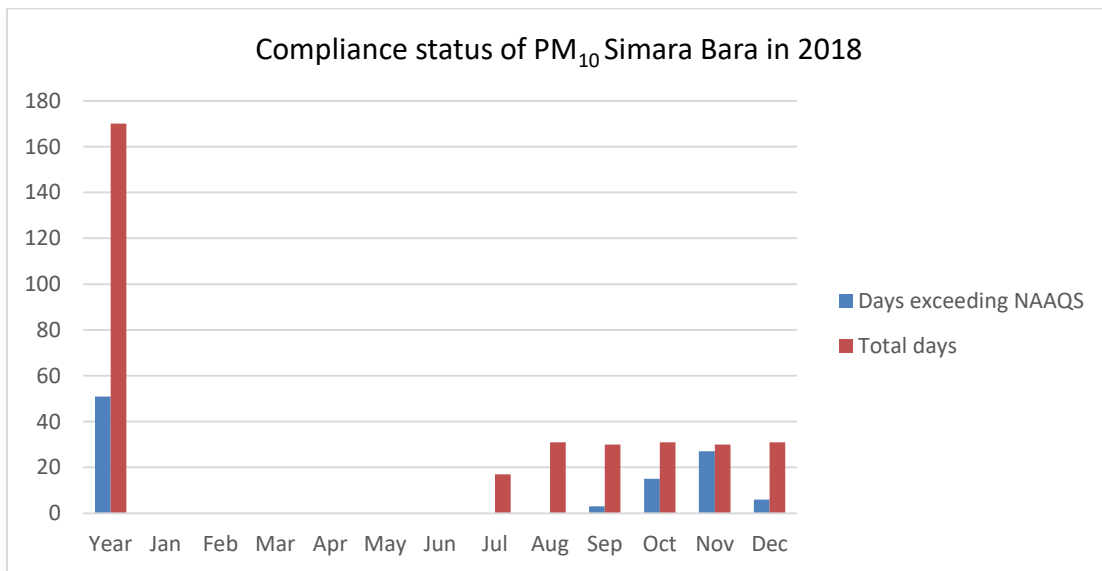


Figure 19: Compliance status of PM10

### 2.1.5. Temporal variation of TSP

Annual average of TSP

Most of the data for TSP was found to be less than the NAAQS.

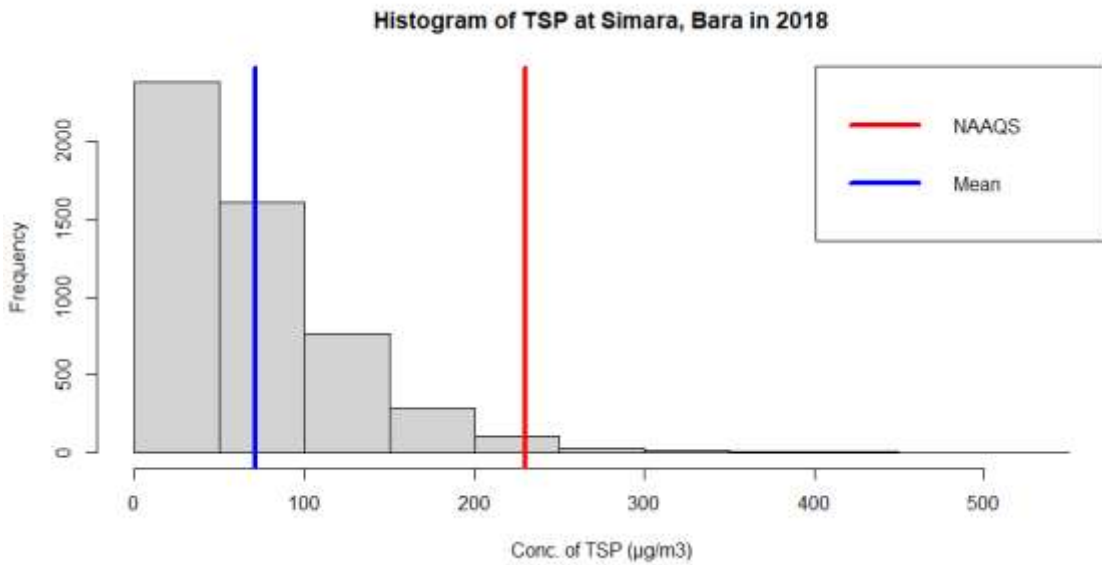


Figure 20: Histogram for the ambient concentration of TSP

**Daily average of TSP:**

Daily average concentration of TSP was high during December and was found low during September according to the available data.

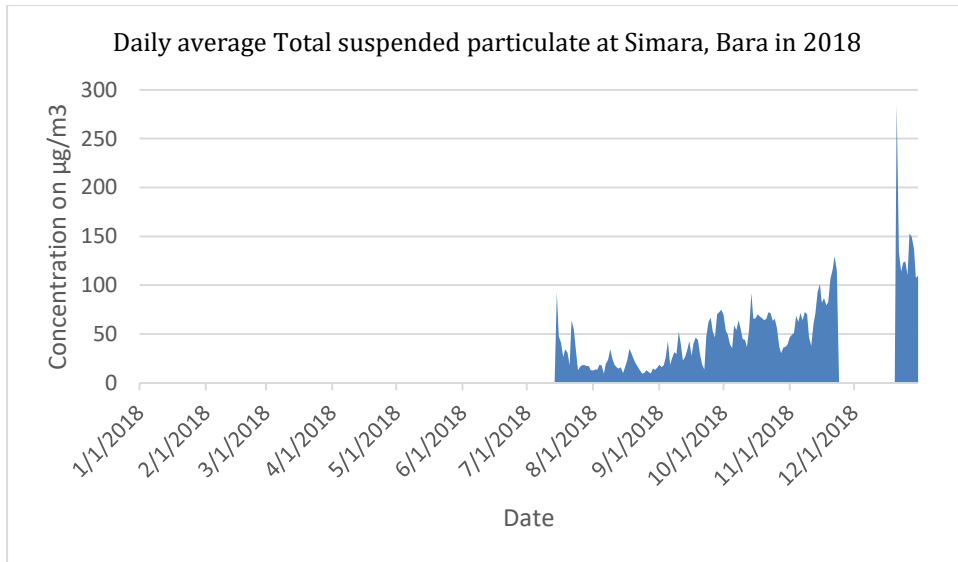


Figure 21: Daily average of TSP

**Monthly average of TSP**

Based on the available data, the highest and the lowest concentration of TSP was found during December and August respectively. The mean value for those months were found to

be 140.62 and 17.36  $\mu\text{g}/\text{m}^3$  respectively (

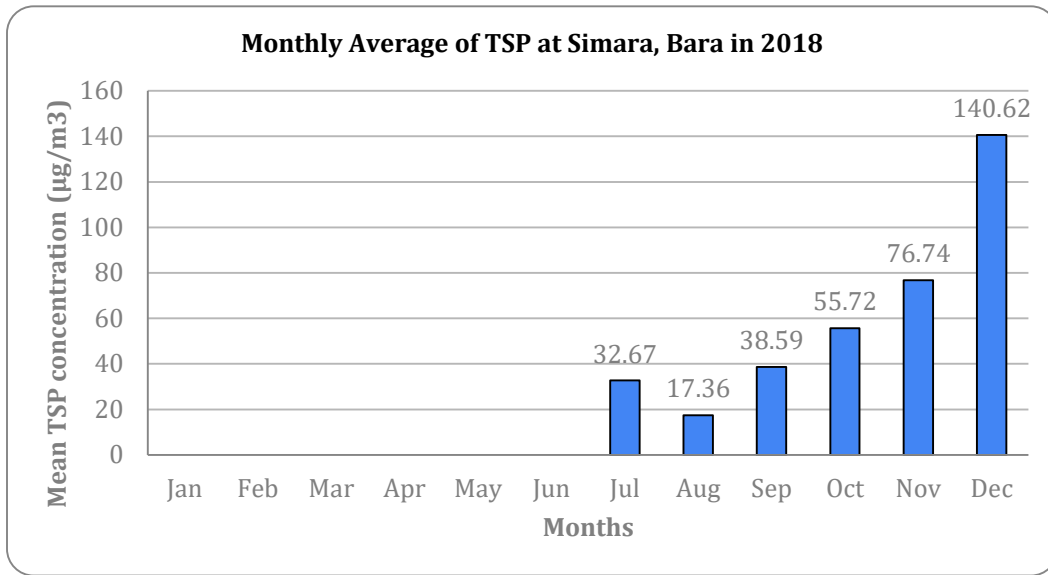


Figure 22: Monthly Average of TSP

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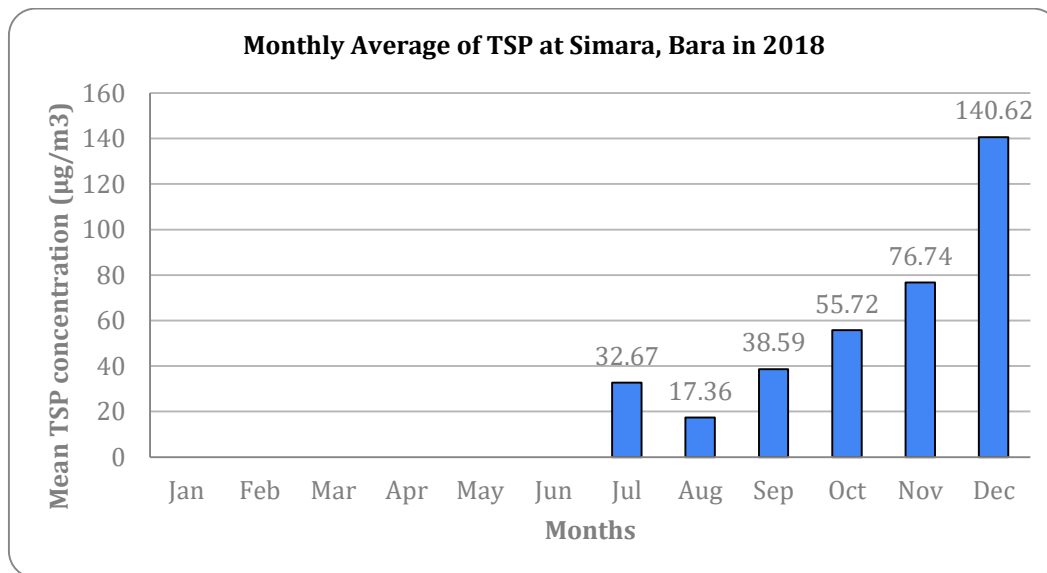


Figure 22: Monthly Average of TSP

Variation in concentration of TSP was found more during December and low during August. The mean value of TSP was found the highest in December and the lowest in August (Figure below).

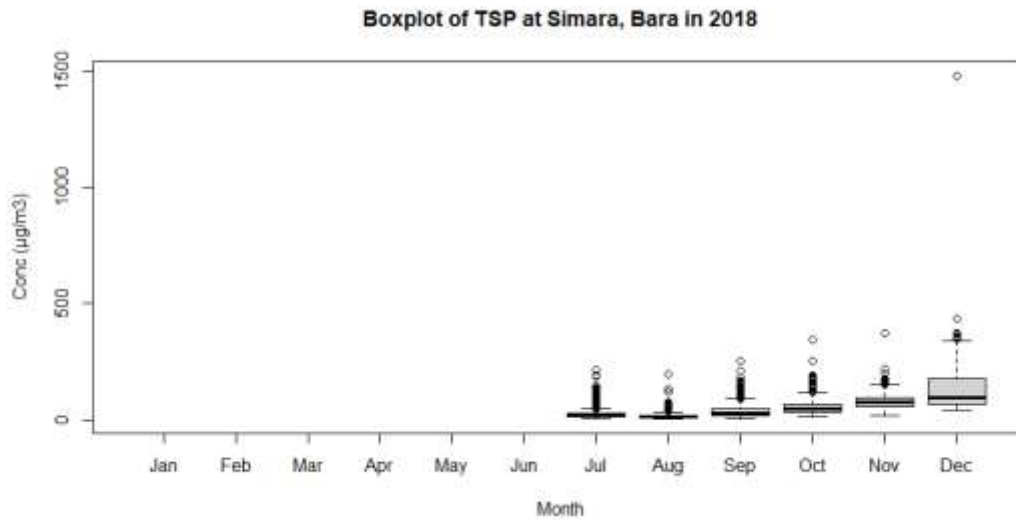


Figure 23: Monthly variation of TSP.

Diurnal variation of average TSP concentration

The diurnal variation of average TSP concentrations can be shown in the **Error! Reference source not found.** below. The variation in TSP concentration was high at around 1 pm and low at 12 am. Additionally, mean concentration of TSP was high and low at 2 pm and 2 am respectively.

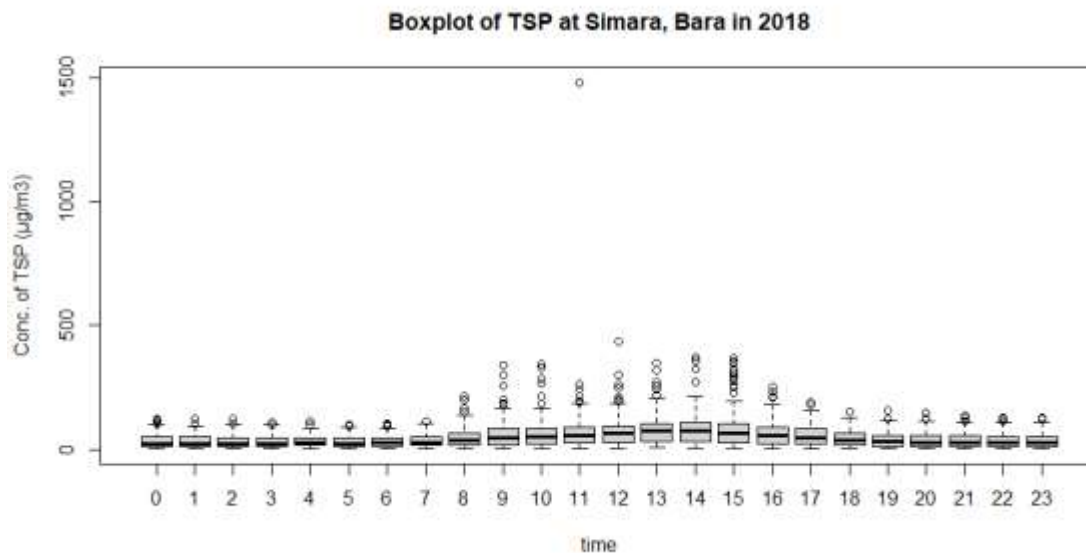


Figure 24: Diurnal Variation of TSP

Compliance status of TSP

The total days of TSP monitored in the year 2018 counts 143 of which none of the days exceed the NAAQS guideline.

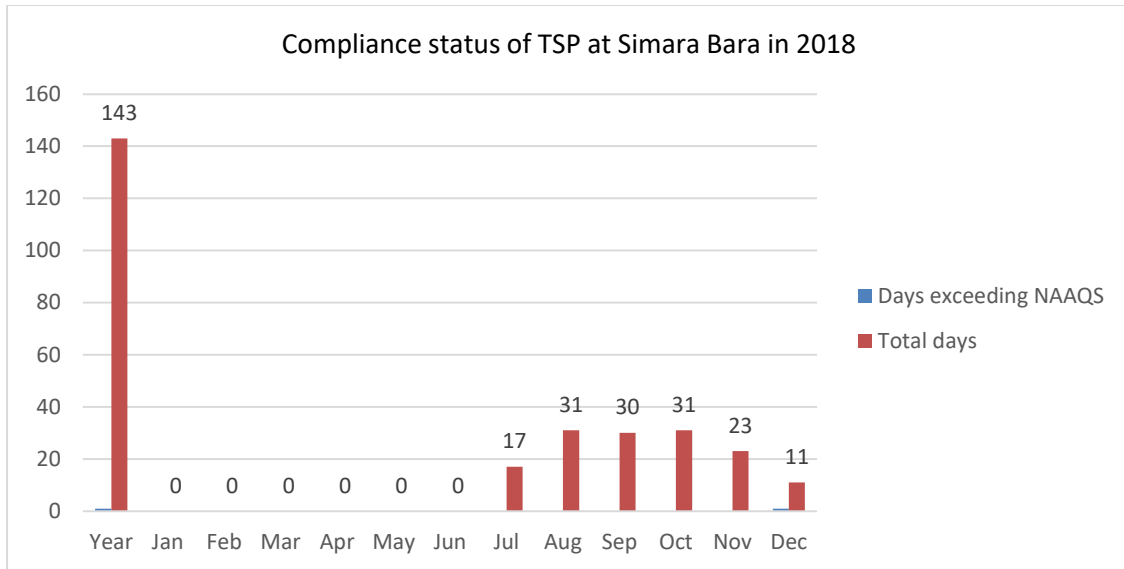


Figure 25: Compliance status of TSP

2.2. Air quality status, 2019

2.2.1. Annual average of PM1, PM2.5, PM10 and TSP

The annual average of PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> and TSP for the Simara station was calculated as shown in figure below.

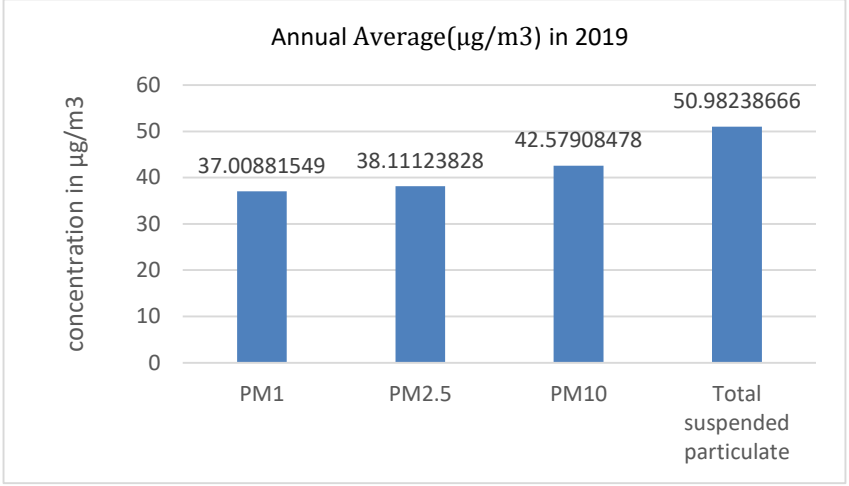


Figure 26: Annual Average(µg/m3) in 2019

2.2.2. Temporal variation of PM1

Annual average of PM1

The annual average of PM<sub>1</sub> at Simara station was found to be 37.00 µg/m<sup>3</sup> in 2019. Histogram of hourly average PM<sub>1</sub> is shown in the figure below.

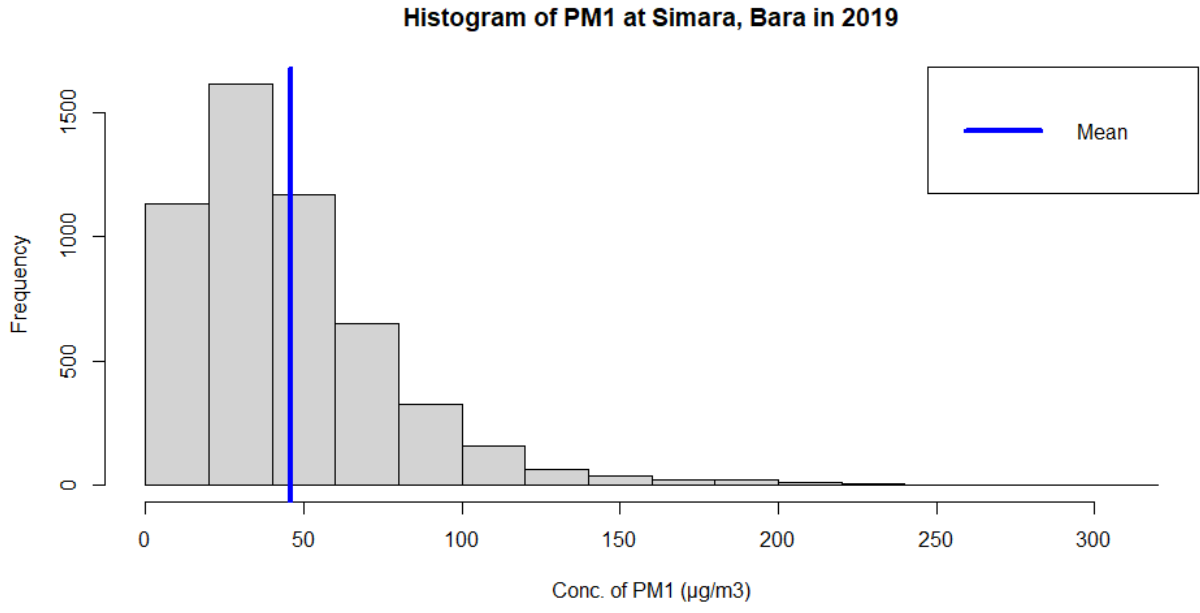


Figure 27 : Histogram for the ambient concentration of PM1

Daily average of PM1

Daily average concentration of PM<sub>1</sub> was found to be low during September and October .

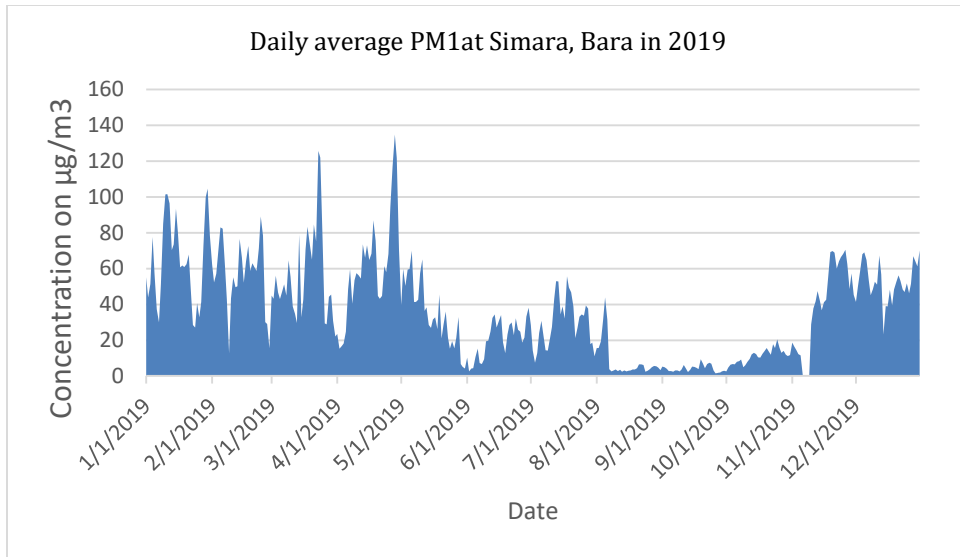


Figure 28: Daily average of PM<sub>1</sub> in 2019

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

The highest and the lowest concentration of PM<sub>1</sub> was found during January (64.36 µg/m<sup>3</sup>) and September (4.15 µg/m<sup>3</sup>) respectively (Figure below) from the available data.

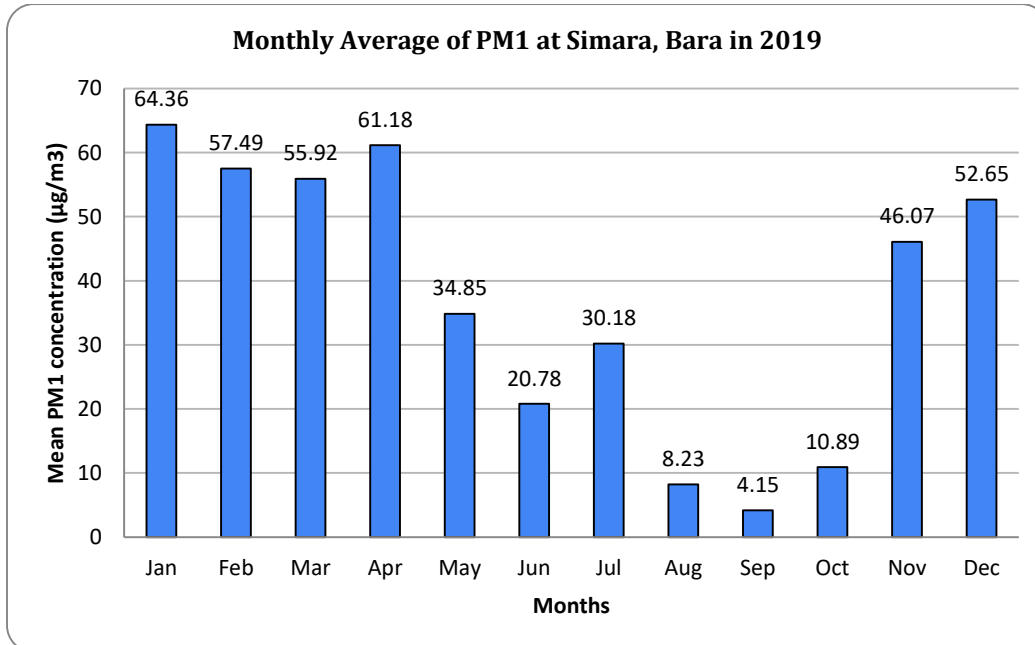


Figure 29: Monthly average of PM<sub>1</sub> in 2019

Variation in concentration of PM<sub>1</sub> was found more during May whereas low during August (Error! Reference source not found.).



