AIR UNIT

THE ENVIRONMENTAL MANAGEMENT AUTHORITY

Ambient Air Quality Monitoring Report 2019 (January – October)

NATIONAL AIR QUALITY INDEX

EMA environmental management authority

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1.0 INTRODUCTION

This report is prepared by the Environmental Management Authority (EMA) to provide information on air quality for Trinidad and Tobago. The purpose of this report is to summarize ambient air quality, while presenting ambient air monitoring results for five (5) criteria pollutants. The EMA sets ambient air quality standards/permissible levels for these pollutants, as outlined in Schedule 1, of the Air Pollution Rules, 2014 (APR). The criteria pollutants are:

- Particulate Matter (PM_{10} ≤10 micrometers, $PM_{2.5}$ ≤2.5 micrometers in diameter)
- Carbon Monoxide (CO)
- Sulfur Dioxide (SO_2)
- Nitrogen Dioxide (NO_2)
- Ozone (O_3)

The following meteorological parameters are also monitored:

- Temperature
- Relative Humidity
- Barometric Pressure
- Wind Speed
- Wind Direction

Particulate matter is currently the most common criteria pollutant of concern because particulate sources are widespread. Common sources include windblown dust, re-entrained road dust, smoke (bushfires during the dry season), Saharan Dust and motor vehicle emissions. Studies have associated fine particulate matter with a variety of respiratory and cardiovascular problems, ranging from aggravated asthma, to irregular heartbeats, heart attacks, and early death in people with heart or lung disease.

Sulfur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) sources are few and localized because these pollutants come primarily from large industrial sources (transportation sources also contribute to NO_2). There are no heavy industries in the Port of Spain area, therefore, elevated SO_2 and NO_2 concentrations due to industrial sources in ambient air are not typically found. Elevated NO_2 concentrations from transportation sources, however, are observed during peak traffic hours.

Carbon monoxide