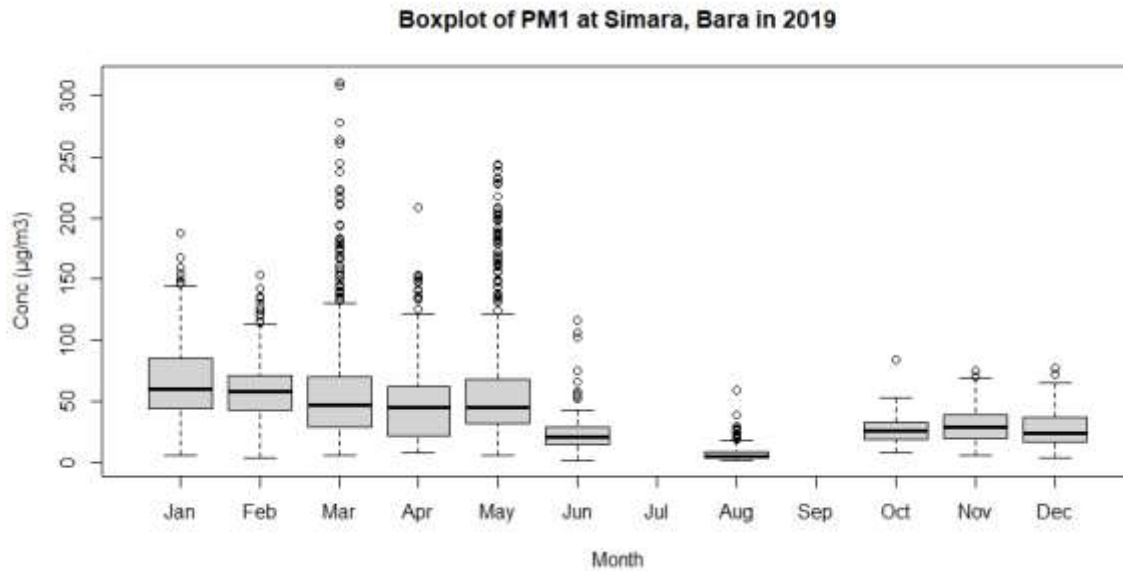


Figure 30: Monthly Variation of PM<sub>1</sub> in 2019

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

Ambient concentration of average PM<sub>1</sub> during Premonsoon (March-May), monsoon (June-September), and post-monsoon (October-November), winter (Dec-Feb) can be shown in the Error! Reference source not found. below. The concentration of PM<sub>2.5</sub> was found highest during winter (51.74  $\mu\text{g}/\text{m}^3$ ) and lowest during monsoon season (19.73  $\mu\text{g}/\text{m}^3$ ).

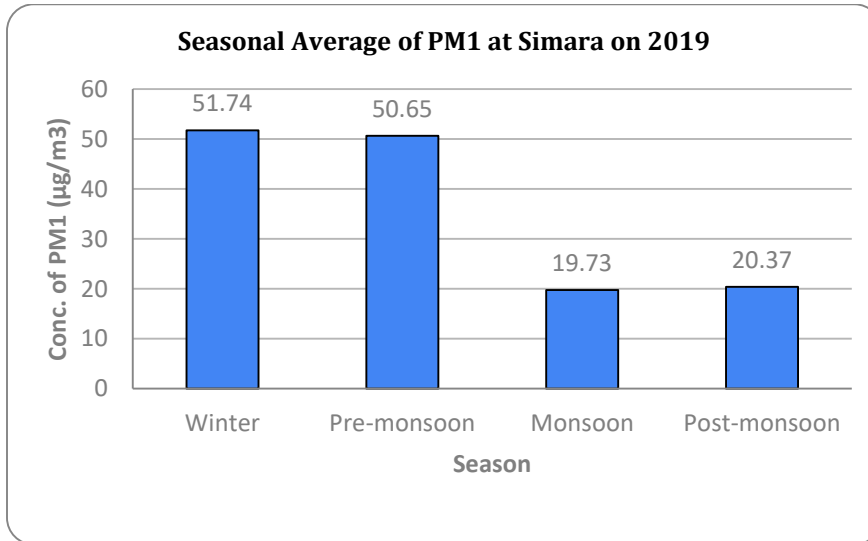


Figure 31: Monthly Variation of PM<sub>1</sub> in 2019

Diurnal variation of average concentration of PM<sub>1</sub>

The diurnal variation of average PM<sub>1</sub> concentration can be shown in the figure below. The variation in PM<sub>1</sub> concentration was higher around 5 am and lower around 12 pm.

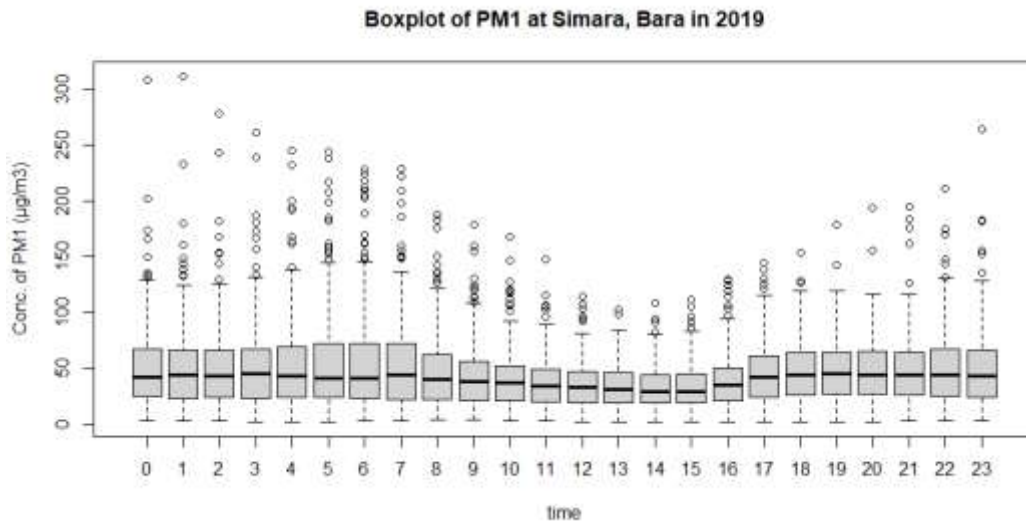


Figure 32: Diurnal variation of average PM<sub>1</sub> concentration

### 2.2.3. Temporal variation of PM<sub>2.5</sub>

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

Most of the data for PM<sub>2.5</sub> was found to be higher than the NAAQS (

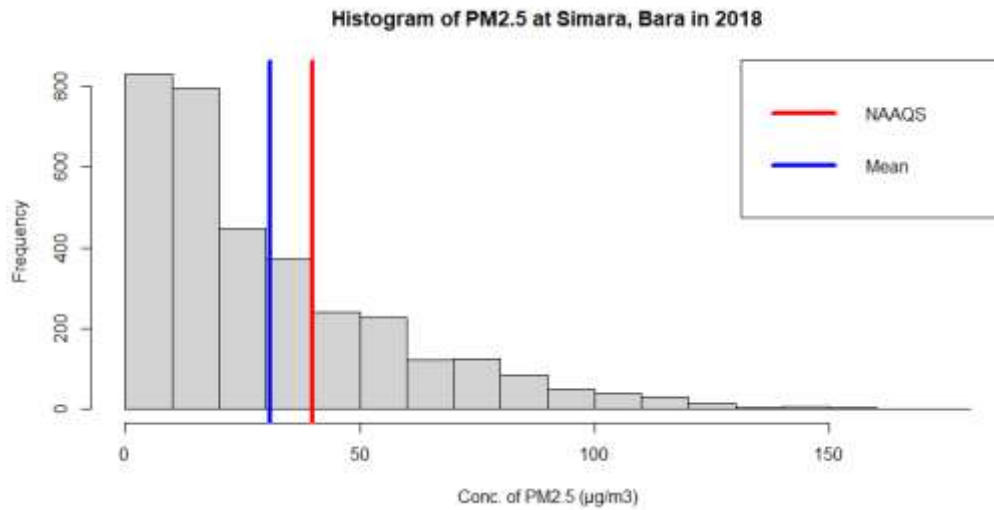


Figure 7: Histogram of PM<sub>2.5</sub>

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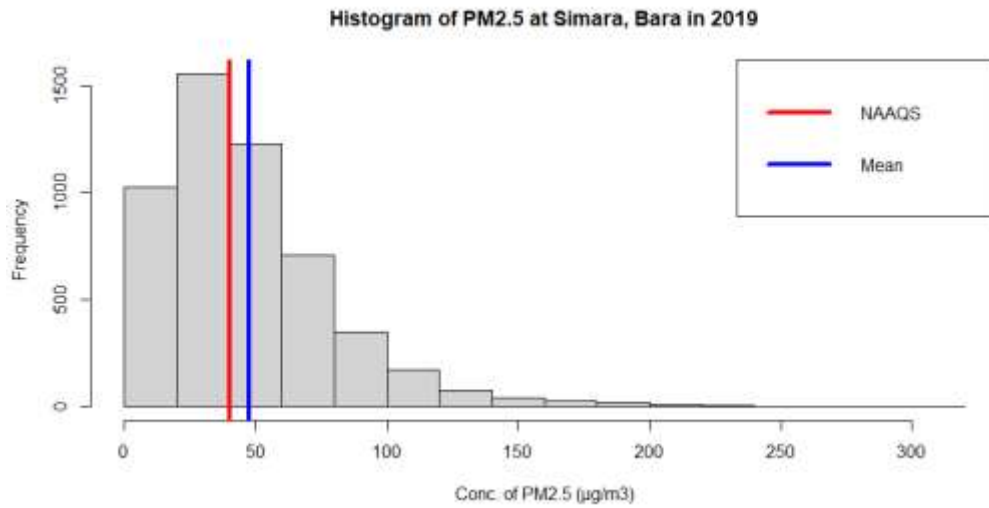


Figure 33: Histogram of PM<sub>2.5</sub>

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

Daily average concentration of PM<sub>2.5</sub> was low during September according to the available data.

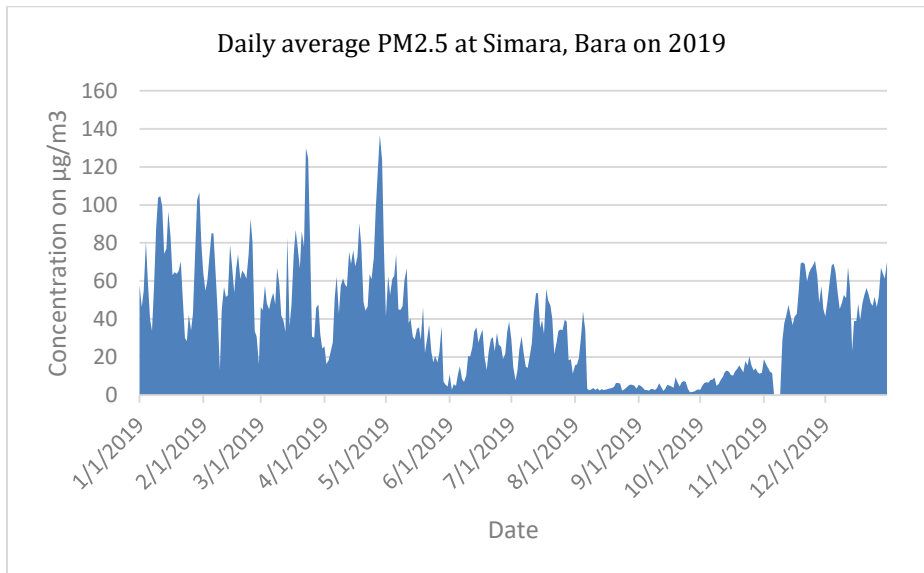


Figure 34: Daily average of PM<sub>2.5</sub>

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

The highest and the lowest concentration of PM<sub>2.5</sub> was found during January and September respectively. The mean value for those months were found to be 66.96 and 4.15 µg/m<sup>3</sup> respectively (**Error! Reference source not found.**).

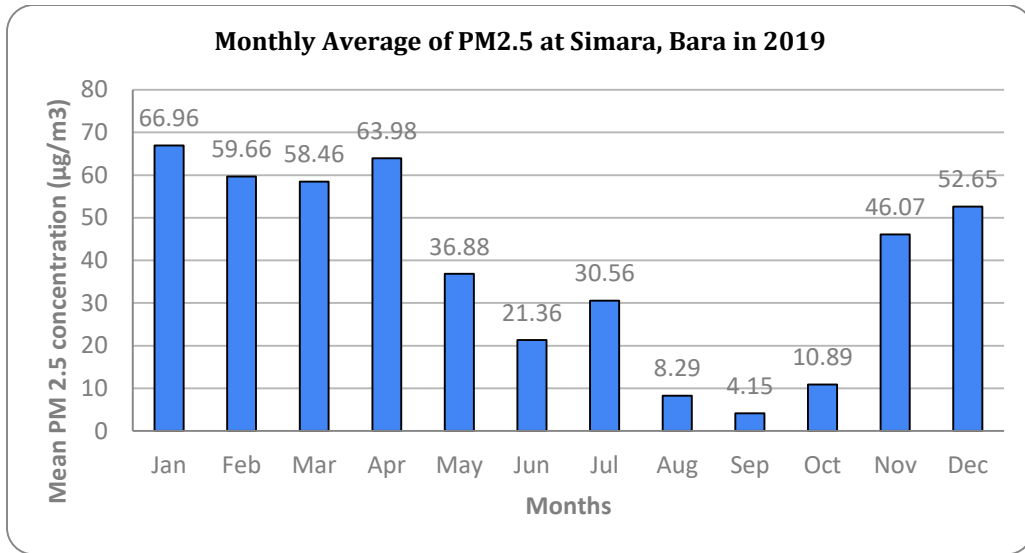


Figure 35: Monthly average of PM<sub>2.5</sub>

Variation in concentration of PM<sub>2.5</sub> was found more during March whereas low during August based on the available data. The mean value of PM<sub>2.5</sub> was found the highest in during May and the lowest during August (**Error! Reference source not found.**).

Figure 36: Monthly Variation of PM<sub>2.5</sub>

Seasonal variation of average PM<sub>2.5</sub> concentration

Ambient concentration of average PM<sub>2.5</sub> during pre monsoon (March-May), monsoon (June-September), and post-monsoon (October-November), winter (Dec-Feb) can be shown in the **Error! Reference source not found.** below. The concentration of PM<sub>2.5</sub> was found highest during winter (53.11 µg/m<sup>3</sup>) and lowest during monsoon season (20.07 µg/m<sup>3</sup>)

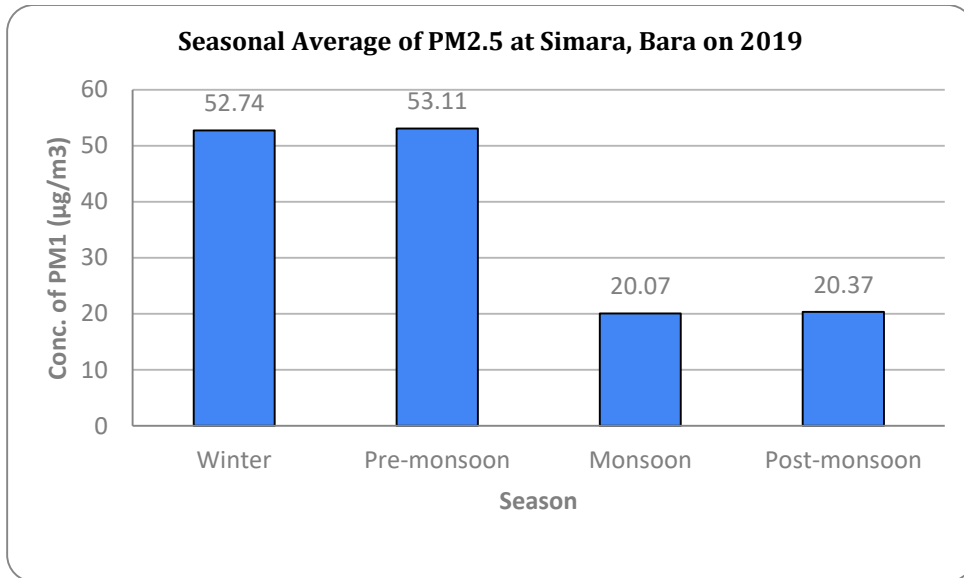


Figure 37: Seasonal variation of PM<sub>2.5</sub>

**Diurnal variation of average PM<sub>2.5</sub> concentration**

The diurnal variation of average PM<sub>2.5</sub> concentrations can be shown in the figure below. The variation in PM<sub>2.5</sub> concentration was high at around 7 am and low at 12 pm. Additionally, mean concentration of PM<sub>2.5</sub> was high and low at 7 am and 2 pm respectively.

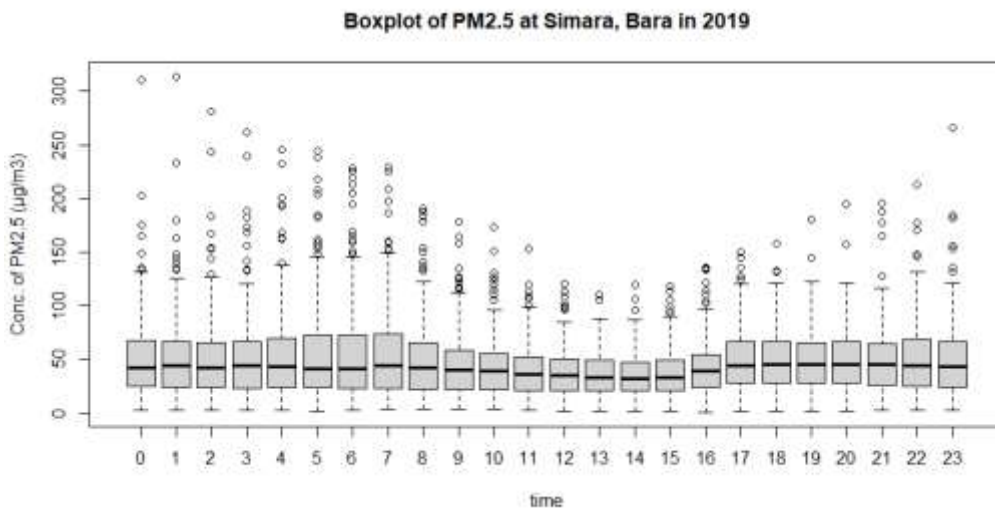


Figure 38: Diurnal variation of PM<sub>2.5</sub>

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

The total days of PM<sub>2.5</sub> monitored in the year 2019 counts 361, of which 164 days exceed the NAAQS guideline. December and January were the months having maximum number of days exceeding the NAAQS guideline. On September and October, none of the days exceeded NAAQS guideline value as shown in figure below.

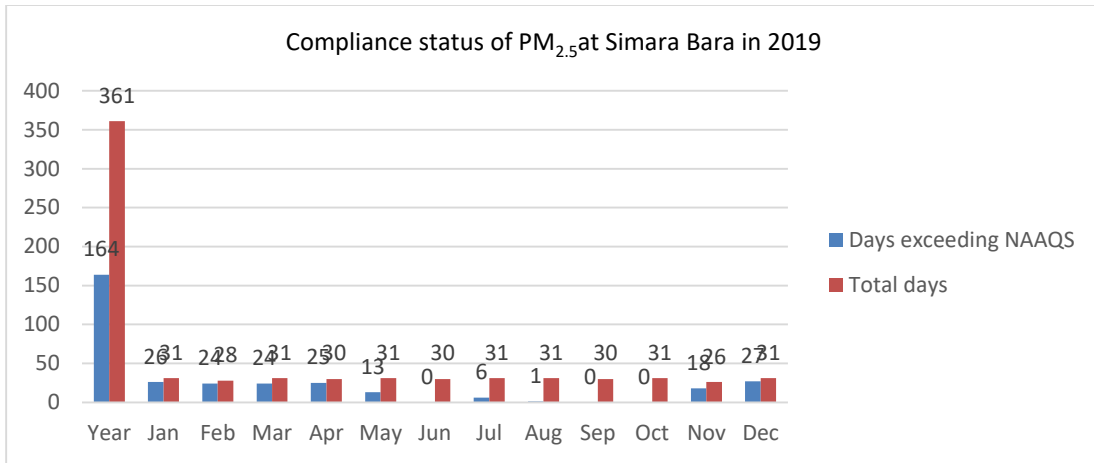


Figure 39: Compliance status of PM<sub>2.5</sub>

#### 2.2.4. Temporal variation of PM<sub>10</sub>

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

Most of the data for PM<sub>10</sub> was found to be less than the NAAQS.

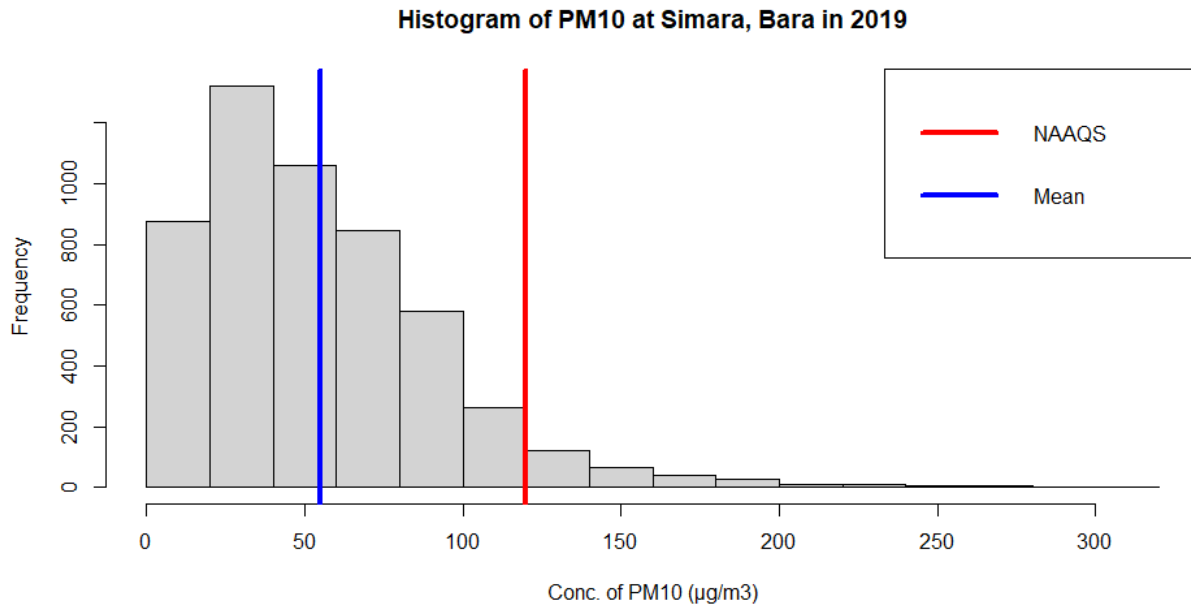


Figure 40: Histogram for the ambient concentration of PM<sub>10</sub>

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

Daily average concentration of PM<sub>10</sub> was found low during September and October based on the available data.

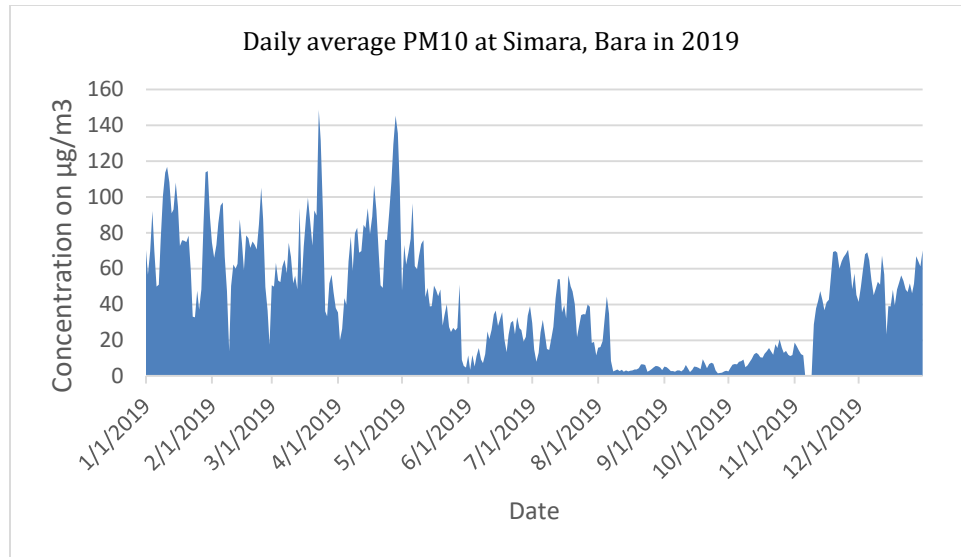


Figure 41: Daily average of PM<sub>10</sub>

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

The highest and the lowest concentration of PM<sub>10</sub> was found during April and September respectively. The mean value for those months were found to be 77.76 and 4.15 µg/m<sup>3</sup> respectively .

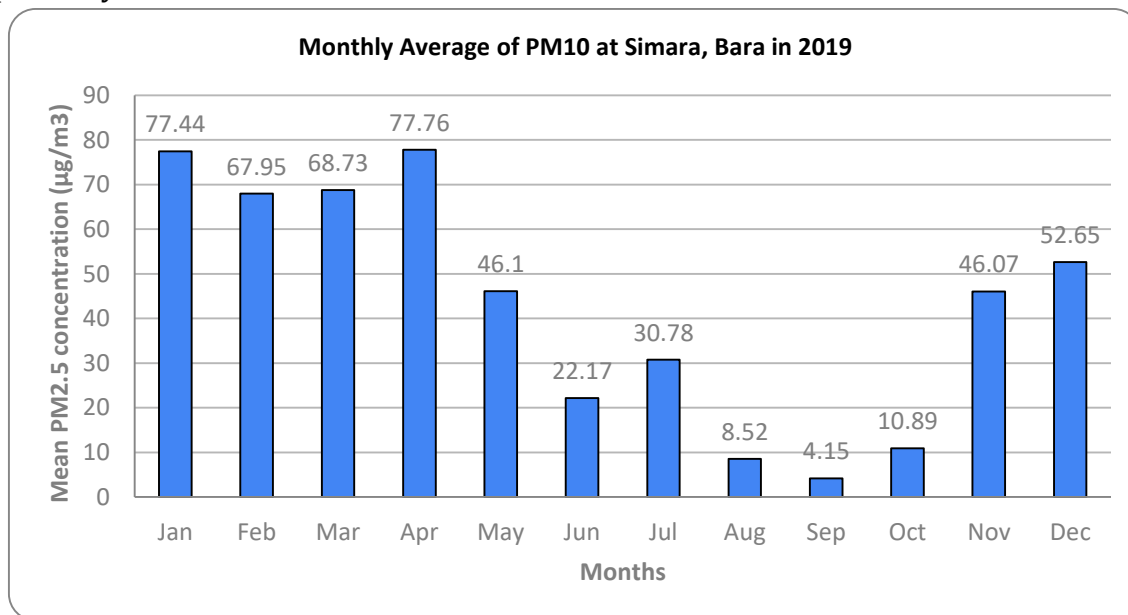


Figure 42: Monthly average of PM<sub>10</sub>

Variation in concentration of PM<sub>10</sub> was found more during March and low during August. The mean value of PM<sub>10</sub> was found the highest in January and the lowest in August (**Error! Reference source not found.**).

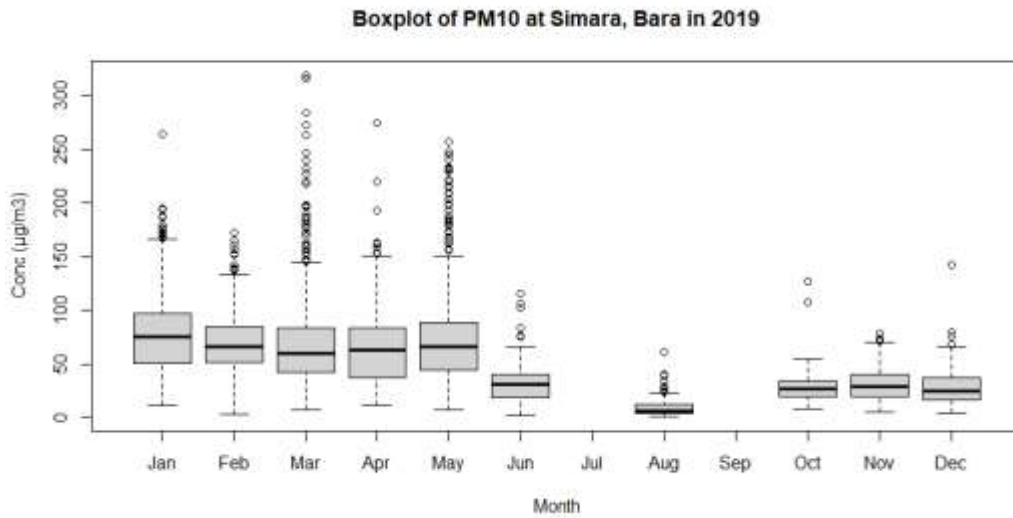


Figure 43: Monthly Variation of PM<sub>10</sub>

Seasonal variation of average PM<sub>10</sub> concentration:

Ambient concentration of average PM<sub>10</sub> was available only for post-monsoon (October-November) shown in the figure below.

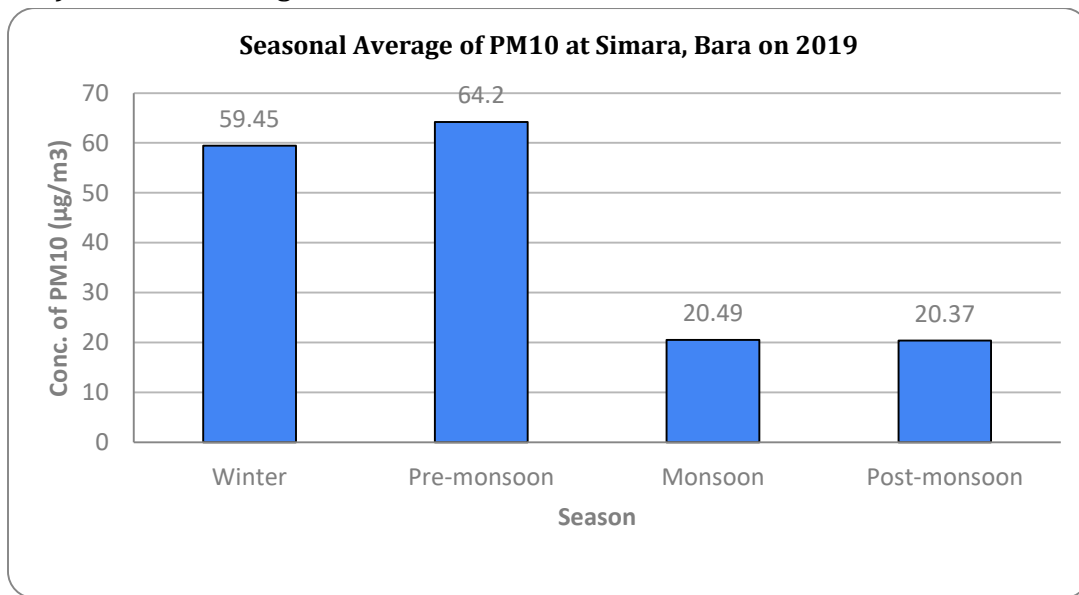


Figure 44: Seasonal variation of PM<sub>10</sub>

Diurnal variation of average PM<sub>10</sub> concentration

The diurnal variation of average PM<sub>10</sub> concentrations can be shown in the **Error! Reference source not found.** below. The variation in PM<sub>10</sub> concentration was high at around 5 pm and low at 8 am. Additionally, mean concentration of PM<sub>10</sub> was high and low around 5 pm and 4 am respectively.



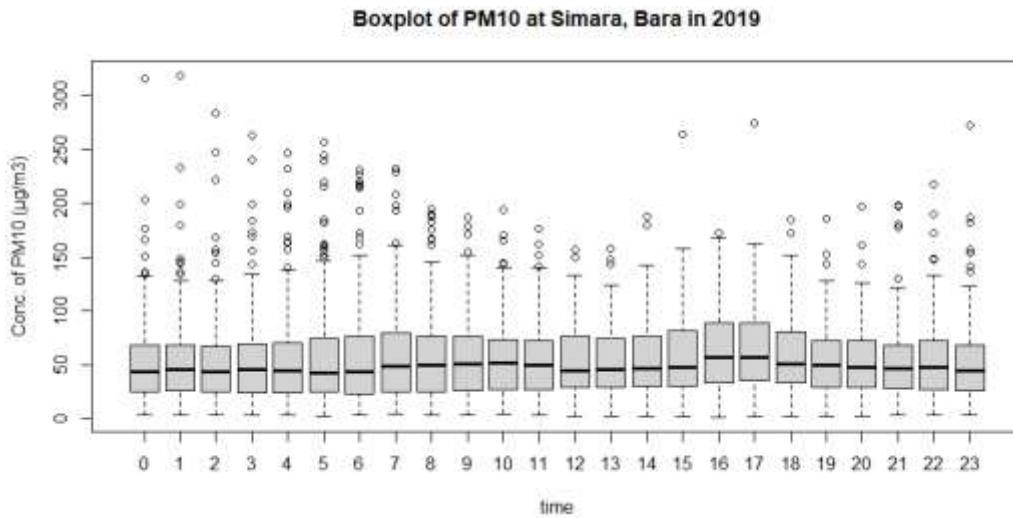


Figure 45: Diurnal variation of PM<sub>10</sub> concentration

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

The total days of PM<sub>10</sub> monitored in the year 2019 counts 361 of which 5 days exceeded the NAAQS guideline as shown in figure below.

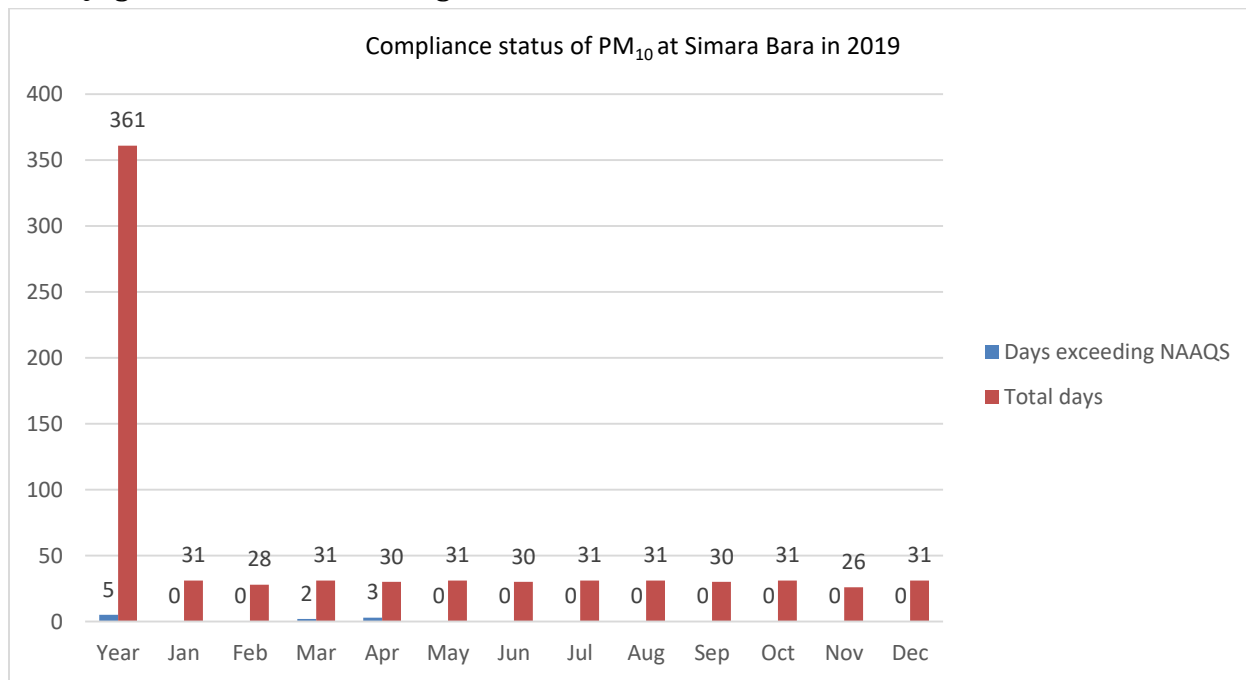


Figure 46: Compliance status of PM<sub>10</sub>

2.2.5. Temporal variation of TSP

Annual average of TSP

Most of the data for TSP was found to be less than the NAAQS.

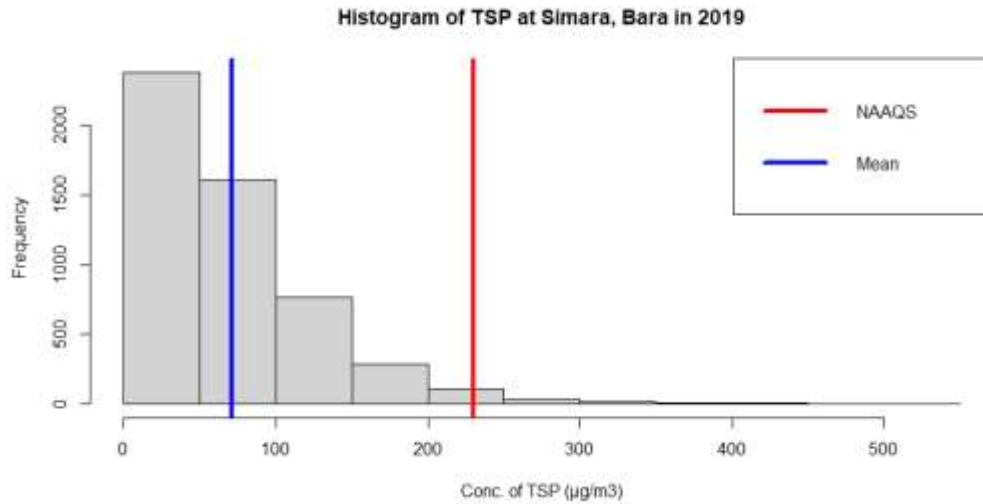


Figure 47: Histogram for the ambient concentration of TSP

Daily average of TSP:

Daily average concentration of TSP was high during December and was found low during September according to the available data.

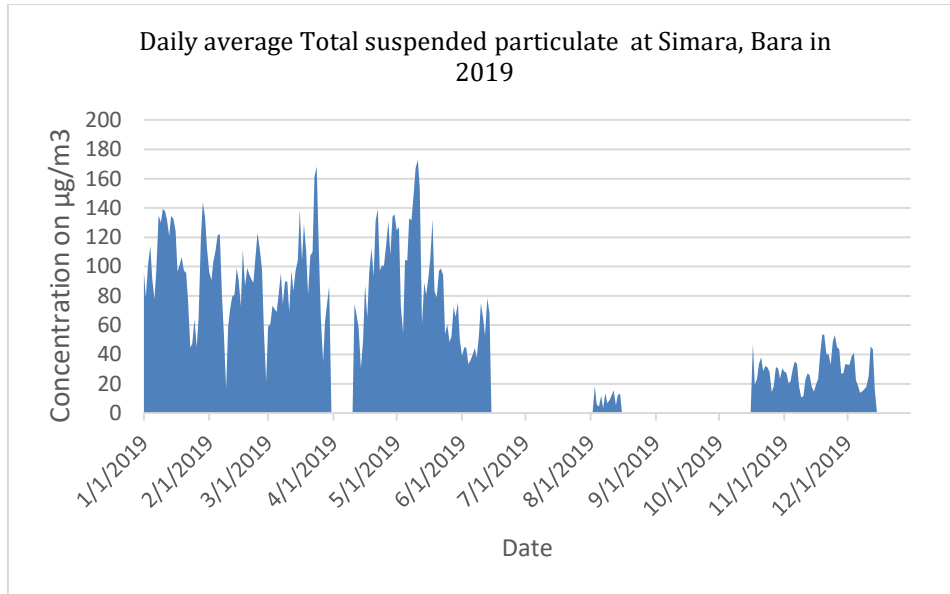


Figure 48: Daily average of TSP

Monthly average of TSP

Based on the available data, the highest and the lowest concentration of TSP was found during January and August respectively. The mean value for those months were found to be 103.04 and 9.44  $\mu\text{g}/\text{m}^3$  respectively.

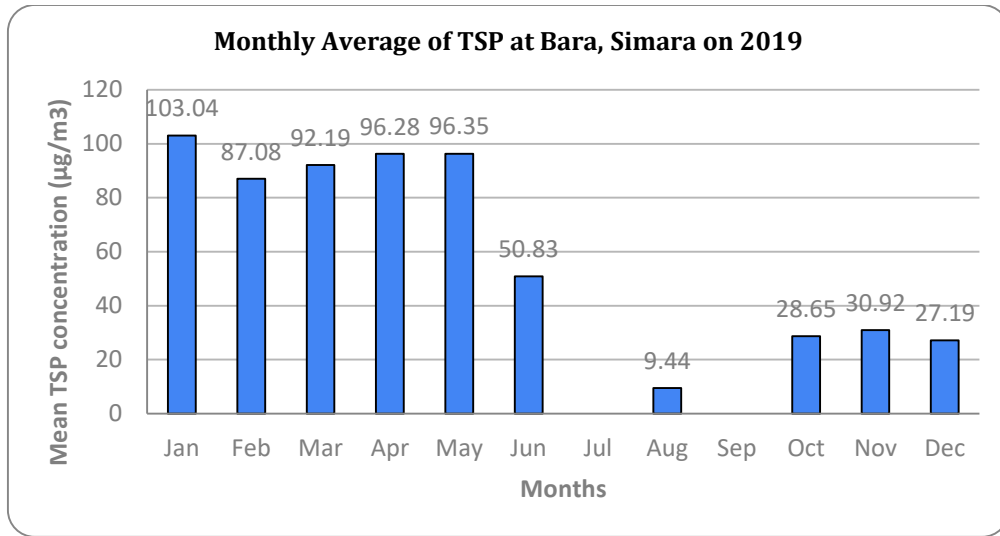


Figure 49: Monthly Average of TSP

Variation in concentration of TSP was found more during January and low during August. The mean value of TSP was found the highest in January and the lowest in August.

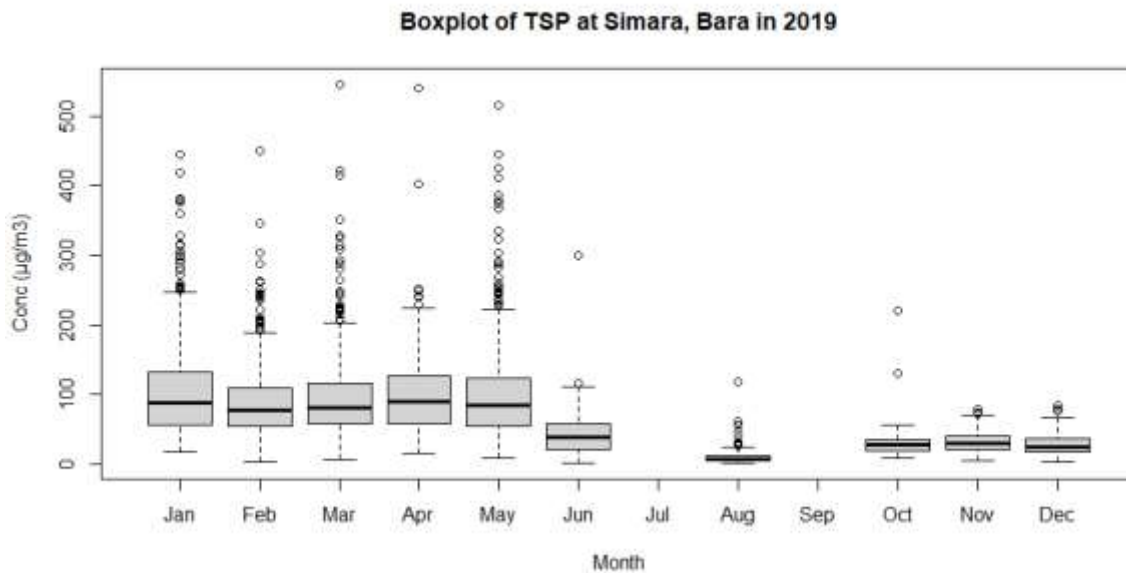


Figure 50: Monthly variation of TSP.

Seasonal variation of average TSP concentration

Ambient concentration of average TSP was available for Winter (December- February) and pre-monsoon (March-May) can be shown in the **Error! Reference source not found.** below. The TSP value was found to be higher in the winter ( $110.32 \mu\text{g}/\text{m}^3$ ) than in pre monsoon ( $94.49 \mu\text{g}/\text{m}^3$ ).

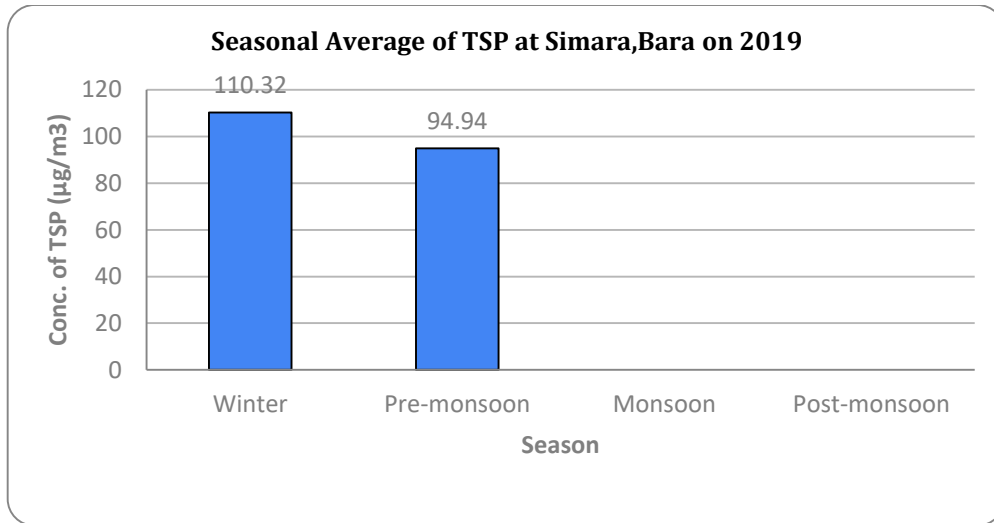


Figure 51: Seasonal variation of TSP

#### Diurnal variation of average TSP concentration

The diurnal variation of average TSP concentrations can be shown in the **Error! Reference source not found.** below. The variation in TSP concentration was high at around 4 pm and low at 12 am. Additionally, mean concentration of TSP was high and low at 2 pm and 2 am respectively.

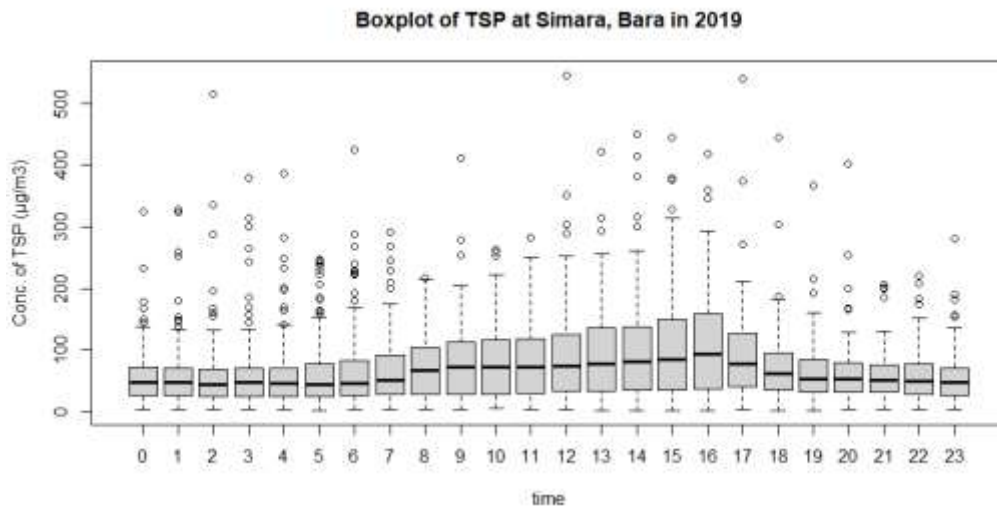


Figure 52: Diurnal Variation of TSP

#### Compliance status of TSP

The total days of TSP monitored in the year 2019 counts 227 of which none of the days exceed the NAAQS guideline.

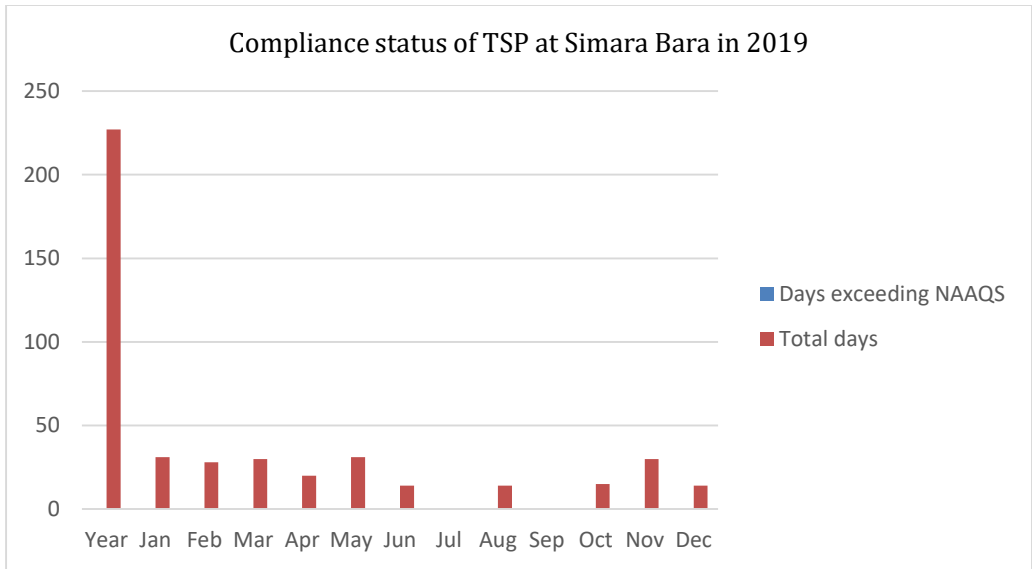


Figure 53: Compliance status of TSP

### 2.3. Air Quality status, 2020

#### 2.3.1. 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 of the Simara monitoring station for 2020 could not be calculated due to the availability of Data was calculated.

#### 2.3.2. Temporal variation of PM<sub>1</sub>

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

Histogram of hourly average PM<sub>1</sub> is shown in the figure below.

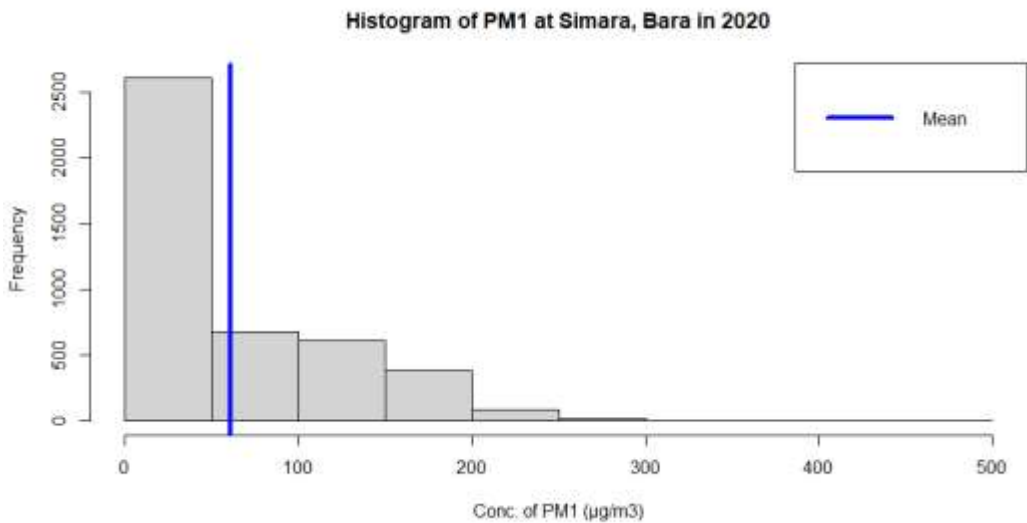


Figure 54: Histogram for the ambient concentration of PM<sub>1</sub>

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

Daily average concentration of PM<sub>1</sub> was found to be high during January and low during July.

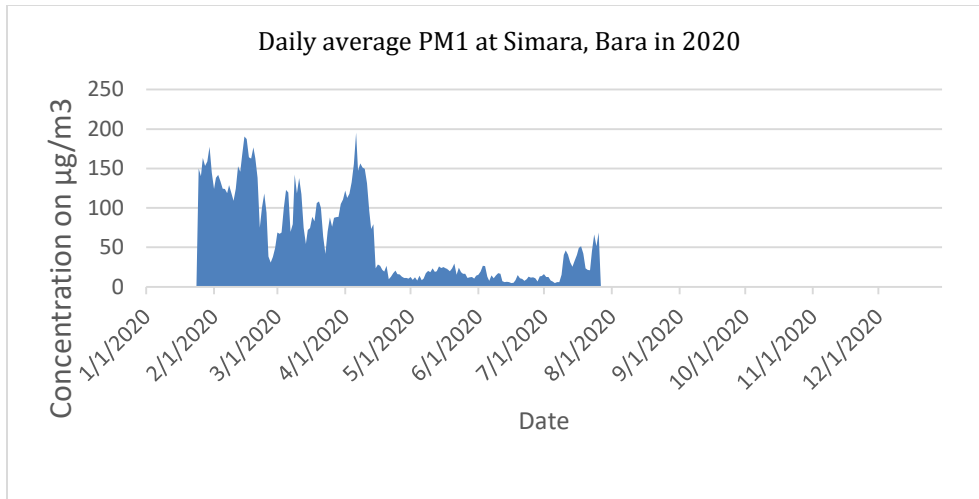


Figure 55: Daily average of PM<sub>1</sub> in 2020

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

The highest and the lowest concentration of PM<sub>1</sub> was found during January (155.45 µg/m<sup>3</sup>) and July (29.56 µg/m<sup>3</sup>) respectively from the available data.

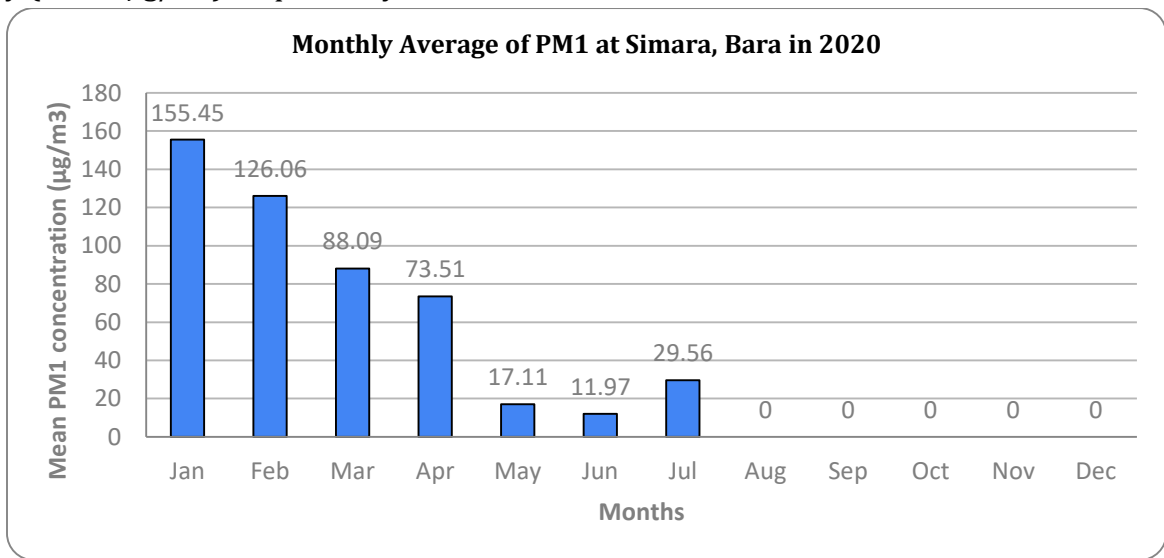
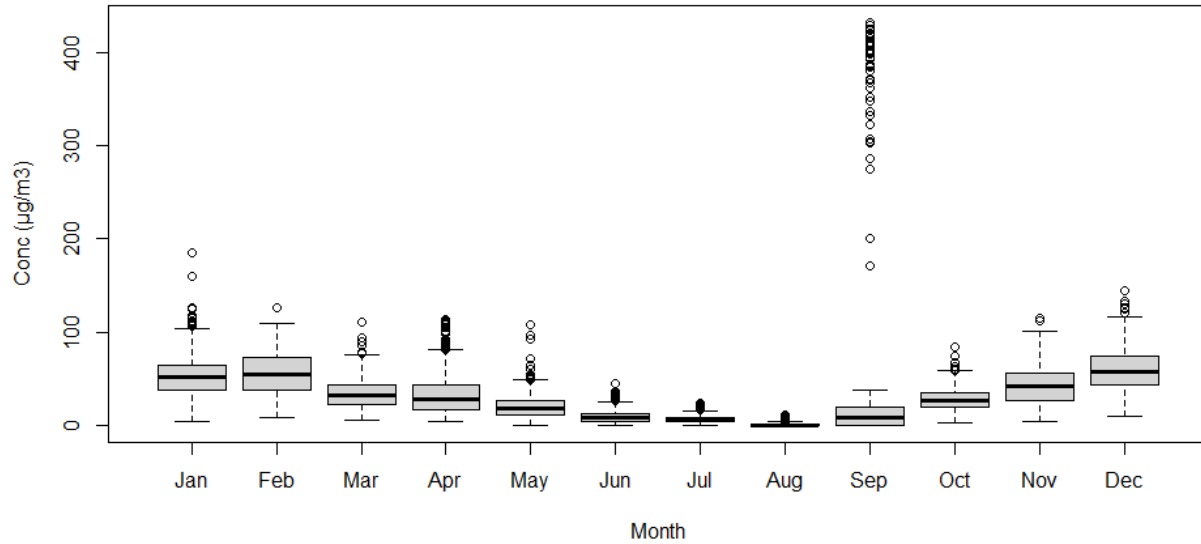


Figure 56: Monthly average of PM<sub>1</sub> in 2020

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

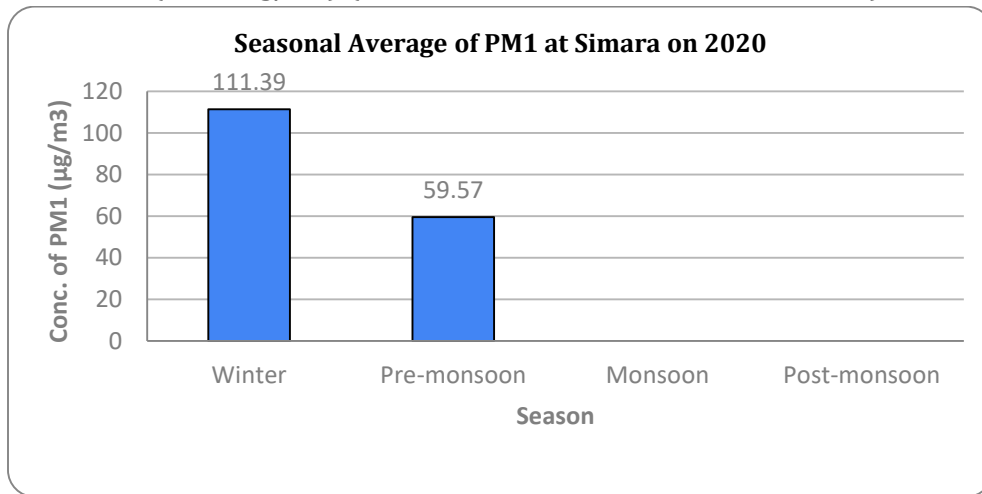
**Boxplot of PM<sub>1</sub> at Simara, Bara in 2020**



**Figure 57: Monthly Variation of PM<sub>1</sub> in 2020**

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

Ambient concentration of average PM<sub>1</sub> was available for Winter (December- February) pre-monsoon (March-May) can be shown in the **Error! Reference source not found.** below. The P M<sub>1</sub> concentration in the winter was found to be higher in the winter (111.39 µg/m<sup>3</sup>) than in the pre monsoon (59.57µg/m<sup>3</sup>) (**Error! Reference source not found.**).



**Figure 58: Seasonal variation of PM<sub>1</sub> in 2020**

**Diurnal variation of average concentration of PM<sub>1</sub>**

The diurnal variation of average PM<sub>1</sub> concentration can be shown in the figure 7. The variation in PM<sub>1</sub> concentration was higher around 10 pm and lower around 1 pm.

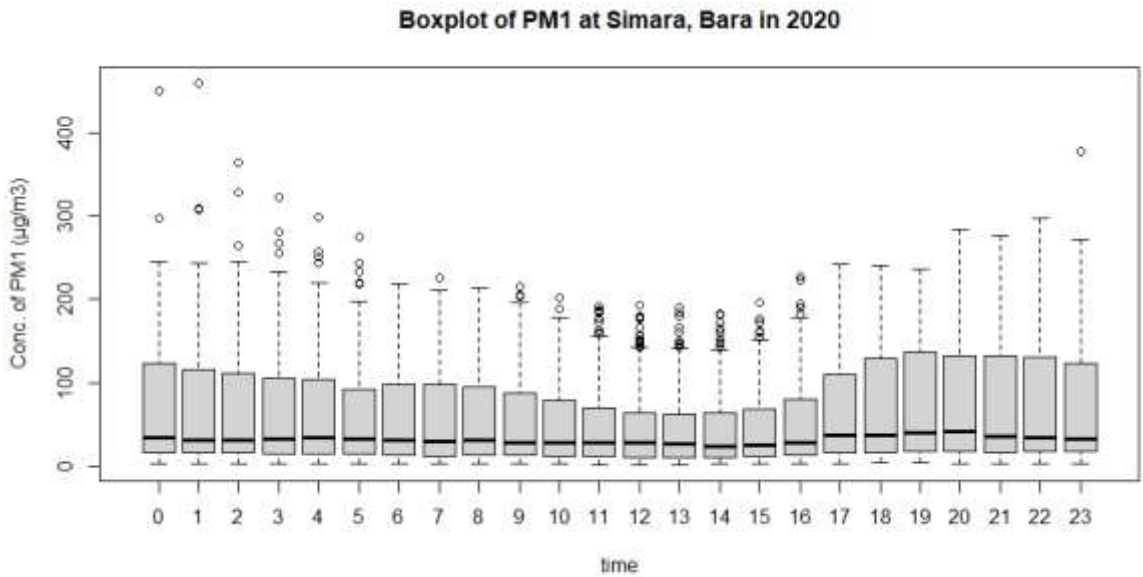


Figure 59: Diurnal variation of average PM<sub>1</sub> concentration

2.3.3. Temporal variation of PM<sub>2.5</sub>

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

Most of the data for PM<sub>2.5</sub> was found to be less than the NAAQS.

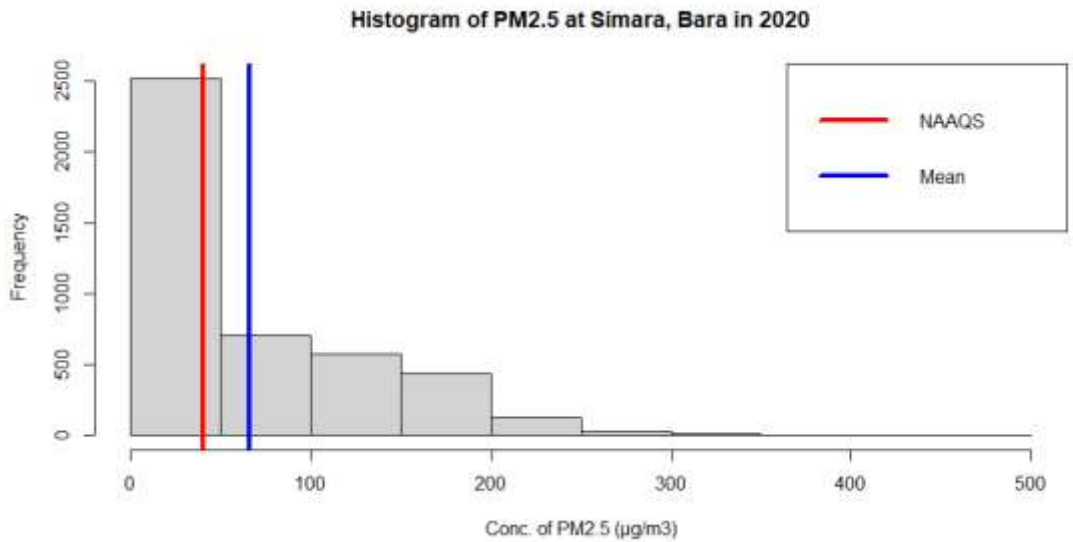


Figure 60: Histogram of PM<sub>2.5</sub>.

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

Plot for daily average concentration of PM<sub>2.5</sub> was not available due to the unavailability of data.

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



The highest and the lowest concentration of PM<sub>2.5</sub> was found during January and June respectively. The mean value for those months were found to be 67.79 and 9.31 µg/m<sup>3</sup> respectively.

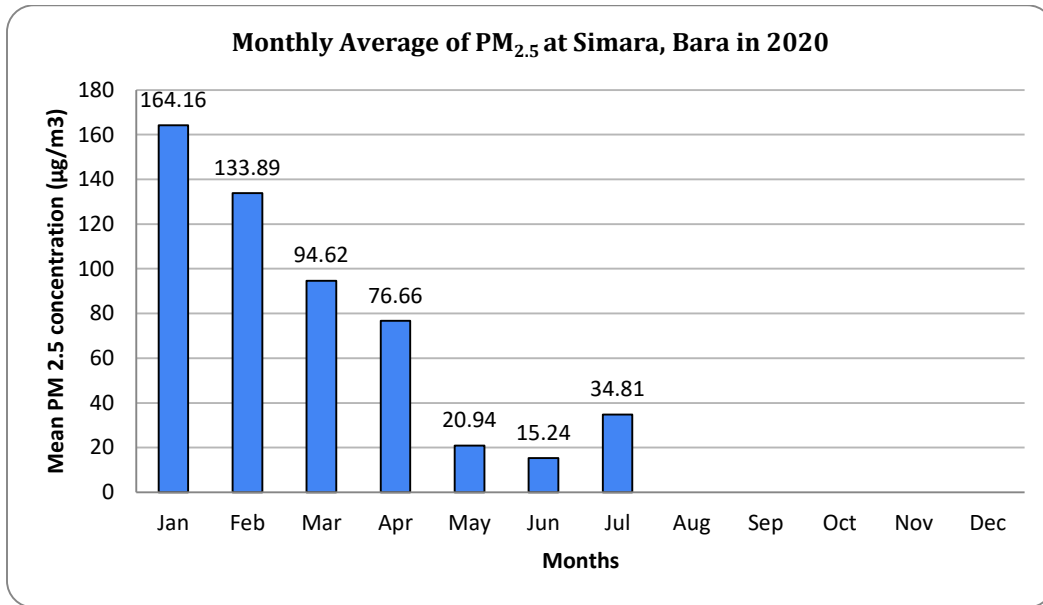


Figure 61: Monthly Average of PM<sub>2.5</sub>

Variation in concentration of PM<sub>2.5</sub> was found more during April whereas low during November based on the available data. The mean value of PM<sub>2.5</sub> was found the highest in during January and the lowest during July.

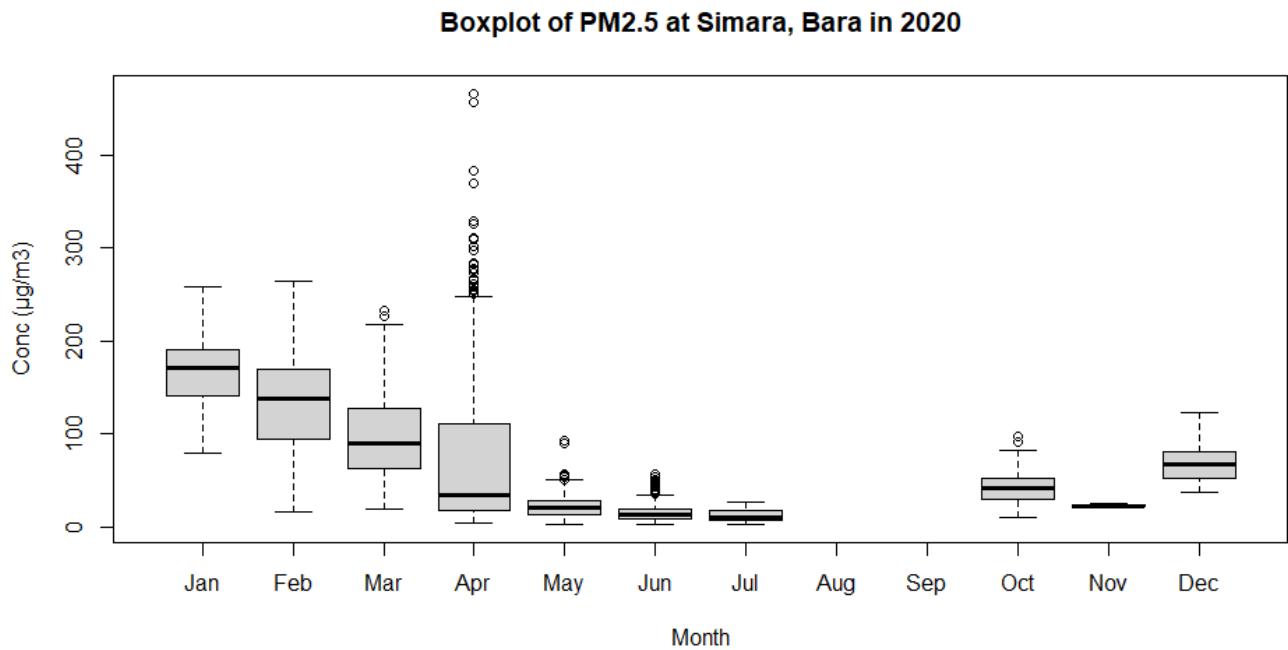


Figure 62: Monthly Variation of PM<sub>2.5</sub>

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

Ambient concentration of average PM<sub>2.5</sub> was available for Winter (December- February) pre-monsoon (March-May) can be shown in the 11 below. The PM<sub>2.5</sub> concentration in the winter was found to be higher in the winter (116.9 µg/m<sup>3</sup>) than in the pre monsoon (64.07µg/m<sup>3</sup>).

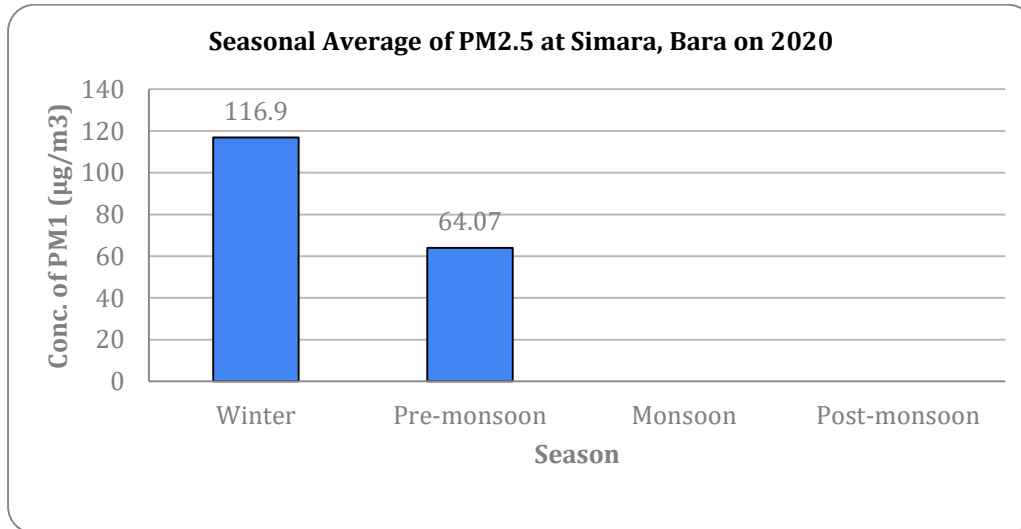


Figure 63: Seasonal variation of PM<sub>2.5</sub>

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

The diurnal variation of average PM<sub>2.5</sub> concentrations can be shown in the **Error! Reference source not found.** below. The variation in PM<sub>2.5</sub> concentration was high at around 5 to 6 pm and low at 8 to 9 am. Additionally, mean concentration of PM<sub>2.5</sub> was high and low at 4 pm and 11 am respectively .

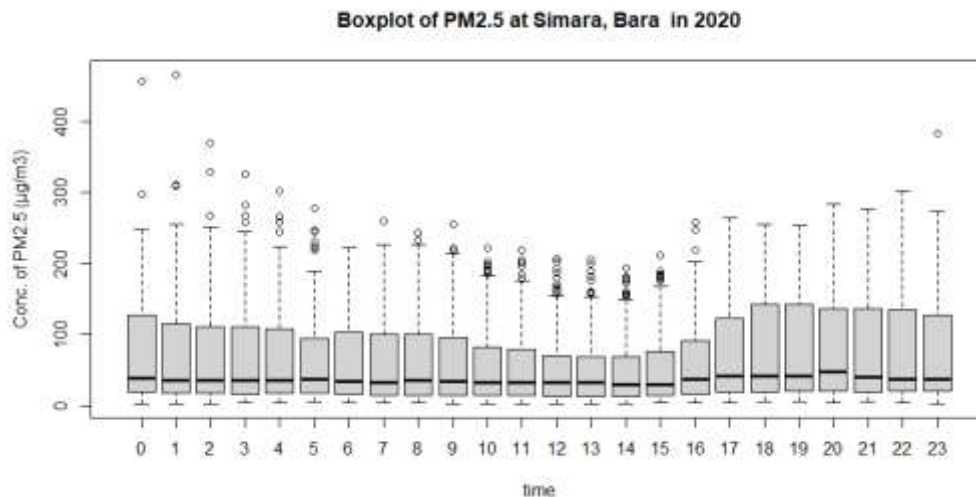


Figure 64: Diurnal variation of PM<sub>2.5</sub>

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

The total days of PM<sub>2.5</sub> monitored in the year 2020 counts 185, of which 90 days exceed the NAAQS guideline. February and March were the months having maximum number of days exceeding the NAAQS guideline. On the months May and June, none of the days exceeded NAAQS guideline value as shown in

Figure 12: Compliance status of PM<sub>2.5</sub>

### 2.3.4. Temporal variation of PM<sub>10</sub>

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

Most of the data for PM<sub>10</sub> was found to be less than the NAAQS.

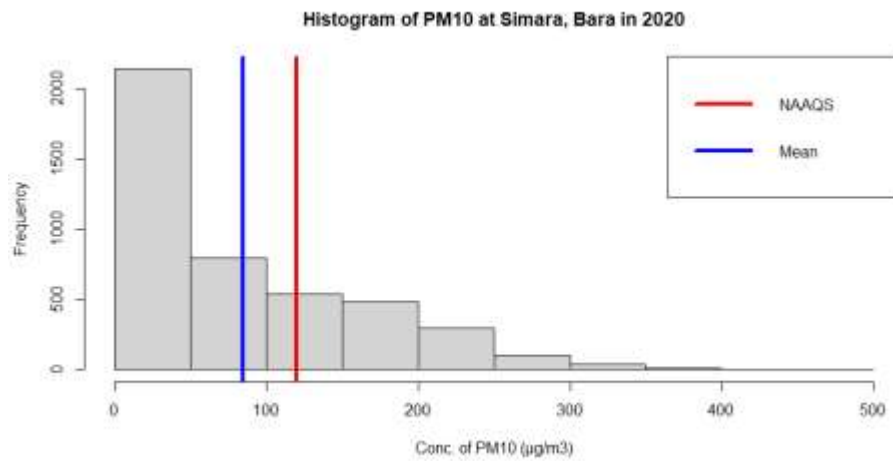


Figure 65: Histogram for the ambient concentration of PM<sub>10</sub>

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

Daily average concentration of PM<sub>10</sub> was high during February and May and was found low during August (**Error! Reference source not found.**5) based on the available data.

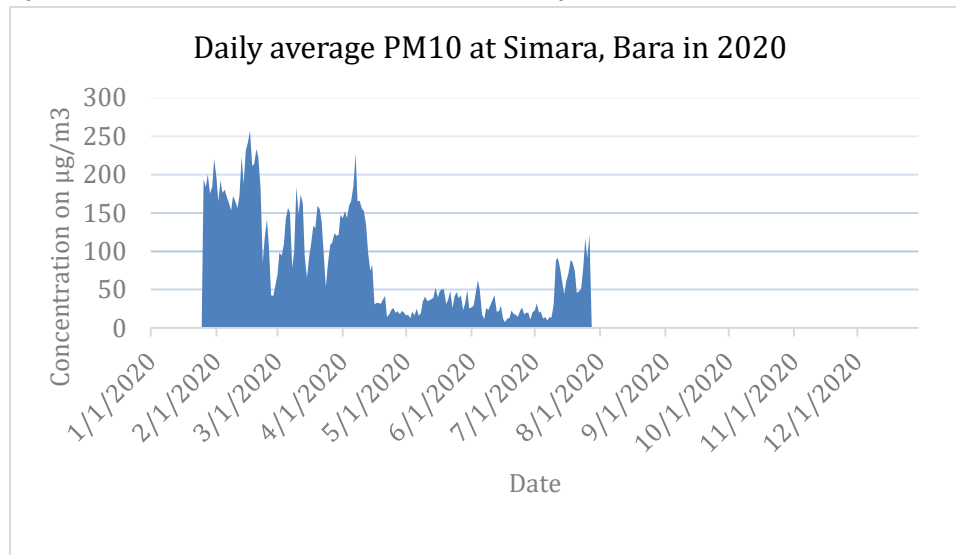


Figure 66: Daily average of PM<sub>10</sub>

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

The highest and the lowest concentration of PM<sub>10</sub> was found during January and June respectively. The mean value for those months were found to be 193.41 and 24.35  $\mu\text{g}/\text{m}^3$  respectively (**Error! Reference source not found.6**).

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Figure 67: Monthly average of PM<sub>10</sub>

Variation in concentration of PM<sub>10</sub> was found more during April and low during July Based on the available data. The mean value of PM<sub>10</sub> was found the highest in February and the lowest in in August (Figure 17).

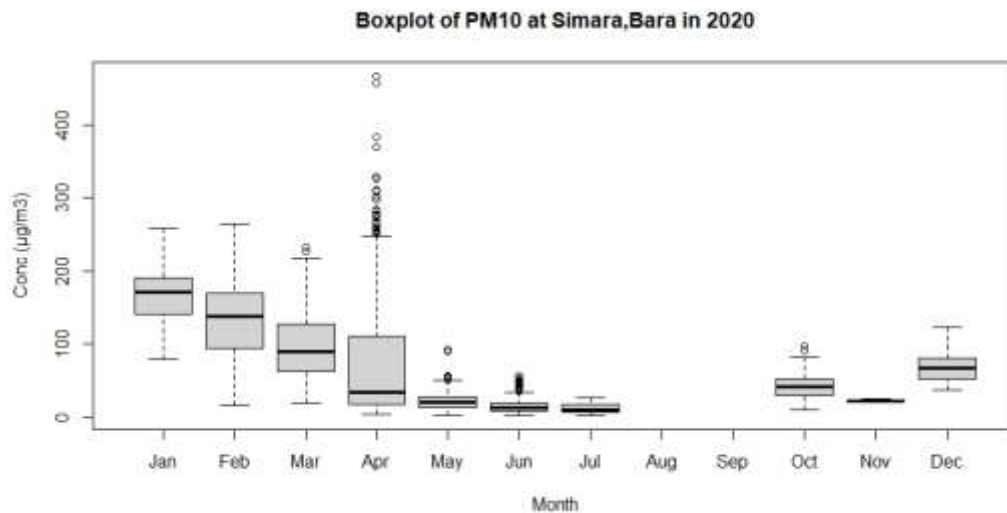


Figure 68: Monthly Variation of PM<sub>10</sub>

Seasonal variation of average PM<sub>10</sub> concentration:

Ambient concentration of average PM<sub>10</sub> was available for Winter (December- February) pre-monsoon (March-May) can be shown in the 11 below. The PM<sub>10</sub> concentration in the winter was found to be higher in the winter (137.51 µg/m<sup>3</sup>) than in the pre monsoon (80.03µg/m<sup>3</sup>).

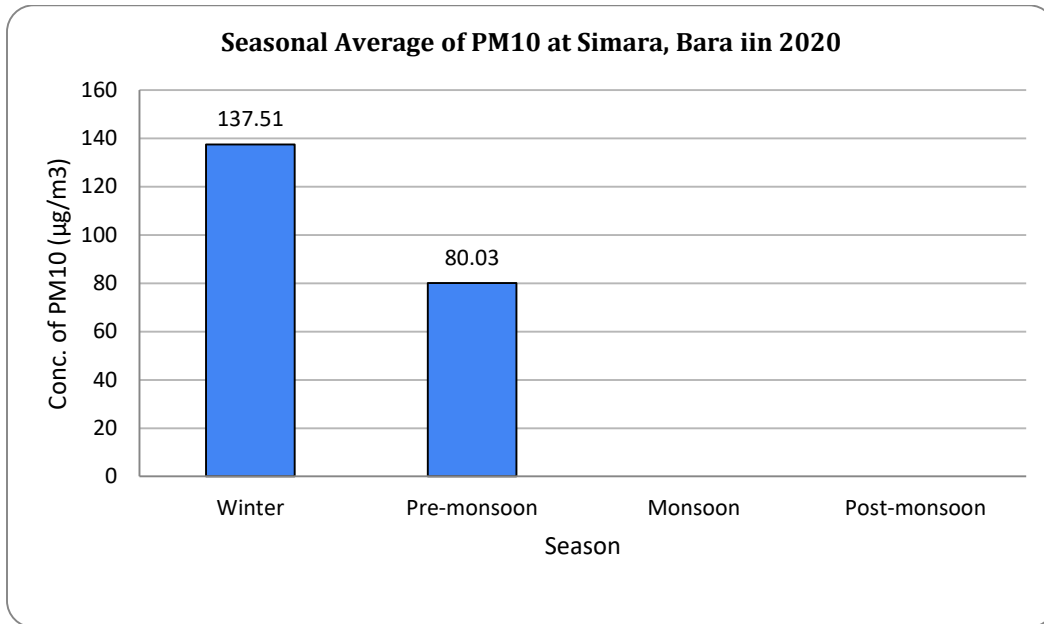


Figure 69: Seasonal variation of PM<sub>10</sub>

Diurnal variation of average PM<sub>10</sub> concentration

The diurnal variation of average PM<sub>10</sub> concentrations can be shown in the **Error! Reference source not found.** below. The variation in PM<sub>10</sub> concentration was high at around 11 pm and low at 1 pm. Additionally, mean concentration of PM<sub>10</sub> was high and low around 6 pm and 1 am respectively.

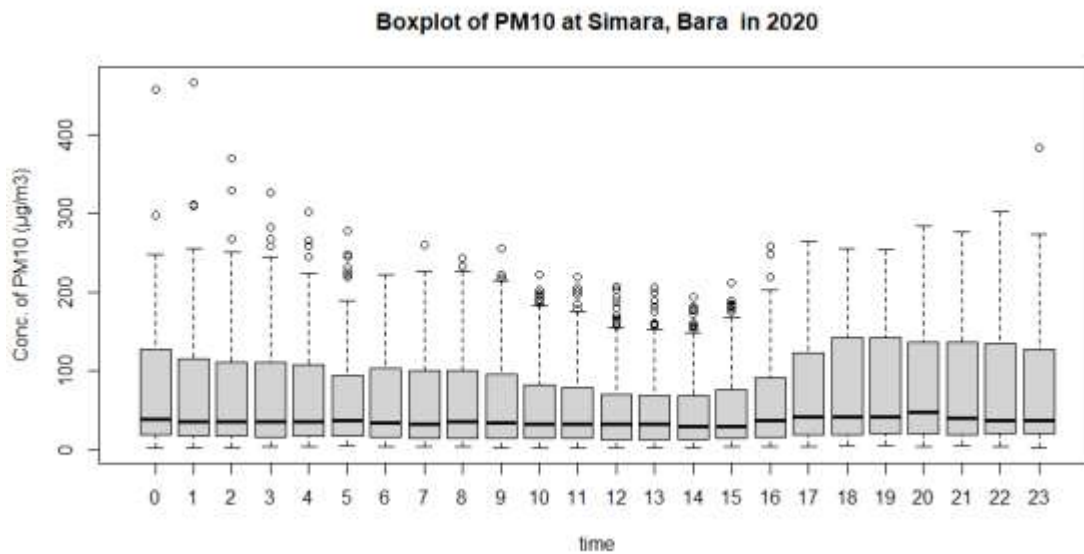


Figure 70: Diurnal variation of PM<sub>10</sub> concentration

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

The total days of PM<sub>10</sub> monitored in the year 2020 counts 184 of which 58 days exceed the NAAQS guideline. February has maximum number of days exceeding the NAAQS guideline as shown in figure below.

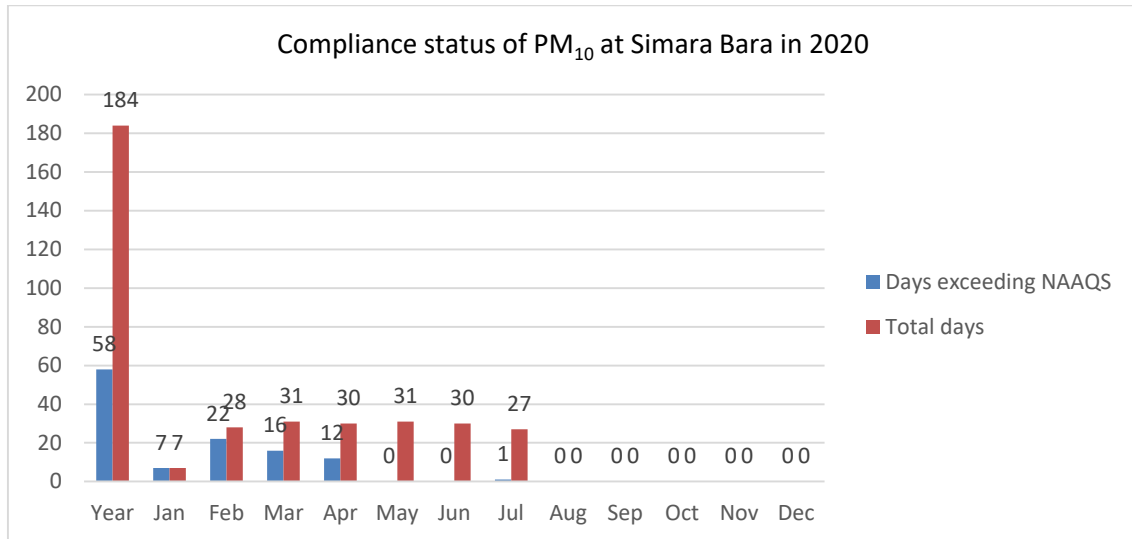


Figure 71: Compliance status of PM<sub>10</sub>

### 2.3.5. Temporal variation of TSP

#### Annual average of TSP

Most of the data for TSP was found to be less than the NAAQS.

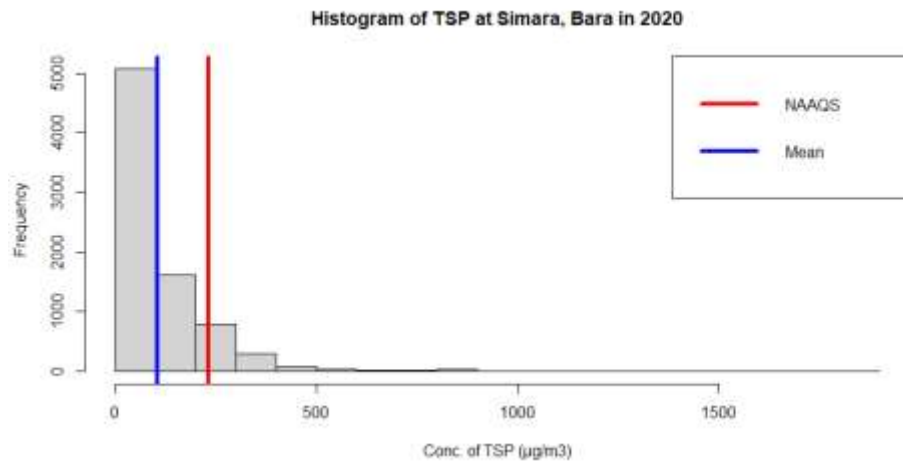


Figure 72 : Histogram for the ambient concentration of TSP

#### Daily average of TSP:

Plot for daily average concentration of TSP was not available due to the unavailability of data.

#### Monthly average of TSP

Based on the available data, the highest and the lowest concentration of TSP was found during January and July respectively. The mean value for those months were found to be

230.58

and

26.11

$\mu\text{g}/\text{m}^3$

respectively

(

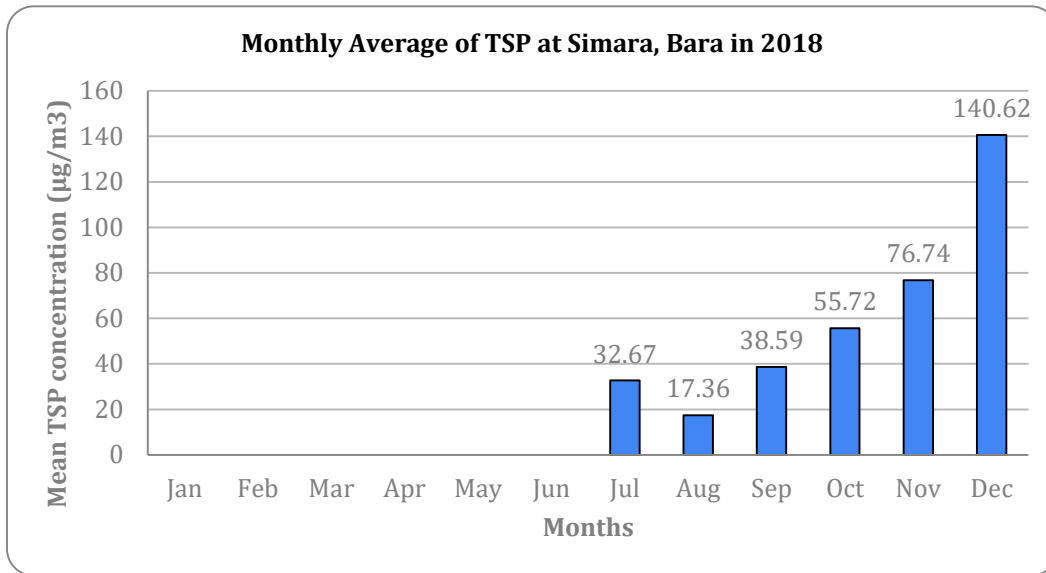


Figure 22: Monthly Average of TSP

).

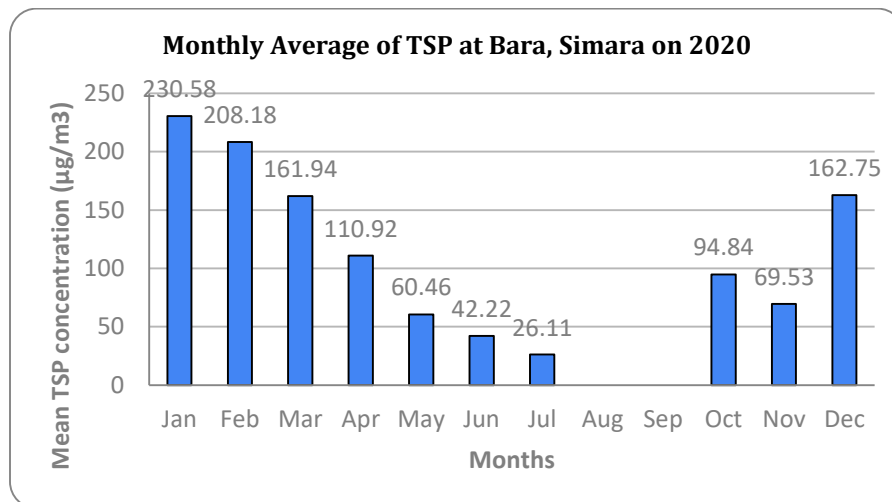


Figure 73: Compliance status of  $\text{PM}_{10}$

Variation in concentration of TSP was found more during December and low during August. The mean value of TSP was found the highest in December and the lowest in August (Figure 24).

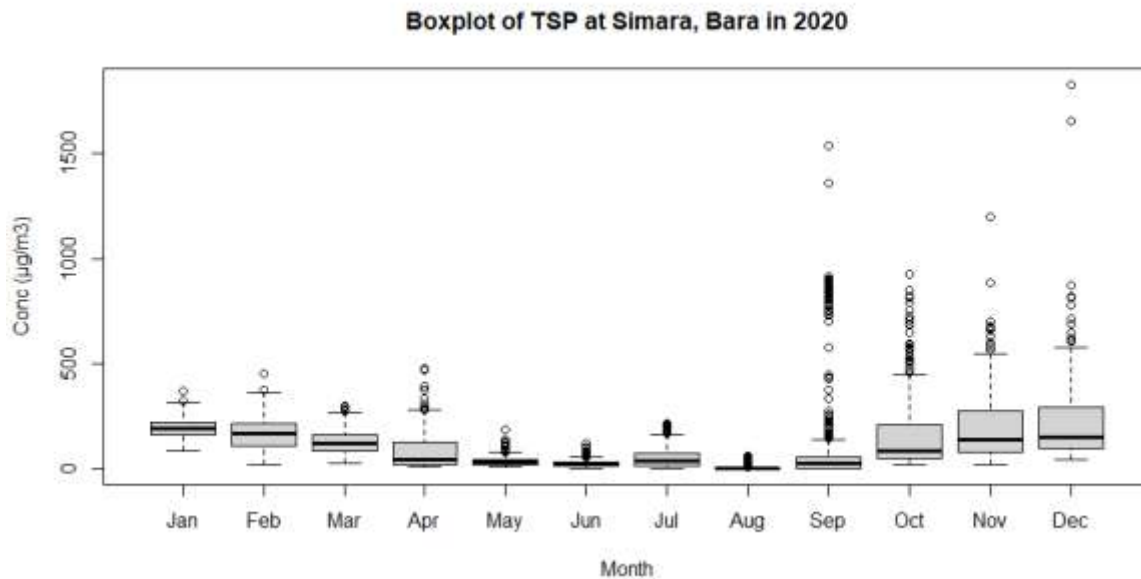


Figure 74: Monthly variation of TSP.

Seasonal variation of average TSP concentration

Ambient concentration of average TSP was available for Winter (December- February) pre-monsoon (March-May) can be shown in the **Error! Reference source not found.** below. The TSP concentration in the winter was found to be higher in the winter ( $155.32 \mu\text{g}/\text{m}^3$ ) than in the pre monsoon ( $111.1 \mu\text{g}/\text{m}^3$ ) (**Error! Reference source not found.**).

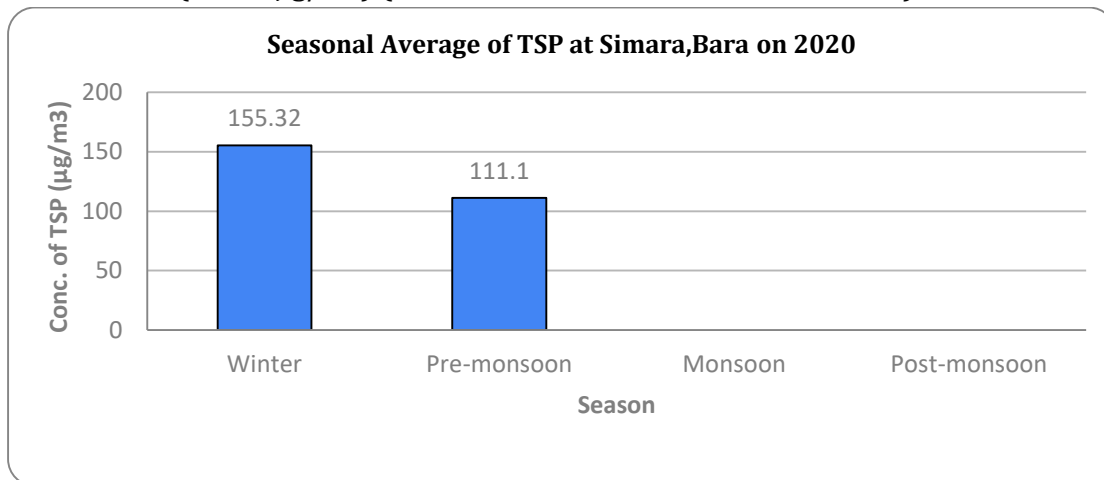


Figure 75: Seasonal variation of TSP

Diurnal variation of average TSP concentration

The diurnal variation of average TSP concentrations can be shown in the **Error! Reference source not found.** below. The variation in TSP concentration was high at around 1 pm and low at 12 am. Additionally, mean concentration of TSP was high and low at 2 pm and 2 am respectively.



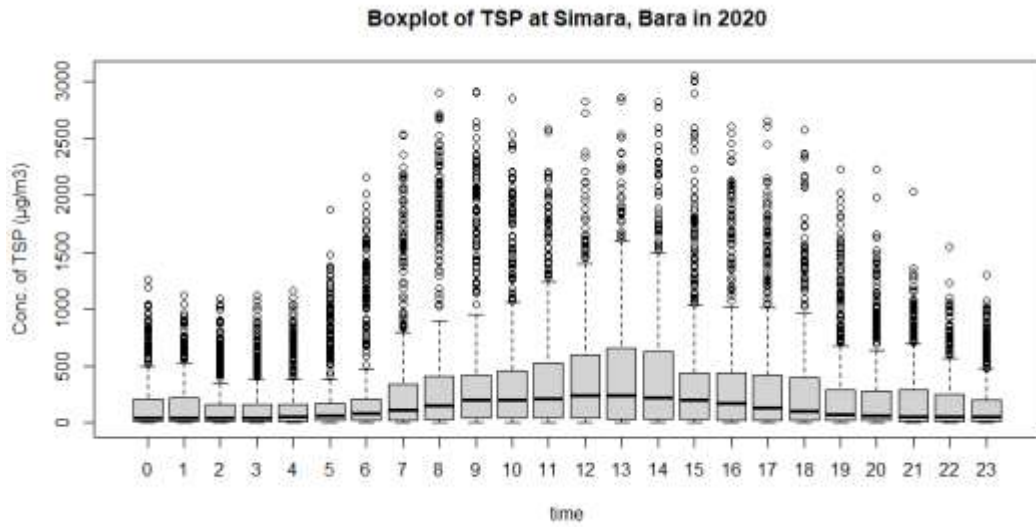


Figure 76: Diurnal Variation of TSP

Compliance status of TSP

The total days of TSP monitored in the year 2020 counts 186 of which 16 days exceed the NAAQS guideline. February has maximum number of days exceeding the NAAQS guideline.

Figure 12: Compliance status of PM2.5

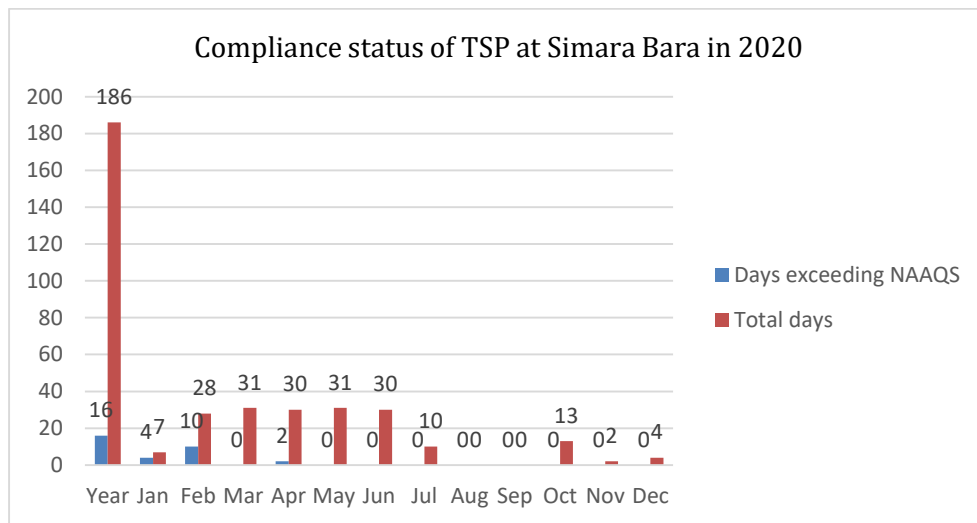


Figure 77: Compliance status of TSP

## Annex

PM<sub>1</sub>

Table 1

dateTime	value	dateTime	value	dateTime	value
1/1/2018		1/1/2019	55.05	1/1/2020	
1/2/2018		1/2/2019	43.86	1/2/2020	
1/3/2018		1/3/2019	51.32	1/3/2020	
1/4/2018		1/4/2019	77.64	1/4/2020	
1/5/2018		1/5/2019	57.15	1/5/2020	
1/6/2018		1/6/2019	37.31	1/6/2020	
1/7/2018		1/7/2019	29.98	1/7/2020	
1/8/2018		1/8/2019	51.44	1/8/2020	
1/9/2018		1/9/2019	85.02	1/9/2020	
1/10/2018		1/10/2019	101.35	1/10/2020	
1/11/2018		1/11/2019	101.69	1/11/2020	
1/12/2018		1/12/2019	96.40	1/12/2020	
1/13/2018		1/13/2019	70.41	1/13/2020	
1/14/2018		1/14/2019	73.53	1/14/2020	
1/15/2018		1/15/2019	93.36	1/15/2020	
1/16/2018		1/16/2019	80.34	1/16/2020	
1/17/2018		1/17/2019	60.74	1/17/2020	
1/18/2018		1/18/2019	61.78	1/18/2020	
1/19/2018		1/19/2019	60.87	1/19/2020	
1/20/2018		1/20/2019	62.51	1/20/2020	
1/21/2018		1/21/2019	67.78	1/21/2020	
1/22/2018		1/22/2019	49.20	1/22/2020	
1/23/2018		1/23/2019	28.46	1/23/2020	
1/24/2018		1/24/2019	27.04	1/24/2020	
1/25/2018		1/25/2019	40.69	1/25/2020	150.04
1/26/2018		1/26/2019	32.87	1/26/2020	140.16
1/27/2018		1/27/2019	41.35	1/27/2020	163.51
1/28/2018		1/28/2019	73.26	1/28/2020	153.37
1/29/2018		1/29/2019	99.88	1/29/2020	158.87
1/30/2018		1/30/2019	104.66	1/30/2020	177.41
1/31/2018		1/31/2019	78.35	1/31/2020	144.82
2/1/2018		2/1/2019	62.19	2/1/2020	124.14
2/2/2018		2/2/2019	52.35	2/2/2020	138.06
2/3/2018		2/3/2019	57.10	2/3/2020	141.68
2/4/2018		2/4/2019	71.07	2/4/2020	133.87

2/5/2018		2/5/2019	83.02	2/5/2020	124.52
2/6/2018		2/6/2019	82.23	2/6/2020	123.80
2/7/2018		2/7/2019	61.98	2/7/2020	118.84
2/8/2018		2/8/2019	42.83	2/8/2020	129.01
2/9/2018		2/9/2019	12.57	2/9/2020	119.10
2/10/2018		2/10/2019	43.27	2/10/2020	109.04
2/11/2018		2/11/2019	55.07	2/11/2020	124.46
2/12/2018		2/12/2019	49.52	2/12/2020	152.83
2/13/2018		2/13/2019	50.10	2/13/2020	145.83
2/14/2018		2/14/2019	76.55	2/14/2020	167.20
2/15/2018		2/15/2019	66.23	2/15/2020	190.51
2/16/2018		2/16/2019	52.16	2/16/2020	187.23
2/17/2018		2/17/2019	64.10	2/17/2020	164.29
2/18/2018		2/18/2019	72.66	2/18/2020	162.35
2/19/2018		2/19/2019	58.68	2/19/2020	176.91
2/20/2018		2/20/2019	63.01	2/20/2020	162.90
2/21/2018		2/21/2019	60.84	2/21/2020	138.02
2/22/2018		2/22/2019	58.74	2/22/2020	74.87
2/23/2018		2/23/2019	71.19	2/23/2020	100.92
2/24/2018		2/24/2019	89.16	2/24/2020	118.47
2/25/2018		2/25/2019	78.36	2/25/2020	93.76
2/26/2018		2/26/2019	30.03	2/26/2020	38.40
2/27/2018		2/27/2019	29.10	2/27/2020	30.52
2/28/2018		2/28/2019	15.52	2/28/2020	38.15
3/1/2018		3/1/2019	44.87	2/29/2020	49.32
3/2/2018		3/2/2019	43.14	3/1/2020	68.65
3/3/2018		3/3/2019	55.94	3/2/2020	67.15
3/4/2018		3/4/2019	46.81	3/3/2020	68.90
3/5/2018		3/5/2019	43.05	3/4/2020	99.76
3/6/2018		3/6/2019	47.23	3/5/2020	122.64
3/7/2018		3/7/2019	51.12	3/6/2020	119.56
3/8/2018		3/8/2019	44.95	3/7/2020	69.49
3/9/2018		3/9/2019	64.62	3/8/2020	79.20
3/10/2018		3/10/2019	55.42	3/9/2020	142.08
3/11/2018		3/11/2019	38.94	3/10/2020	118.33
3/12/2018		3/12/2019	34.79	3/11/2020	137.66
3/13/2018		3/13/2019	29.63	3/12/2020	117.63
3/14/2018		3/14/2019	78.95	3/13/2020	74.98
3/15/2018		3/15/2019	32.76	3/14/2020	54.12
3/16/2018		3/16/2019	42.80	3/15/2020	72.19
3/17/2018		3/17/2019	70.64	3/16/2020	74.33

3/18/2018		3/18/2019	83.45	3/17/2020	88.86
3/19/2018		3/19/2019	73.95	3/18/2020	82.94
3/20/2018		3/20/2019	64.91	3/19/2020	106.22
3/21/2018		3/21/2019	84.55	3/20/2020	108.18
3/22/2018		3/22/2019	75.14	3/21/2020	99.99
3/23/2018		3/23/2019	125.66	3/22/2020	64.04
3/24/2018		3/24/2019	122.06	3/23/2020	41.77
3/25/2018		3/25/2019	77.50	3/24/2020	69.90
3/26/2018		3/26/2019	29.34	3/25/2020	87.84
3/27/2018		3/27/2019	28.90	3/26/2020	76.19
3/28/2018		3/28/2019	44.25	3/27/2020	87.35
3/29/2018		3/29/2019	45.45	3/28/2020	88.32
3/30/2018		3/30/2019	30.83	3/29/2020	88.49
3/31/2018		3/31/2019	21.98	3/30/2020	104.75
4/1/2018		4/1/2019	23.50	3/31/2020	110.77
4/2/2018		4/2/2019	15.30	4/1/2020	122.12
4/3/2018		4/3/2019	16.67	4/2/2020	112.64
4/4/2018		4/4/2019	18.11	4/3/2020	117.76
4/5/2018		4/5/2019	24.75	4/4/2020	132.67
4/6/2018		4/6/2019	48.51	4/5/2020	155.82
4/7/2018		4/7/2019	59.59	4/6/2020	195.39
4/8/2018		4/8/2019	40.20	4/7/2020	146.91
4/9/2018		4/9/2019	53.51	4/8/2020	156.60
4/10/2018		4/10/2019	57.48	4/9/2020	151.00
4/11/2018		4/11/2019	56.28	4/10/2020	149.40
4/12/2018		4/12/2019	54.41	4/11/2020	131.33
4/13/2018		4/13/2019	73.51	4/12/2020	96.52
4/14/2018		4/14/2019	66.09	4/13/2020	73.43
4/15/2018		4/15/2019	72.97	4/14/2020	79.30
4/16/2018		4/16/2019	64.86	4/15/2020	23.27
4/17/2018		4/17/2019	68.42	4/16/2020	28.33
4/18/2018		4/18/2019	86.91	4/17/2020	26.60
4/19/2018		4/19/2019	75.56	4/18/2020	21.50
4/20/2018		4/20/2019	44.76	4/19/2020	19.49
4/21/2018		4/21/2019	43.17	4/20/2020	26.79
4/22/2018		4/22/2019	44.68	4/21/2020	9.77
4/23/2018		4/23/2019	61.45	4/22/2020	13.01
4/24/2018		4/24/2019	57.93	4/23/2020	17.31
4/25/2018		4/25/2019	68.26	4/24/2020	20.73
4/26/2018		4/26/2019	94.48	4/25/2020	15.89
4/27/2018		4/27/2019	117.08	4/26/2020	15.67

4/28/2018		4/28/2019	134.93	4/27/2020	12.64
4/29/2018		4/29/2019	121.72	4/28/2020	11.40
4/30/2018		4/30/2019	70.24	4/29/2020	11.29
5/1/2018		5/1/2019	39.62	4/30/2020	10.52
5/2/2018		5/2/2019	59.74	5/1/2020	12.30
5/3/2018		5/3/2019	50.29	5/2/2020	8.58
5/4/2018		5/4/2019	59.36	5/3/2020	11.98
5/5/2018		5/5/2019	59.85	5/4/2020	7.87
5/6/2018		5/6/2019	69.96	5/5/2020	14.09
5/7/2018		5/7/2019	41.34	5/6/2020	8.49
5/8/2018		5/8/2019	41.35	5/7/2020	10.35
5/9/2018		5/9/2019	42.54	5/8/2020	17.17
5/10/2018		5/10/2019	57.40	5/9/2020	20.31
5/11/2018		5/11/2019	65.08	5/10/2020	18.53
5/12/2018		5/12/2019	36.42	5/11/2020	23.20
5/13/2018		5/13/2019	38.37	5/12/2020	18.92
5/14/2018		5/14/2019	28.54	5/13/2020	19.89
5/15/2018		5/15/2019	26.94	5/14/2020	25.87
5/16/2018		5/16/2019	31.60	5/15/2020	23.72
5/17/2018		5/17/2019	32.81	5/16/2020	24.99
5/18/2018		5/18/2019	26.18	5/17/2020	23.20
5/19/2018		5/19/2019	45.56	5/18/2020	21.88
5/20/2018		5/20/2019	20.94	5/19/2020	19.68
5/21/2018		5/21/2019	28.50	5/20/2020	23.30
5/22/2018		5/22/2019	36.03	5/21/2020	29.34
5/23/2018		5/23/2019	21.47	5/22/2020	15.15
5/24/2018		5/24/2019	15.23	5/23/2020	24.25
5/25/2018		5/25/2019	19.31	5/24/2020	18.70
5/26/2018		5/26/2019	15.39	5/25/2020	16.49
5/27/2018		5/27/2019	21.35	5/26/2020	16.35
5/28/2018		5/28/2019	32.91	5/27/2020	11.00
5/29/2018		5/29/2019	6.69	5/28/2020	11.91
5/30/2018		5/30/2019	5.15	5/29/2020	12.23
5/31/2018		5/31/2019	4.27	5/30/2020	10.29
6/1/2018		6/1/2019	10.31	5/31/2020	13.99
6/2/2018		6/2/2019	2.53	6/1/2020	15.06
6/3/2018		6/3/2019	4.20	6/2/2020	19.21
6/4/2018		6/4/2019	4.40	6/3/2020	26.52
6/5/2018		6/5/2019	10.57	6/4/2020	26.17
6/6/2018		6/6/2019	15.25	6/5/2020	12.69
6/7/2018		6/7/2019	7.14	6/6/2020	7.39

6/8/2018		6/8/2019	6.64	6/7/2020	14.40
6/9/2018		6/9/2019	9.37	6/8/2020	10.83
6/10/2018		6/10/2019	19.44	6/9/2020	14.58
6/11/2018		6/11/2019	19.74	6/10/2020	17.31
6/12/2018		6/12/2019	24.89	6/11/2020	16.32
6/13/2018		6/13/2019	32.49	6/12/2020	7.30
6/14/2018		6/14/2019	34.31	6/13/2020	5.90
6/15/2018		6/15/2019	27.11	6/14/2020	6.32
6/16/2018		6/16/2019	30.63	6/15/2020	5.79
6/17/2018		6/17/2019	34.10	6/16/2020	4.89
6/18/2018		6/18/2019	18.86	6/17/2020	5.30
6/19/2018		6/19/2019	12.85	6/18/2020	8.50
6/20/2018		6/20/2019	23.05	6/19/2020	14.90
6/21/2018		6/21/2019	28.49	6/20/2020	10.94
6/22/2018		6/22/2019	29.85	6/21/2020	9.82
6/23/2018		6/23/2019	22.84	6/22/2020	7.64
6/24/2018		6/24/2019	32.24	6/23/2020	9.62
6/25/2018		6/25/2019	25.80	6/24/2020	13.02
6/26/2018		6/26/2019	24.81	6/25/2020	11.81
6/27/2018		6/27/2019	18.64	6/26/2020	12.07
6/28/2018		6/28/2019	21.45	6/27/2020	10.86
6/29/2018		6/29/2019	33.15	6/28/2020	6.78
6/30/2018		6/30/2019	38.16	6/29/2020	13.17
7/1/2018		7/1/2019	28.41	6/30/2020	13.52
7/2/2018		7/2/2019	14.16	7/1/2020	15.95
7/3/2018		7/3/2019	7.46	7/2/2020	12.29
7/4/2018		7/4/2019	12.71	7/3/2020	12.38
7/5/2018		7/5/2019	23.96	7/4/2020	7.77
7/6/2018		7/6/2019	30.73	7/5/2020	6.83
7/7/2018		7/7/2019	21.87	7/6/2020	4.59
7/8/2018		7/8/2019	14.46	7/7/2020	5.85
7/9/2018		7/9/2019	14.18	7/8/2020	5.99
7/10/2018		7/10/2019	21.21	7/9/2020	15.46
7/11/2018		7/11/2019	27.44	7/10/2020	40.28
7/12/2018		7/12/2019	43.05	7/11/2020	46.04
7/13/2018		7/13/2019	52.92	7/12/2020	40.96
7/14/2018		7/14/2019	52.82	7/13/2020	31.09
7/15/2018		7/15/2019	34.46	7/14/2020	25.45
7/16/2018		7/16/2019	38.84	7/15/2020	33.19
7/17/2018		7/17/2019	31.99	7/16/2020	40.55
7/18/2018		7/18/2019	55.67	7/17/2020	49.14

7/19/2018	6.09	7/19/2019	49.39	7/18/2020	51.51
7/20/2018	5.99	7/20/2019	46.78	7/19/2020	41.91
7/21/2018	6.80	7/21/2019	38.93	7/20/2020	23.22
7/22/2018	4.90	7/22/2019	21.15	7/21/2020	21.49
7/23/2018	6.15	7/23/2019	27.15	7/22/2020	20.92
7/24/2018	8.58	7/24/2019	33.19	7/23/2020	45.13
7/25/2018	10.52	7/25/2019	34.44	7/24/2020	66.22
7/26/2018	9.39	7/26/2019	33.76	7/25/2020	51.56
7/27/2018	8.66	7/27/2019	39.46	7/26/2020	68.94
7/28/2018	7.72	7/28/2019	37.69	7/27/2020	
7/29/2018	10.36	7/29/2019	17.74	7/28/2020	
7/30/2018	13.23	7/30/2019	18.63	7/29/2020	
7/31/2018	10.41	7/31/2019	10.95	7/30/2020	
8/1/2018	9.08	8/1/2019	15.71	7/31/2020	
8/2/2018	6.61	8/2/2019	15.68	8/1/2020	
8/3/2018	8.52	8/3/2019	19.30	8/2/2020	
8/4/2018	9.89	8/4/2019	31.51	8/3/2020	
8/5/2018	9.69	8/5/2019	43.88	8/4/2020	
8/6/2018	4.25	8/6/2019	31.48	8/5/2020	
8/7/2018	5.06	8/7/2019	3.89	8/6/2020	
8/8/2018	9.60	8/8/2019	2.57	8/7/2020	
8/9/2018	12.48	8/9/2019	3.09	8/8/2020	
8/10/2018	12.98	8/10/2019	3.65	8/9/2020	
8/11/2018	10.24	8/11/2019	2.69	8/10/2020	
8/12/2018	9.40	8/12/2019	3.51	8/11/2020	
8/13/2018	9.04	8/13/2019	2.40	8/12/2020	
8/14/2018	8.33	8/14/2019	3.19	8/13/2020	
8/15/2018	3.87	8/15/2019	2.61	8/14/2020	
8/16/2018	6.55	8/16/2019	2.91	8/15/2020	
8/17/2018	7.02	8/17/2019	3.18	8/16/2020	
8/18/2018	8.63	8/18/2019	3.56	8/17/2020	
8/19/2018	9.84	8/19/2019	3.73	8/18/2020	
8/20/2018	7.78	8/20/2019	4.41	8/19/2020	
8/21/2018	6.26	8/21/2019	6.44	8/20/2020	
8/22/2018	7.26	8/22/2019	6.44	8/21/2020	
8/23/2018	5.38	8/23/2019	6.12	8/22/2020	
8/24/2018	5.78	8/24/2019	2.32	8/23/2020	
8/25/2018	6.82	8/25/2019	2.95	8/24/2020	
8/26/2018	5.27	8/26/2019	3.89	8/25/2020	
8/27/2018	4.68	8/27/2019	4.89	8/26/2020	
8/28/2018	5.35	8/28/2019	5.56	8/27/2020	

8/29/2018	5.66	8/29/2019	5.42	8/28/2020	
8/30/2018	6.21	8/30/2019	4.80	8/29/2020	
8/31/2018	7.89	8/31/2019	3.32	8/30/2020	
9/1/2018	7.10	9/1/2019	5.32	8/31/2020	
9/2/2018	9.16	9/2/2019	4.91	9/1/2020	
9/3/2018	8.88	9/3/2019	4.09	9/2/2020	
9/4/2018	17.85	9/4/2019	2.71	9/3/2020	
9/5/2018	21.20	9/5/2019	2.69	9/4/2020	
9/6/2018	11.95	9/6/2019	2.31	9/5/2020	
9/7/2018	6.51	9/7/2019	3.13	9/6/2020	
9/8/2018	13.87	9/8/2019	3.13	9/7/2020	
9/9/2018	12.22	9/9/2019	2.61	9/8/2020	
9/10/2018	20.83	9/10/2019	3.68	9/9/2020	
9/11/2018	22.27	9/11/2019	6.16	9/10/2020	
9/12/2018	13.94	9/12/2019	4.35	9/11/2020	
9/13/2018	16.68	9/13/2019	2.13	9/12/2020	
9/14/2018	14.76	9/14/2019	3.40	9/13/2020	
9/15/2018	18.35	9/15/2019	5.31	9/14/2020	
9/16/2018	14.38	9/16/2019	5.03	9/15/2020	
9/17/2018	19.97	9/17/2019	4.52	9/16/2020	
9/18/2018	23.04	9/18/2019	3.76	9/17/2020	
9/19/2018	19.31	9/19/2019	9.37	9/18/2020	
9/20/2018	11.39	9/20/2019	6.89	9/19/2020	
9/21/2018	5.02	9/21/2019	4.44	9/20/2020	
9/22/2018	8.43	9/22/2019	6.74	9/21/2020	
9/23/2018	16.54	9/23/2019	7.33	9/22/2020	
9/24/2018	20.76	9/24/2019	6.82	9/23/2020	
9/25/2018	24.83	9/25/2019	3.15	9/24/2020	
9/26/2018	21.42	9/26/2019	1.56	9/25/2020	
9/27/2018	21.51	9/27/2019	1.61	9/26/2020	
9/28/2018	27.37	9/28/2019	1.85	9/27/2020	
9/29/2018	31.14	9/29/2019	2.56	9/28/2020	
9/30/2018	41.17	9/30/2019	2.98	9/29/2020	
10/1/2018	32.10	10/1/2019	2.64	9/30/2020	
10/2/2018	27.94	10/2/2019	4.67	10/1/2020	
10/3/2018	28.76	10/3/2019	6.31	10/2/2020	
10/4/2018	24.29	10/4/2019	6.75	10/3/2020	
10/5/2018	23.01	10/5/2019	6.51	10/4/2020	
10/6/2018	28.06	10/6/2019	7.96	10/5/2020	
10/7/2018	28.45	10/7/2019	8.26	10/6/2020	
10/8/2018	30.51	10/8/2019	9.16	10/7/2020	



10/9/2018	32.40	10/9/2019	4.83	10/8/2020	
10/10/2018	26.89	10/10/2019	5.93	10/9/2020	
10/11/2018	23.30	10/11/2019	7.92	10/10/2020	
10/12/2018	14.82	10/12/2019	9.60	10/11/2020	
10/13/2018	21.53	10/13/2019	12.14	10/12/2020	
10/14/2018	32.30	10/14/2019	12.89	10/13/2020	
10/15/2018	36.54	10/15/2019	12.20	10/14/2020	
10/16/2018	42.12	10/16/2019	10.51	10/15/2020	
10/17/2018	47.23	10/17/2019	10.32	10/16/2020	
10/18/2018	44.11	10/18/2019	12.42	10/17/2020	
10/19/2018	45.08	10/19/2019	13.75	10/18/2020	
10/20/2018	44.82	10/20/2019	15.67	10/19/2020	
10/21/2018	47.54	10/21/2019	13.88	10/20/2020	
10/22/2018	45.39	10/22/2019	11.87	10/21/2020	
10/23/2018	39.03	10/23/2019	17.73	10/22/2020	
10/24/2018	36.99	10/24/2019	15.60	10/23/2020	
10/25/2018	44.13	10/25/2019	20.38	10/24/2020	
10/26/2018	32.52	10/26/2019	15.86	10/25/2020	
10/27/2018	21.20	10/27/2019	12.90	10/26/2020	
10/28/2018	18.16	10/28/2019	14.10	10/27/2020	
10/29/2018	19.70	10/29/2019	11.91	10/28/2020	
10/30/2018	17.30	10/30/2019	11.23	10/29/2020	
10/31/2018	15.22	10/31/2019	11.71	10/30/2020	
11/1/2018	22.41	11/1/2019	18.74	10/31/2020	
11/2/2018	27.95	11/2/2019	16.57	11/1/2020	
11/3/2018	33.52	11/3/2019	14.31	11/2/2020	
11/4/2018	48.68	11/4/2019	12.26	11/3/2020	
11/5/2018	35.41	11/5/2019	11.57	11/4/2020	
11/6/2018	45.92	11/6/2019		11/5/2020	
11/7/2018	51.29	11/7/2019		11/6/2020	
11/8/2018	56.92	11/8/2019		11/7/2020	
11/9/2018	56.79	11/9/2019		11/8/2020	
11/10/2018	40.72	11/10/2019	28.93	11/9/2020	
11/11/2018	32.53	11/11/2019	37.76	11/10/2020	
11/12/2018	47.47	11/12/2019	41.73	11/11/2020	
11/13/2018	64.09	11/13/2019	47.46	11/12/2020	
11/14/2018	79.68	11/14/2019	42.27	11/13/2020	
11/15/2018	85.49	11/15/2019	36.80	11/14/2020	
11/16/2018	60.21	11/16/2019	41.28	11/15/2020	
11/17/2018	70.64	11/17/2019	42.69	11/16/2020	
11/18/2018	68.40	11/18/2019	54.86	11/17/2020	

11/19/2018	72.67	11/19/2019	69.19	11/18/2020	
11/20/2018	88.97	11/20/2019	69.82	11/19/2020	
11/21/2018	106.29	11/21/2019	68.82	11/20/2020	
11/22/2018	99.16	11/22/2019	59.92	11/21/2020	
11/23/2018	74.31	11/23/2019	64.10	11/22/2020	
11/24/2018	85.89	11/24/2019	66.41	11/23/2020	
11/25/2018	64.49	11/25/2019	68.21	11/24/2020	
11/26/2018	51.16	11/26/2019	70.58	11/25/2020	
11/27/2018	69.28	11/27/2019	62.49	11/26/2020	
11/28/2018	73.31	11/28/2019	48.49	11/27/2020	
11/29/2018	81.32	11/29/2019	57.29	11/28/2020	
11/30/2018	93.48	11/30/2019	45.23	11/29/2020	
12/1/2018	103.09	12/1/2019	41.39	11/30/2020	
12/2/2018	63.77	12/2/2019	49.69	12/1/2020	
12/3/2018	53.55	12/3/2019	58.52	12/2/2020	
12/4/2018	39.08	12/4/2019	68.07	12/3/2020	
12/5/2018	29.98	12/5/2019	69.11	12/4/2020	
12/6/2018	23.92	12/6/2019	64.72	12/5/2020	
12/7/2018	23.81	12/7/2019	53.54	12/6/2020	
12/8/2018	24.38	12/8/2019	45.18	12/7/2020	
12/9/2018	21.62	12/9/2019	48.46	12/8/2020	
12/10/2018	17.48	12/10/2019	52.64	12/9/2020	
12/11/2018	16.79	12/11/2019	50.96	12/10/2020	
12/12/2018	16.38	12/12/2019	67.23	12/11/2020	
12/13/2018	16.51	12/13/2019	56.76	12/12/2020	
12/14/2018	20.97	12/14/2019	23.17	12/13/2020	
12/15/2018	22.71	12/15/2019	39.03	12/14/2020	
12/16/2018	21.90	12/16/2019	38.84	12/15/2020	
12/17/2018	40.13	12/17/2019	48.14	12/16/2020	
12/18/2018	38.06	12/18/2019	39.41	12/17/2020	
12/19/2018	42.19	12/19/2019	48.28	12/18/2020	
12/20/2018	41.18	12/20/2019	52.49	12/19/2020	
12/21/2018	35.16	12/21/2019	56.27	12/20/2020	
12/22/2018	33.97	12/22/2019	53.21	12/21/2020	
12/23/2018	25.87	12/23/2019	48.40	12/22/2020	
12/24/2018	23.88	12/24/2019	46.88	12/23/2020	
12/25/2018	22.53	12/25/2019	51.69	12/24/2020	
12/26/2018	23.15	12/26/2019	46.25	12/25/2020	
12/27/2018	31.14	12/27/2019	51.60	12/26/2020	
12/28/2018	33.37	12/28/2019	66.86	12/27/2020	
12/29/2018	39.59	12/29/2019	63.89	12/28/2020	

12/30/2018	39.17	12/30/2019	61.19	12/29/2020	
12/31/2018	39.50	12/31/2019	70.21	12/30/2020	

PM<sub>2.5</sub>

date	value	dateTime	value	dateTime	value
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1/4/2018		1/4/2019	80.77	1/4/2020	
1/5/2018		1/5/2019	59.85	1/5/2020	
1/6/2018		1/6/2019	39.73	1/6/2020	
1/7/2018		1/7/2019	33.77	1/7/2020	
1/8/2018		1/8/2019	55.66	1/8/2020	
1/9/2018		1/9/2019	87.87	1/9/2020	
1/10/2018		1/10/2019	103.84	1/10/2020	
1/11/2018		1/11/2019	104.68	1/11/2020	
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1/22/2018		1/22/2019	51.46	1/22/2020	
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1/26/2018		1/26/2019	33.96	1/26/2020	
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1/28/2018		1/28/2019	75.63	1/28/2020	
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2/3/2018		2/3/2019	60.15	2/3/2020	
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2/8/2018		2/8/2019	44.19	2/8/2020	
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2/11/2018		2/11/2019	56.78	2/11/2020	
2/12/2018		2/12/2019	51.62	2/12/2020	
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2/28/2018		2/28/2019	16.13	2/28/2020	
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3/4/2018		3/4/2019	48.15	3/3/2020	
3/5/2018		3/5/2019	45.04	3/4/2020	
3/6/2018		3/6/2019	49.95	3/5/2020	
3/7/2018		3/7/2019	53.80	3/6/2020	
3/8/2018		3/8/2019	47.55	3/7/2020	
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3/15/2018		3/15/2019	36.15	3/14/2020	
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4/1/2018		4/1/2019	25.64	3/31/2020	
4/2/2018		4/2/2019	16.34	4/1/2020	
4/3/2018		4/3/2019	18.26	4/2/2020	
4/4/2018		4/4/2019	22.51	4/3/2020	
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4/22/2018		4/22/2019	46.62	4/21/2020	

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4/26/2018		4/26/2019	96.85	4/25/2020	
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5/1/2018		5/1/2019	41.38	4/30/2020	
5/2/2018		5/2/2019	62.49	5/1/2020	
5/3/2018		5/3/2019	52.57	5/2/2020	
5/4/2018		5/4/2019	61.07	5/3/2020	
5/5/2018		5/5/2019	62.66	5/4/2020	
5/6/2018		5/6/2019	74.07	5/5/2020	
5/7/2018		5/7/2019	45.00	5/6/2020	
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5/13/2018		5/13/2019	40.26	5/12/2020	
5/14/2018		5/14/2019	30.58	5/13/2020	
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6/6/2018		6/6/2019	15.14	6/5/2020	
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7/8/2018		7/8/2019	14.91	7/7/2020	
7/9/2018		7/9/2019	14.34	7/8/2020	
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7/16/2018	7.62	7/16/2019	39.36	7/15/2020	
7/17/2018	10.98	7/17/2019	32.04	7/16/2020	
7/18/2018	8.49	7/18/2019	55.89	7/17/2020	
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7/25/2018	11.06	7/25/2019	34.43	7/24/2020	
7/26/2018	11.56	7/26/2019	34.10	7/25/2020	
7/27/2018	7.05	7/27/2019	39.65	7/26/2020	
7/28/2018	12.17	7/28/2019	38.48	7/27/2020	
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7/31/2018	11.25	7/31/2019	11.33	7/30/2020	
8/1/2018	8.92	8/1/2019	15.61	7/31/2020	
8/2/2018	8.05	8/2/2019	16.06	8/1/2020	
8/3/2018	13.41	8/3/2019	19.40	8/2/2020	
8/4/2018	12.33	8/4/2019	31.13	8/3/2020	
8/5/2018	6.83	8/5/2019	43.94	8/4/2020	
8/6/2018	6.91	8/6/2019	33.89	8/5/2020	
8/7/2018	9.76	8/7/2019	3.35	8/6/2020	
8/8/2018	16.36	8/8/2019	2.57	8/7/2020	
8/9/2018	16.67	8/9/2019	3.09	8/8/2020	
8/10/2018	13.10	8/10/2019	3.65	8/9/2020	
8/11/2018	10.61	8/11/2019	2.69	8/10/2020	
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8/14/2018	5.89	8/14/2019	3.19	8/13/2020	
8/15/2018	6.63	8/15/2019	2.61	8/14/2020	
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8/17/2018	11.08	8/17/2019	3.18	8/16/2020	
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8/23/2018	6.49	8/23/2019	6.12	8/22/2020	



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8/25/2018	6.98	8/25/2019	2.95	8/24/2020	
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8/27/2018	6.52	8/27/2019	4.89	8/26/2020	
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9/2/2018	9.96	9/2/2019	4.91	9/1/2020	
9/3/2018	17.96	9/3/2019	4.09	9/2/2020	
9/4/2018	23.00	9/4/2019	2.71	9/3/2020	
9/5/2018	18.84	9/5/2019	2.69	9/4/2020	
9/6/2018	7.43	9/6/2019	2.31	9/5/2020	
9/7/2018	14.80	9/7/2019	3.13	9/6/2020	
9/8/2018	17.50	9/8/2019	3.13	9/7/2020	
9/9/2018	21.77	9/9/2019	2.61	9/8/2020	
9/10/2018	27.63	9/10/2019	3.68	9/9/2020	
9/11/2018	18.21	9/11/2019	6.16	9/10/2020	
9/12/2018	20.72	9/12/2019	4.35	9/11/2020	
9/13/2018	16.83	9/13/2019	2.13	9/12/2020	
9/14/2018	21.29	9/14/2019	3.40	9/13/2020	
9/15/2018	18.26	9/15/2019	5.31	9/14/2020	
9/16/2018	22.87	9/16/2019	5.03	9/15/2020	
9/17/2018	27.57	9/17/2019	4.52	9/16/2020	
9/18/2018	25.70	9/18/2019	3.76	9/17/2020	
9/19/2018	15.08	9/19/2019	9.37	9/18/2020	
9/20/2018	5.71	9/20/2019	6.89	9/19/2020	
9/21/2018	7.95	9/21/2019	4.44	9/20/2020	
9/22/2018	20.35	9/22/2019	6.74	9/21/2020	
9/23/2018	22.97	9/23/2019	7.33	9/22/2020	
9/24/2018	26.97	9/24/2019	6.82	9/23/2020	
9/25/2018	27.19	9/25/2019	3.15	9/24/2020	
9/26/2018	21.70	9/26/2019	1.56	9/25/2020	
9/27/2018	30.14	9/27/2019	1.61	9/26/2020	
9/28/2018	32.47	9/28/2019	1.85	9/27/2020	
9/29/2018	45.28	9/29/2019	2.56	9/28/2020	
9/30/2018	37.00	9/30/2019	2.98	9/29/2020	
10/1/2018	31.14	10/1/2019	2.64	9/30/2020	
10/2/2018	30.12	10/2/2019	4.67	10/1/2020	
10/3/2018	29.01	10/3/2019	6.31	10/2/2020	

10/4/2018	23.18	10/4/2019	6.75	10/3/2020	
10/5/2018	30.45	10/5/2019	6.51	10/4/2020	
10/6/2018	31.63	10/6/2019	7.96	10/5/2020	
10/7/2018	33.60	10/7/2019	8.26	10/6/2020	
10/8/2018	34.66	10/8/2019	9.16	10/7/2020	
10/9/2018	32.15	10/9/2019	4.83	10/8/2020	
10/10/2018	25.16	10/10/2019	5.93	10/9/2020	
10/11/2018	19.98	10/11/2019	7.92	10/10/2020	
10/12/2018	22.32	10/12/2019	9.60	10/11/2020	
10/13/2018	33.94	10/13/2019	12.14	10/12/2020	
10/14/2018	38.46	10/14/2019	12.89	10/13/2020	
10/15/2018	44.33	10/15/2019	12.20	10/14/2020	
10/16/2018	49.55	10/16/2019	10.51	10/15/2020	
10/17/2018	49.65	10/17/2019	10.32	10/16/2020	
10/18/2018	46.81	10/18/2019	12.42	10/17/2020	
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10/21/2018	50.24	10/21/2019	13.88	10/20/2020	
10/22/2018	45.19	10/22/2019	11.87	10/21/2020	
10/23/2018	37.39	10/23/2019	17.73	10/22/2020	
10/24/2018	46.61	10/24/2019	15.60	10/23/2020	
10/25/2018	40.08	10/25/2019	20.38	10/24/2020	
10/26/2018	24.43	10/26/2019	15.86	10/25/2020	
10/27/2018	20.15	10/27/2019	12.90	10/26/2020	
10/28/2018	22.21	10/28/2019	14.10	10/27/2020	
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11/1/2018	30.48	11/1/2019	18.74	10/31/2020	
11/2/2018	29.04	11/2/2019	16.57	11/1/2020	
11/3/2018	48.88	11/3/2019	14.31	11/2/2020	
11/4/2018	44.40	11/4/2019	12.26	11/3/2020	
11/5/2018	44.20	11/5/2019	11.57	11/4/2020	
11/6/2018	51.95	11/6/2019		11/5/2020	
11/7/2018	59.31	11/7/2019		11/6/2020	
11/8/2018	58.62	11/8/2019		11/7/2020	
11/9/2018	45.93	11/9/2019		11/8/2020	
11/10/2018	34.13	11/10/2019	28.93	11/9/2020	
11/11/2018	41.68	11/11/2019	37.76	11/10/2020	
11/12/2018	64.94	11/12/2019	41.73	11/11/2020	
11/13/2018	74.62	11/13/2019	47.46	11/12/2020	

11/14/2018	93.82	11/14/2019	42.27	11/13/2020	
11/15/2018	67.99	11/15/2019	36.80	11/14/2020	
11/16/2018	67.54	11/16/2019	41.28	11/15/2020	
11/17/2018	70.12	11/17/2019	42.69	11/16/2020	
11/18/2018	73.06	11/18/2019	54.86	11/17/2020	
11/19/2018	86.30	11/19/2019	69.19	11/18/2020	
11/20/2018	103.26	11/20/2019	69.82	11/19/2020	
11/21/2018	110.03	11/21/2019	68.82	11/20/2020	
11/22/2018	82.52	11/22/2019	59.92	11/21/2020	
11/23/2018	87.13	11/23/2019	64.10	11/22/2020	
11/24/2018	77.16	11/24/2019	66.41	11/23/2020	
11/25/2018	56.79	11/25/2019	68.21	11/24/2020	
11/26/2018	65.08	11/26/2019	70.58	11/25/2020	
11/27/2018	82.56	11/27/2019	62.49	11/26/2020	
11/28/2018	79.18	11/28/2019	48.49	11/27/2020	
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11/30/2018	111.31	11/30/2019	45.23	11/29/2020	
12/1/2018	74.07	12/1/2019	41.39	11/30/2020	
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12/3/2018	49.30	12/3/2019	58.52	12/2/2020	
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12/5/2018	29.98	12/5/2019	69.11	12/4/2020	
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12/12/2018	16.38	12/12/2019	67.23	12/11/2020	
12/13/2018	16.51	12/13/2019	56.76	12/12/2020	
12/14/2018	20.97	12/14/2019	23.17	12/13/2020	
12/15/2018	22.71	12/15/2019	39.03	12/14/2020	
12/16/2018	21.90	12/16/2019	38.84	12/15/2020	
12/17/2018	40.13	12/17/2019	48.14	12/16/2020	
12/18/2018	38.06	12/18/2019	39.41	12/17/2020	
12/19/2018	42.19	12/19/2019	48.28	12/18/2020	
12/20/2018	41.18	12/20/2019	52.49	12/19/2020	
12/21/2018	35.16	12/21/2019	56.27	12/20/2020	
12/22/2018	33.97	12/22/2019	53.21	12/21/2020	
12/23/2018	25.87	12/23/2019	48.40	12/22/2020	
12/24/2018	23.88	12/24/2019	46.88	12/23/2020	

12/25/2018	22.53	12/25/2019	51.69	12/24/2020	
12/26/2018	23.15	12/26/2019	46.25	12/25/2020	
12/27/2018	31.14	12/27/2019	51.60	12/26/2020	
12/28/2018	33.37	12/28/2019	66.86	12/27/2020	
12/29/2018	39.59	12/29/2019	63.89	12/28/2020	
12/30/2018	39.17	12/30/2019	61.19	12/29/2020	
12/31/2018	39.50	12/31/2019	70.21	12/30/2020	

**PM<sub>10</sub>**

dateTime	value	dateTime	value	dateTime	value
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1/4/2018		1/4/2019	92.21	1/4/2020	
1/5/2018		1/5/2019	70.23	1/5/2020	
1/6/2018		1/6/2019	49.90	1/6/2020	
1/7/2018		1/7/2019	51.04	1/7/2020	
1/8/2018		1/8/2019	76.44	1/8/2020	
1/9/2018		1/9/2019	100.78	1/9/2020	
1/10/2018		1/10/2019	113.65	1/10/2020	
1/11/2018		1/11/2019	116.78	1/11/2020	
1/12/2018		1/12/2019	108.23	1/12/2020	
1/13/2018		1/13/2019	90.87	1/13/2020	
1/14/2018		1/14/2019	93.05	1/14/2020	
1/15/2018		1/15/2019	108.07	1/15/2020	
1/16/2018		1/16/2019	94.49	1/16/2020	
1/17/2018		1/17/2019	72.72	1/17/2020	
1/18/2018		1/18/2019	75.81	1/18/2020	
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1/24/2018		1/24/2019	32.86	1/24/2020	
1/25/2018		1/25/2019	47.71	1/25/2020	
1/26/2018		1/26/2019	37.07	1/26/2020	193.77

1/27/2018		1/27/2019	48.35	1/27/2020	183.47
1/28/2018		1/28/2019	86.30	1/28/2020	200.28
1/29/2018		1/29/2019	113.74	1/29/2020	175.08
1/30/2018		1/30/2019	114.48	1/30/2020	184.09
1/31/2018		1/31/2019	88.57	1/31/2020	220.83
2/1/2018		2/1/2019	74.57	2/1/2020	196.34
2/2/2018		2/2/2019	66.06	2/2/2020	164.78
2/3/2018		2/3/2019	73.16	2/3/2020	192.41
2/4/2018		2/4/2019	85.28	2/4/2020	176.28
2/5/2018		2/5/2019	95.25	2/5/2020	180.33
2/6/2018		2/6/2019	97.04	2/6/2020	170.24
2/7/2018		2/7/2019	66.84	2/7/2020	163.12
2/8/2018		2/8/2019	47.36	2/8/2020	153.10
2/9/2018		2/9/2019	13.69	2/9/2020	172.06
2/10/2018		2/10/2019	50.28	2/10/2020	165.37
2/11/2018		2/11/2019	62.35	2/11/2020	156.14
2/12/2018		2/12/2019	60.05	2/12/2020	171.96
2/13/2018		2/13/2019	62.63	2/13/2020	223.43
2/14/2018		2/14/2019	87.55	2/14/2020	187.68
2/15/2018		2/15/2019	74.13	2/15/2020	231.50
2/16/2018		2/16/2019	59.07	2/16/2020	242.79
2/17/2018		2/17/2019	78.47	2/17/2020	257.01
2/18/2018		2/18/2019	76.99	2/18/2020	210.99
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2/21/2018		2/21/2019	73.18	2/21/2020	222.82
2/22/2018		2/22/2019	70.71	2/22/2020	181.34
2/23/2018		2/23/2019	84.74	2/23/2020	85.54
2/24/2018		2/24/2019	105.14	2/24/2020	117.40
2/25/2018		2/25/2019	87.69	2/25/2020	142.01
2/26/2018		2/26/2019	49.75	2/26/2020	106.38
2/27/2018		2/27/2019	36.59	2/27/2020	42.64
2/28/2018		2/28/2019	17.38	2/28/2020	41.84
3/1/2018		3/1/2019	50.72	2/29/2020	54.97
3/2/2018		3/2/2019	49.91	3/1/2020	69.61
3/3/2018		3/3/2019	63.09	3/2/2020	98.26
3/4/2018		3/4/2019	53.30	3/3/2020	94.30
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3/6/2018		3/6/2019	61.11	3/5/2020	142.77
3/7/2018		3/7/2019	65.01	3/6/2020	156.47
3/8/2018		3/8/2019	57.44	3/7/2020	149.67
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3/10/2018		3/10/2019	66.55	3/9/2020	99.34

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3/12/2018		3/12/2019	56.08	3/11/2020	147.96
3/13/2018		3/13/2019	48.29	3/12/2020	174.18
3/14/2018		3/14/2019	93.70	3/13/2020	162.53
3/15/2018		3/15/2019	50.56	3/14/2020	93.75
3/16/2018		3/16/2019	72.44	3/15/2020	65.39
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3/20/2018		3/20/2019	72.86	3/19/2020	129.98
3/21/2018		3/21/2019	92.42	3/20/2020	159.60
3/22/2018		3/22/2019	89.66	3/21/2020	154.83
3/23/2018		3/23/2019	148.62	3/22/2020	138.55
3/24/2018		3/24/2019	131.39	3/23/2020	92.57
3/25/2018		3/25/2019	91.61	3/24/2020	53.47
3/26/2018		3/26/2019	36.10	3/25/2020	85.64
3/27/2018		3/27/2019	33.32	3/26/2020	108.61
3/28/2018		3/28/2019	51.65	3/27/2020	111.47
3/29/2018		3/29/2019	56.49	3/28/2020	123.37
3/30/2018		3/30/2019	46.90	3/29/2020	120.16
3/31/2018		3/31/2019	38.02	3/30/2020	121.28
4/1/2018		4/1/2019	35.48	3/31/2020	147.72
4/2/2018		4/2/2019	19.86	4/1/2020	143.21
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4/4/2018		4/4/2019	43.59	4/3/2020	143.28
4/5/2018		4/5/2019	39.79	4/4/2020	160.38
4/6/2018		4/6/2019	64.05	4/5/2020	165.18
4/7/2018		4/7/2019	77.89	4/6/2020	184.60
4/8/2018		4/8/2019	58.66	4/7/2020	226.97
4/9/2018		4/9/2019	79.75	4/8/2020	165.44
4/10/2018		4/10/2019	82.85	4/9/2020	165.78
4/11/2018		4/11/2019	68.96	4/10/2020	155.97
4/12/2018		4/12/2019	69.75	4/11/2020	152.30
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4/20/2018		4/20/2019	69.41	4/19/2020	31.45
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4/22/2018		4/22/2019	49.28	4/21/2020	41.85

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4/25/2018		4/25/2019	91.25	4/24/2020	23.96
4/26/2018		4/26/2019	108.58	4/25/2020	26.05
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4/28/2018		4/28/2019	145.35	4/27/2020	21.76
4/29/2018		4/29/2019	135.60	4/28/2020	18.23
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5/1/2018		5/1/2019	47.62	4/30/2020	20.07
5/2/2018		5/2/2019	73.24	5/1/2020	16.61
5/3/2018		5/3/2019	62.27	5/2/2020	17.11
5/4/2018		5/4/2019	68.81	5/3/2020	12.56
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5/6/2018		5/6/2019	96.38	5/5/2020	16.28
5/7/2018		5/7/2019	61.46	5/6/2020	24.98
5/8/2018		5/8/2019	59.68	5/7/2020	16.21
5/9/2018		5/9/2019	66.92	5/8/2020	19.52
5/10/2018		5/10/2019	73.80	5/9/2020	34.17
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5/19/2018		5/19/2019	48.40	5/18/2020	50.49
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5/21/2018		5/21/2019	34.25	5/20/2020	31.60
5/22/2018		5/22/2019	40.04	5/21/2020	37.01
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5/25/2018		5/25/2019	26.94	5/24/2020	40.99
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5/29/2018		5/29/2019	9.07	5/28/2020	23.53
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6/7/2018		6/7/2019	9.11	6/6/2020	17.97
6/8/2018		6/8/2019	7.25	6/7/2020	11.43
6/9/2018		6/9/2019	12.28	6/8/2020	25.94
6/10/2018		6/10/2019	24.86	6/9/2020	23.51
6/11/2018		6/11/2019	20.57	6/10/2020	29.43
6/12/2018		6/12/2019	25.78	6/11/2020	37.04
6/13/2018		6/13/2019	34.40	6/12/2020	42.65
6/14/2018		6/14/2019	36.51	6/13/2020	21.49
6/15/2018		6/15/2019	27.91	6/14/2020	21.72
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6/17/2018		6/17/2019	35.66	6/16/2020	11.65
6/18/2018		6/18/2019	20.44	6/17/2020	7.54
6/19/2018		6/19/2019	13.38	6/18/2020	12.33
6/20/2018		6/20/2019	22.99	6/19/2020	13.20
6/21/2018		6/21/2019	29.77	6/20/2020	22.48
6/22/2018		6/22/2019	30.73	6/21/2020	18.66
6/23/2018		6/23/2019	23.37	6/22/2020	17.31
6/24/2018		6/24/2019	32.97	6/23/2020	14.85
6/25/2018		6/25/2019	26.62	6/24/2020	22.42
6/26/2018		6/26/2019	25.72	6/25/2020	27.04
6/27/2018		6/27/2019	19.26	6/26/2020	17.80
6/28/2018		6/28/2019	21.96	6/27/2020	20.06
6/29/2018		6/29/2019	33.61	6/28/2020	19.58
6/30/2018		6/30/2019	38.99	6/29/2020	11.14
7/1/2018		7/1/2019	29.62	6/30/2020	20.50
7/2/2018		7/2/2019	14.95	7/1/2020	23.12
7/3/2018		7/3/2019	7.94	7/2/2020	31.89
7/4/2018		7/4/2019	13.03	7/3/2020	20.25
7/5/2018		7/5/2019	24.39	7/4/2020	21.01
7/6/2018		7/6/2019	31.35	7/5/2020	12.13
7/7/2018		7/7/2019	22.79	7/6/2020	14.22
7/8/2018		7/8/2019	15.05	7/7/2020	9.84
7/9/2018		7/9/2019	14.49	7/8/2020	14.13
7/10/2018		7/10/2019	21.26	7/9/2020	13.42
7/11/2018		7/11/2019	27.46	7/10/2020	30.79
7/12/2018		7/12/2019	43.26	7/11/2020	88.12
7/13/2018		7/13/2019	54.07	7/12/2020	91.47
7/14/2018		7/14/2019	54.04	7/13/2020	78.06
7/15/2018	24.17	7/15/2019	35.41	7/14/2020	61.92
7/16/2018	15.20	7/16/2019	39.61	7/15/2020	43.75
7/17/2018	16.95	7/17/2019	32.28	7/16/2020	60.66



7/18/2018	15.83	7/18/2019	56.19	7/17/2020	70.88
7/19/2018	16.89	7/19/2019	50.10	7/18/2020	88.57
7/20/2018	12.55	7/20/2019	47.22	7/19/2020	85.65
7/21/2018	19.39	7/21/2019	40.13	7/20/2020	74.49
7/22/2018	16.57	7/22/2019	21.67	7/21/2020	46.05
7/23/2018	14.36	7/23/2019	27.53	7/22/2020	47.55
7/24/2018	11.91	7/24/2019	33.98	7/23/2020	51.48
7/25/2018	13.08	7/25/2019	34.62	7/24/2020	76.45
7/26/2018	14.99	7/26/2019	34.39	7/25/2020	117.04
7/27/2018	9.80	7/27/2019	39.86	7/26/2020	91.08
7/28/2018	15.60	7/28/2019	38.64	7/27/2020	121.35
7/29/2018	16.84	7/29/2019	18.49	7/28/2020	
7/30/2018	13.24	7/30/2019	19.00	7/29/2020	
7/31/2018	12.72	7/31/2019	11.44	7/30/2020	
8/1/2018	11.81	8/1/2019	15.72	7/31/2020	
8/2/2018	10.16	8/2/2019	16.15	8/1/2020	
8/3/2018	17.16	8/3/2019	19.52	8/2/2020	
8/4/2018	15.88	8/4/2019	31.30	8/3/2020	
8/5/2018	8.31	8/5/2019	44.35	8/4/2020	
8/6/2018	10.64	8/6/2019	34.81	8/5/2020	
8/7/2018	13.53	8/7/2019	8.50	8/6/2020	
8/8/2018	23.37	8/8/2019	2.57	8/7/2020	
8/9/2018	21.89	8/9/2019	3.09	8/8/2020	
8/10/2018	16.50	8/10/2019	3.65	8/9/2020	
8/11/2018	13.19	8/11/2019	2.69	8/10/2020	
8/12/2018	11.90	8/12/2019	3.51	8/11/2020	
8/13/2018	14.82	8/13/2019	2.40	8/12/2020	
8/14/2018	7.81	8/14/2019	3.19	8/13/2020	
8/15/2018	9.27	8/15/2019	2.61	8/14/2020	
8/16/2018	13.25	8/16/2019	2.91	8/15/2020	
8/17/2018	17.99	8/17/2019	3.18	8/16/2020	
8/18/2018	18.53	8/18/2019	3.56	8/17/2020	
8/19/2018	13.65	8/19/2019	3.73	8/18/2020	
8/20/2018	12.45	8/20/2019	4.41	8/19/2020	
8/21/2018	10.88	8/21/2019	6.44	8/20/2020	
8/22/2018	10.68	8/22/2019	6.44	8/21/2020	
8/23/2018	7.96	8/23/2019	6.12	8/22/2020	
8/24/2018	9.01	8/24/2019	2.32	8/23/2020	
8/25/2018	9.62	8/25/2019	2.95	8/24/2020	
8/26/2018	7.91	8/26/2019	3.89	8/25/2020	
8/27/2018	8.48	8/27/2019	4.89	8/26/2020	
8/28/2018	10.00	8/28/2019	5.56	8/27/2020	
8/29/2018	10.93	8/29/2019	5.42	8/28/2020	

8/30/2018	10.82	8/30/2019	4.80	8/29/2020	
8/31/2018	12.71	8/31/2019	3.32	8/30/2020	
9/1/2018	13.35	9/1/2019	5.32	8/31/2020	
9/2/2018	12.98	9/2/2019	4.91	9/1/2020	
9/3/2018	21.16	9/3/2019	4.09	9/2/2020	
9/4/2018	30.86	9/4/2019	2.71	9/3/2020	
9/5/2018	23.15	9/5/2019	2.69	9/4/2020	
9/6/2018	11.27	9/6/2019	2.31	9/5/2020	
9/7/2018	19.96	9/7/2019	3.13	9/6/2020	
9/8/2018	23.39	9/8/2019	3.13	9/7/2020	
9/9/2018	29.85	9/9/2019	2.61	9/8/2020	
9/10/2018	35.84	9/10/2019	3.68	9/9/2020	
9/11/2018	23.07	9/11/2019	6.16	9/10/2020	
9/12/2018	26.50	9/12/2019	4.35	9/11/2020	
9/13/2018	22.81	9/13/2019	2.13	9/12/2020	
9/14/2018	30.86	9/14/2019	3.40	9/13/2020	
9/15/2018	23.84	9/15/2019	5.31	9/14/2020	
9/16/2018	31.84	9/16/2019	5.03	9/15/2020	
9/17/2018	37.27	9/17/2019	4.52	9/16/2020	
9/18/2018	35.35	9/18/2019	3.76	9/17/2020	
9/19/2018	20.48	9/19/2019	9.37	9/18/2020	
9/20/2018	8.67	9/20/2019	6.89	9/19/2020	
9/21/2018	9.56	9/21/2019	4.44	9/20/2020	
9/22/2018	28.53	9/22/2019	6.74	9/21/2020	
9/23/2018	32.64	9/23/2019	7.33	9/22/2020	
9/24/2018	35.03	9/24/2019	6.82	9/23/2020	
9/25/2018	34.77	9/25/2019	3.15	9/24/2020	
9/26/2018	28.36	9/26/2019	1.56	9/25/2020	
9/27/2018	39.22	9/27/2019	1.61	9/26/2020	
9/28/2018	42.55	9/28/2019	1.85	9/27/2020	
9/29/2018	54.59	9/29/2019	2.56	9/28/2020	
9/30/2018	46.67	9/30/2019	2.98	9/29/2020	
10/1/2018	37.55	10/1/2019	2.64	9/30/2020	
10/2/2018	36.12	10/2/2019	4.67	10/1/2020	
10/3/2018	33.12	10/3/2019	6.31	10/2/2020	
10/4/2018	26.68	10/4/2019	6.75	10/3/2020	
10/5/2018	38.33	10/5/2019	6.51	10/4/2020	
10/6/2018	38.57	10/6/2019	7.96	10/5/2020	
10/7/2018	42.69	10/7/2019	8.26	10/6/2020	
10/8/2018	42.15	10/8/2019	9.16	10/7/2020	
10/9/2018	37.70	10/9/2019	4.83	10/8/2020	
10/10/2018	30.05	10/10/2019	5.93	10/9/2020	
10/11/2018	24.24	10/11/2019	7.92	10/10/2020	

10/12/2018	30.12	10/12/2019	9.60	10/11/2020	
10/13/2018	47.63	10/13/2019	12.14	10/12/2020	
10/14/2018	47.25	10/14/2019	12.89	10/13/2020	
10/15/2018	52.02	10/15/2019	12.20	10/14/2020	
10/16/2018	58.27	10/16/2019	10.51	10/15/2020	
10/17/2018	57.97	10/17/2019	10.32	10/16/2020	
10/18/2018	54.01	10/18/2019	12.42	10/17/2020	
10/19/2018	55.93	10/19/2019	13.75	10/18/2020	
10/20/2018	56.04	10/20/2019	15.67	10/19/2020	
10/21/2018	59.50	10/21/2019	13.88	10/20/2020	
10/22/2018	56.80	10/22/2019	11.87	10/21/2020	
10/23/2018	45.77	10/23/2019	17.73	10/22/2020	
10/24/2018	54.69	10/24/2019	15.60	10/23/2020	
10/25/2018	46.94	10/25/2019	20.38	10/24/2020	
10/26/2018	29.38	10/26/2019	15.86	10/25/2020	
10/27/2018	23.71	10/27/2019	12.90	10/26/2020	
10/28/2018	27.15	10/28/2019	14.10	10/27/2020	
10/29/2018	24.09	10/29/2019	11.91	10/28/2020	
10/30/2018	24.66	10/30/2019	11.23	10/29/2020	
10/31/2018	28.09	10/31/2019	11.71	10/30/2020	
11/1/2018	36.24	11/1/2019	18.74	10/31/2020	
11/2/2018	33.90	11/2/2019	16.57	11/1/2020	
11/3/2018	55.04	11/3/2019	14.31	11/2/2020	
11/4/2018	51.22	11/4/2019	12.26	11/3/2020	
11/5/2018	52.86	11/5/2019	11.57	11/4/2020	
11/6/2018	56.54	11/6/2019		11/5/2020	
11/7/2018	64.96	11/7/2019		11/6/2020	
11/8/2018	62.61	11/8/2019		11/7/2020	
11/9/2018	47.99	11/9/2019		11/8/2020	
11/10/2018	36.19	11/10/2019	28.93	11/9/2020	
11/11/2018	45.49	11/11/2019	37.76	11/10/2020	
11/12/2018	67.86	11/12/2019	41.73	11/11/2020	
11/13/2018	78.70	11/13/2019	47.46	11/12/2020	
11/14/2018	99.69	11/14/2019	42.27	11/13/2020	
11/15/2018	73.70	11/15/2019	36.80	11/14/2020	
11/16/2018	72.73	11/16/2019	41.28	11/15/2020	
11/17/2018	73.98	11/17/2019	42.69	11/16/2020	
11/18/2018	77.04	11/18/2019	54.86	11/17/2020	
11/19/2018	91.35	11/19/2019	69.19	11/18/2020	
11/20/2018	106.48	11/20/2019	69.82	11/19/2020	
11/21/2018	118.78	11/21/2019	68.82	11/20/2020	
11/22/2018	90.07	11/22/2019	59.92	11/21/2020	
11/23/2018	105.96	11/23/2019	64.10	11/22/2020	

11/24/2018	92.24	11/24/2019	66.41	11/23/2020	
11/25/2018	70.36	11/25/2019	68.21	11/24/2020	
11/26/2018	81.86	11/26/2019	70.58	11/25/2020	
11/27/2018	95.14	11/27/2019	62.49	11/26/2020	
11/28/2018	91.24	11/28/2019	48.49	11/27/2020	
11/29/2018	110.19	11/29/2019	57.29	11/28/2020	
11/30/2018	124.42	11/30/2019	45.23	11/29/2020	
12/1/2018	87.46	12/1/2019	41.39	11/30/2020	
12/2/2018	71.09	12/2/2019	49.69	12/1/2020	
12/3/2018	64.58	12/3/2019	58.52	12/2/2020	
12/4/2018	26.02	12/4/2019	68.07	12/3/2020	
12/5/2018	29.98	12/5/2019	69.11	12/4/2020	
12/6/2018	23.92	12/6/2019	64.72	12/5/2020	
12/7/2018	23.81	12/7/2019	53.54	12/6/2020	
12/8/2018	24.38	12/8/2019	45.18	12/7/2020	
12/9/2018	21.62	12/9/2019	48.46	12/8/2020	
12/10/2018	17.48	12/10/2019	52.64	12/9/2020	
12/11/2018	16.79	12/11/2019	50.96	12/10/2020	
12/12/2018	16.38	12/12/2019	67.23	12/11/2020	
12/13/2018	16.51	12/13/2019	56.76	12/12/2020	
12/14/2018	20.97	12/14/2019	23.17	12/13/2020	
12/15/2018	22.71	12/15/2019	39.03	12/14/2020	
12/16/2018	21.90	12/16/2019	38.84	12/15/2020	
12/17/2018	40.13	12/17/2019	48.14	12/16/2020	
12/18/2018	38.06	12/18/2019	39.41	12/17/2020	
12/19/2018	42.19	12/19/2019	48.28	12/18/2020	
12/20/2018	41.18	12/20/2019	52.49	12/19/2020	
12/21/2018	35.16	12/21/2019	56.27	12/20/2020	
12/22/2018	33.97	12/22/2019	53.21	12/21/2020	
12/23/2018	25.87	12/23/2019	48.40	12/22/2020	
12/24/2018	23.88	12/24/2019	46.88	12/23/2020	
12/25/2018	22.53	12/25/2019	51.69	12/24/2020	
12/26/2018	23.15	12/26/2019	46.25	12/25/2020	
12/27/2018	31.14	12/27/2019	51.60	12/26/2020	
12/28/2018	33.37	12/28/2019	66.86	12/27/2020	
12/29/2018	39.59	12/29/2019	63.89	12/28/2020	
12/30/2018	39.17	12/30/2019	61.19	12/29/2020	
12/31/2018	39.50	12/31/2019	70.21	12/30/2020	

## TSP

Table 2

1/1/2018		1/1/2019	96.15	1/1/2020	
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1/2/2018		1/2/2019	78.71	1/2/2020	
1/3/2018		1/3/2019	101.41	1/3/2020	
1/4/2018		1/4/2019	113.94	1/4/2020	
1/5/2018		1/5/2019	91.77	1/5/2020	
1/6/2018		1/6/2019	77.65	1/6/2020	
1/7/2018		1/7/2019	98.75	1/7/2020	
1/8/2018		1/8/2019	134.89	1/8/2020	
1/9/2018		1/9/2019	130.07	1/9/2020	
1/10/2018		1/10/2019	139.27	1/10/2020	
1/11/2018		1/11/2019	137.74	1/11/2020	
1/12/2018		1/12/2019	132.19	1/12/2020	
1/13/2018		1/13/2019	120.82	1/13/2020	
1/14/2018		1/14/2019	134.55	1/14/2020	
1/15/2018		1/15/2019	132.49	1/15/2020	
1/16/2018		1/16/2019	124.35	1/16/2020	
1/17/2018		1/17/2019	96.57	1/17/2020	
1/18/2018		1/18/2019	101.46	1/18/2020	
1/19/2018		1/19/2019	106.38	1/19/2020	
1/20/2018		1/20/2019	97.19	1/20/2020	
1/21/2018		1/21/2019	95.72	1/21/2020	
1/22/2018		1/22/2019	76.20	1/22/2020	
1/23/2018		1/23/2019	44.64	1/23/2020	
1/24/2018		1/24/2019	47.43	1/24/2020	
1/25/2018		1/25/2019	64.03	1/25/2020	
1/26/2018		1/26/2019	45.02	1/26/2020	
1/27/2018		1/27/2019	65.32	1/27/2020	
1/28/2018		1/28/2019	119.25	1/28/2020	
1/29/2018		1/29/2019	143.94	1/29/2020	
1/30/2018		1/30/2019	133.60	1/30/2020	
1/31/2018		1/31/2019	112.68	1/31/2020	
2/1/2018		2/1/2019	96.37	2/1/2020	
2/2/2018		2/2/2019	90.74	2/2/2020	
2/3/2018		2/3/2019	103.40	2/3/2020	
2/4/2018		2/4/2019	110.98	2/4/2020	
2/5/2018		2/5/2019	121.08	2/5/2020	
2/6/2018		2/6/2019	122.28	2/6/2020	
2/7/2018		2/7/2019	79.66	2/7/2020	
2/8/2018		2/8/2019	53.38	2/8/2020	
2/9/2018		2/9/2019	16.37	2/9/2020	
2/10/2018		2/10/2019	58.62	2/10/2020	
2/11/2018		2/11/2019	71.94	2/11/2020	

2/12/2018		2/12/2019	79.51	2/12/2020	
2/13/2018		2/13/2019	80.84	2/13/2020	
2/14/2018		2/14/2019	98.89	2/14/2020	
2/15/2018		2/15/2019	90.82	2/15/2020	
2/16/2018		2/16/2019	73.03	2/16/2020	
2/17/2018		2/17/2019	111.70	2/17/2020	
2/18/2018		2/18/2019	86.78	2/18/2020	
2/19/2018		2/19/2019	98.99	2/19/2020	
2/20/2018		2/20/2019	94.74	2/20/2020	
2/21/2018		2/21/2019	91.34	2/21/2020	
2/22/2018		2/22/2019	88.98	2/22/2020	
2/23/2018		2/23/2019	107.28	2/23/2020	
2/24/2018		2/24/2019	123.08	2/24/2020	
2/25/2018		2/25/2019	112.04	2/25/2020	
2/26/2018		2/26/2019	98.14	2/26/2020	
2/27/2018		2/27/2019	55.85	2/27/2020	
2/28/2018		2/28/2019	21.39	2/28/2020	
3/1/2018		3/1/2019	59.01	2/29/2020	
3/2/2018		3/2/2019	60.80	3/1/2020	
3/3/2018		3/3/2019	73.40	3/2/2020	
3/4/2018		3/4/2019	70.96	3/3/2020	
3/5/2018		3/5/2019	69.15	3/4/2020	
3/6/2018		3/6/2019	81.06	3/5/2020	
3/7/2018		3/7/2019	95.56	3/6/2020	
3/8/2018		3/8/2019	74.46	3/7/2020	
3/9/2018		3/9/2019	89.80	3/8/2020	
3/10/2018		3/10/2019	89.81	3/9/2020	
3/11/2018		3/11/2019	69.08	3/10/2020	
3/12/2018		3/12/2019	96.97	3/11/2020	
3/13/2018		3/13/2019	83.55	3/12/2020	
3/14/2018		3/14/2019	97.16	3/13/2020	
3/15/2018		3/15/2019	104.44	3/14/2020	
3/16/2018		3/16/2019	138.86	3/15/2020	
3/17/2018		3/17/2019	104.09	3/16/2020	
3/18/2018		3/18/2019	129.18	3/17/2020	
3/19/2018		3/19/2019	110.60	3/18/2020	
3/20/2018		3/20/2019	80.78	3/19/2020	
3/21/2018		3/21/2019	107.44	3/20/2020	
3/22/2018		3/22/2019	109.88	3/21/2020	
3/23/2018		3/23/2019	161.40	3/22/2020	
3/24/2018		3/24/2019	168.14	3/23/2020	

3/25/2018		3/25/2019	116.24	3/24/2020	
3/26/2018		3/26/2019	64.44	3/25/2020	
3/27/2018		3/27/2019	34.73	3/26/2020	
3/28/2018		3/28/2019	62.57	3/27/2020	
3/29/2018		3/29/2019	75.76	3/28/2020	
3/30/2018		3/30/2019	86.50	3/29/2020	
3/31/2018		3/31/2019		3/30/2020	
4/1/2018		4/1/2019		3/31/2020	
4/2/2018		4/2/2019		4/1/2020	
4/3/2018		4/3/2019		4/2/2020	
4/4/2018		4/4/2019		4/3/2020	
4/5/2018		4/5/2019		4/4/2020	
4/6/2018		4/6/2019		4/5/2020	
4/7/2018		4/7/2019		4/6/2020	
4/8/2018		4/8/2019		4/7/2020	
4/9/2018		4/9/2019		4/8/2020	
4/10/2018		4/10/2019		4/9/2020	
4/11/2018		4/11/2019	74.49	4/10/2020	
4/12/2018		4/12/2019	66.40	4/11/2020	
4/13/2018		4/13/2019	58.01	4/12/2020	
4/14/2018		4/14/2019	30.34	4/13/2020	
4/15/2018		4/15/2019	50.08	4/14/2020	
4/16/2018		4/16/2019	87.06	4/15/2020	
4/17/2018		4/17/2019	65.28	4/16/2020	
4/18/2018		4/18/2019	95.76	4/17/2020	
4/19/2018		4/19/2019	112.53	4/18/2020	
4/20/2018		4/20/2019	93.34	4/19/2020	
4/21/2018		4/21/2019	131.02	4/20/2020	
4/22/2018		4/22/2019	139.43	4/21/2020	
4/23/2018		4/23/2019	97.24	4/22/2020	
4/24/2018		4/24/2019	100.89	4/23/2020	
4/25/2018		4/25/2019	100.25	4/24/2020	
4/26/2018		4/26/2019	114.69	4/25/2020	
4/27/2018		4/27/2019	131.04	4/26/2020	
4/28/2018		4/28/2019	108.00	4/27/2020	
4/29/2018		4/29/2019	134.20	4/28/2020	
4/30/2018		4/30/2019	135.57	4/29/2020	
5/1/2018		5/1/2019	124.82	4/30/2020	
5/2/2018		5/2/2019	126.92	5/1/2020	
5/3/2018		5/3/2019	72.78	5/2/2020	
5/4/2018		5/4/2019	54.63	5/3/2020	

5/5/2018		5/5/2019	104.68	5/4/2020	
5/6/2018		5/6/2019	103.91	5/5/2020	
5/7/2018		5/7/2019	132.96	5/6/2020	
5/8/2018		5/8/2019	131.49	5/7/2020	
5/9/2018		5/9/2019	149.40	5/8/2020	
5/10/2018		5/10/2019	167.05	5/9/2020	
5/11/2018		5/11/2019	172.92	5/10/2020	
5/12/2018		5/12/2019	153.30	5/11/2020	
5/13/2018		5/13/2019	60.55	5/12/2020	
5/14/2018		5/14/2019	88.92	5/13/2020	
5/15/2018		5/15/2019	80.57	5/14/2020	
5/16/2018		5/16/2019	92.33	5/15/2020	
5/17/2018		5/17/2019	105.79	5/16/2020	
5/18/2018		5/18/2019	132.35	5/17/2020	
5/19/2018		5/19/2019	83.24	5/18/2020	
5/20/2018		5/20/2019	78.83	5/19/2020	
5/21/2018		5/21/2019	96.99	5/20/2020	
5/22/2018		5/22/2019	98.74	5/21/2020	
5/23/2018		5/23/2019	94.10	5/22/2020	
5/24/2018		5/24/2019	53.91	5/23/2020	
5/25/2018		5/25/2019	60.51	5/24/2020	
5/26/2018		5/26/2019	48.55	5/25/2020	
5/27/2018		5/27/2019	52.12	5/26/2020	
5/28/2018		5/28/2019	72.64	5/27/2020	
5/29/2018		5/29/2019	65.62	5/28/2020	
5/30/2018		5/30/2019	75.65	5/29/2020	
5/31/2018		5/31/2019	50.46	5/30/2020	
6/1/2018		6/1/2019	38.81	5/31/2020	
6/2/2018		6/2/2019	44.88	6/1/2020	
6/3/2018		6/3/2019	44.86	6/2/2020	
6/4/2018		6/4/2019	33.47	6/3/2020	
6/5/2018		6/5/2019	35.84	6/4/2020	
6/6/2018		6/6/2019	39.63	6/5/2020	
6/7/2018		6/7/2019	44.32	6/6/2020	
6/8/2018		6/8/2019	37.78	6/7/2020	
6/9/2018		6/9/2019	53.19	6/8/2020	
6/10/2018		6/10/2019	74.83	6/9/2020	
6/11/2018		6/11/2019	64.99	6/10/2020	
6/12/2018		6/12/2019	52.63	6/11/2020	
6/13/2018		6/13/2019	78.42	6/12/2020	
6/14/2018		6/14/2019	67.90	6/13/2020	



6/15/2018		6/15/2019		6/14/2020	
6/16/2018		6/16/2019		6/15/2020	
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6/18/2018		6/18/2019		6/17/2020	
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6/29/2018		6/29/2019		6/28/2020	
6/30/2018		6/30/2019		6/29/2020	
7/1/2018		7/1/2019		6/30/2020	
7/2/2018		7/2/2019		7/1/2020	
7/3/2018		7/3/2019		7/2/2020	
7/4/2018		7/4/2019		7/3/2020	
7/5/2018		7/5/2019		7/4/2020	
7/6/2018		7/6/2019		7/5/2020	
7/7/2018		7/7/2019		7/6/2020	
7/8/2018		7/8/2019		7/7/2020	
7/9/2018		7/9/2019		7/8/2020	
7/10/2018		7/10/2019		7/9/2020	
7/11/2018		7/11/2019		7/10/2020	
7/12/2018		7/12/2019		7/11/2020	
7/13/2018		7/13/2019		7/12/2020	
7/14/2018		7/14/2019		7/13/2020	
7/15/2018	92.48	7/15/2019		7/14/2020	
7/16/2018	47.83	7/16/2019		7/15/2020	
7/17/2018	41.17	7/17/2019		7/16/2020	
7/18/2018	26.35	7/18/2019		7/17/2020	
7/19/2018	34.25	7/19/2019		7/18/2020	
7/20/2018	31.33	7/20/2019		7/19/2020	
7/21/2018	18.14	7/21/2019		7/20/2020	
7/22/2018	63.85	7/22/2019		7/21/2020	
7/23/2018	54.90	7/23/2019		7/22/2020	
7/24/2018	31.55	7/24/2019		7/23/2020	
7/25/2018	13.05	7/25/2019		7/24/2020	

7/26/2018	16.53	7/26/2019		7/25/2020	
7/27/2018	18.31	7/27/2019		7/26/2020	
7/28/2018	18.16	7/28/2019		7/27/2020	
7/29/2018	17.25	7/29/2019		7/28/2020	
7/30/2018	17.30	7/30/2019		7/29/2020	
7/31/2018	12.95	7/31/2019		7/30/2020	
8/1/2018	12.77	8/1/2019	0.80	7/31/2020	
8/2/2018	13.74	8/2/2019		8/1/2020	
8/3/2018	13.75	8/3/2019	18.31	8/2/2020	
8/4/2018	18.47	8/4/2019	5.82	8/3/2020	
8/5/2018	17.81	8/5/2019	4.50	8/4/2020	
8/6/2018	9.24	8/6/2019	11.87	8/5/2020	
8/7/2018	19.41	8/7/2019	3.20	8/6/2020	
8/8/2018	23.54	8/8/2019	13.64	8/7/2020	
8/9/2018	34.75	8/9/2019	6.77	8/8/2020	
8/10/2018	25.31	8/10/2019	8.74	8/9/2020	
8/11/2018	18.56	8/11/2019	11.92	8/10/2020	
8/12/2018	15.88	8/12/2019	15.63	8/11/2020	
8/13/2018	14.73	8/13/2019	5.37	8/12/2020	
8/14/2018	16.01	8/14/2019	12.24	8/13/2020	
8/15/2018	9.98	8/15/2019	13.30	8/14/2020	
8/16/2018	16.04	8/16/2019		8/15/2020	
8/17/2018	23.29	8/17/2019		8/16/2020	
8/18/2018	34.98	8/18/2019		8/17/2020	
8/19/2018	30.33	8/19/2019		8/18/2020	
8/20/2018	24.32	8/20/2019		8/19/2020	
8/21/2018	19.64	8/21/2019		8/20/2020	
8/22/2018	15.99	8/22/2019		8/21/2020	
8/23/2018	12.55	8/23/2019		8/22/2020	
8/24/2018	9.30	8/24/2019		8/23/2020	
8/25/2018	10.38	8/25/2019		8/24/2020	
8/26/2018	12.84	8/26/2019		8/25/2020	
8/27/2018	10.89	8/27/2019		8/26/2020	
8/28/2018	9.75	8/28/2019		8/27/2020	
8/29/2018	14.73	8/29/2019		8/28/2020	
8/30/2018	13.46	8/30/2019		8/29/2020	
8/31/2018	15.63	8/31/2019		8/30/2020	
9/1/2018	18.40	9/1/2019		8/31/2020	
9/2/2018	16.25	9/2/2019		9/1/2020	
9/3/2018	17.90	9/3/2019		9/2/2020	
9/4/2018	25.85	9/4/2019		9/3/2020	

9/5/2018	42.82	9/5/2019		9/4/2020	
9/6/2018	18.51	9/6/2019		9/5/2020	
9/7/2018	25.20	9/7/2019		9/6/2020	
9/8/2018	31.43	9/8/2019		9/7/2020	
9/9/2018	29.68	9/9/2019		9/8/2020	
9/10/2018	52.17	9/10/2019		9/9/2020	
9/11/2018	40.43	9/11/2019		9/10/2020	
9/12/2018	22.86	9/12/2019		9/11/2020	
9/13/2018	26.87	9/13/2019		9/12/2020	
9/14/2018	33.03	9/14/2019		9/13/2020	
9/15/2018	42.63	9/15/2019		9/14/2020	
9/16/2018	27.84	9/16/2019		9/15/2020	
9/17/2018	40.10	9/17/2019		9/16/2020	
9/18/2018	46.44	9/18/2019		9/17/2020	
9/19/2018	43.72	9/19/2019		9/18/2020	
9/20/2018	29.87	9/20/2019		9/19/2020	
9/21/2018	18.93	9/21/2019		9/20/2020	
9/22/2018	13.63	9/22/2019		9/21/2020	
9/23/2018	47.42	9/23/2019		9/22/2020	
9/24/2018	62.34	9/24/2019		9/23/2020	
9/25/2018	66.76	9/25/2019		9/24/2020	
9/26/2018	52.89	9/26/2019		9/25/2020	
9/27/2018	46.35	9/27/2019		9/26/2020	
9/28/2018	70.24	9/28/2019		9/27/2020	
9/29/2018	72.48	9/29/2019		9/28/2020	
9/30/2018	74.81	9/30/2019		9/29/2020	
10/1/2018	69.72	10/1/2019		9/30/2020	
10/2/2018	53.14	10/2/2019		10/1/2020	
10/3/2018	49.51	10/3/2019		10/2/2020	
10/4/2018	39.42	10/4/2019		10/3/2020	
10/5/2018	35.74	10/5/2019		10/4/2020	
10/6/2018	58.69	10/6/2019		10/5/2020	
10/7/2018	53.77	10/7/2019		10/6/2020	
10/8/2018	63.97	10/8/2019		10/7/2020	
10/9/2018	55.95	10/9/2019		10/8/2020	
10/10/2018	44.85	10/10/2019		10/9/2020	
10/11/2018	44.08	10/11/2019		10/10/2020	
10/12/2018	36.49	10/12/2019		10/11/2020	
10/13/2018	55.23	10/13/2019		10/12/2020	
10/14/2018	91.82	10/14/2019		10/13/2020	
10/15/2018	65.85	10/15/2019		10/14/2020	

10/16/2018	66.11	10/16/2019		10/15/2020	
10/17/2018	70.42	10/17/2019	47.11	10/16/2020	
10/18/2018	67.67	10/18/2019	19.43	10/17/2020	
10/19/2018	66.23	10/19/2019	23.39	10/18/2020	
10/20/2018	64.12	10/20/2019	33.51	10/19/2020	
10/21/2018	65.73	10/21/2019	37.97	10/20/2020	
10/22/2018	72.11	10/22/2019	28.67	10/21/2020	
10/23/2018	71.22	10/23/2019	32.19	10/22/2020	
10/24/2018	63.32	10/24/2019	31.10	10/23/2020	
10/25/2018	65.66	10/25/2019	28.04	10/24/2020	
10/26/2018	55.98	10/26/2019	14.37	10/25/2020	
10/27/2018	37.37	10/27/2019	18.16	10/26/2020	
10/28/2018	30.40	10/28/2019	31.38	10/27/2020	
10/29/2018	36.25	10/29/2019	30.40	10/28/2020	
10/30/2018	36.83	10/30/2019	23.44	10/29/2020	
10/31/2018	39.60	10/31/2019	30.56	10/30/2020	
11/1/2018	46.60	11/1/2019	28.32	10/31/2020	
11/2/2018	49.36	11/2/2019	27.25	11/1/2020	
11/3/2018	50.89	11/3/2019	20.14	11/2/2020	
11/4/2018	68.68	11/4/2019	22.19	11/3/2020	
11/5/2018	62.35	11/5/2019	30.46	11/4/2020	
11/6/2018	71.48	11/6/2019	35.26	11/5/2020	
11/7/2018	64.16	11/7/2019	33.60	11/6/2020	
11/8/2018	72.59	11/8/2019	18.50	11/7/2020	
11/9/2018	70.17	11/9/2019	10.72	11/8/2020	
11/10/2018	46.77	11/10/2019	11.66	11/9/2020	
11/11/2018	37.85	11/11/2019	22.49	11/10/2020	
11/12/2018	60.24	11/12/2019	27.14	11/11/2020	
11/13/2018	71.37	11/13/2019	26.11	11/12/2020	
11/14/2018	93.26	11/14/2019	17.96	11/13/2020	
11/15/2018	101.25	11/15/2019	14.60	11/14/2020	
11/16/2018	82.17	11/16/2019	19.22	11/15/2020	
11/17/2018	86.65	11/17/2019	23.30	11/16/2020	
11/18/2018	79.42	11/18/2019	39.48	11/17/2020	
11/19/2018	82.56	11/19/2019	53.84	11/18/2020	
11/20/2018	106.78	11/20/2019	53.28	11/19/2020	
11/21/2018	116.31	11/21/2019	40.25	11/20/2020	
11/22/2018	129.49	11/22/2019	40.09	11/21/2020	
11/23/2018	114.71	11/23/2019	33.01	11/22/2020	
11/24/2018		11/24/2019	48.95	11/23/2020	
11/25/2018		11/25/2019	53.41	11/24/2020	

11/26/2018		11/26/2019	44.96	11/25/2020	
11/27/2018		11/27/2019	43.49	11/26/2020	
11/28/2018		11/28/2019	26.92	11/27/2020	
11/29/2018		11/29/2019	27.37	11/28/2020	
11/30/2018		11/30/2019	33.65	11/29/2020	
12/1/2018		12/1/2019	32.99	11/30/2020	
12/2/2018		12/2/2019	33.01	12/1/2020	
12/3/2018		12/3/2019	38.91	12/2/2020	
12/4/2018		12/4/2019	41.18	12/3/2020	
12/5/2018		12/5/2019	22.59	12/4/2020	
12/6/2018		12/6/2019	18.40	12/5/2020	
12/7/2018		12/7/2019	13.74	12/6/2020	
12/8/2018		12/8/2019	14.81	12/7/2020	
12/9/2018		12/9/2019	16.47	12/8/2020	
12/10/2018		12/10/2019	18.26	12/9/2020	
12/11/2018		12/11/2019	25.63	12/10/2020	
12/12/2018		12/12/2019	45.37	12/11/2020	
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12/14/2018		12/14/2019	15.78	12/13/2020	
12/15/2018		12/15/2019		12/14/2020	
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12/17/2018		12/17/2019		12/16/2020	
12/18/2018		12/18/2019		12/17/2020	
12/19/2018		12/19/2019		12/18/2020	
12/20/2018		12/20/2019		12/19/2020	
12/21/2018	285.10	12/21/2019		12/20/2020	
12/22/2018	133.36	12/22/2019		12/21/2020	
12/23/2018	113.80	12/23/2019		12/22/2020	
12/24/2018	123.15	12/24/2019		12/23/2020	
12/25/2018	124.19	12/25/2019		12/24/2020	
12/26/2018	110.20	12/26/2019		12/25/2020	
12/27/2018	152.92	12/27/2019		12/26/2020	
12/28/2018	149.56	12/28/2019		12/27/2020	
12/29/2018	137.33	12/29/2019		12/28/2020	
12/30/2018	107.29	12/30/2019		12/29/2020	
12/31/2018	109.93	12/31/2019		12/30/2020	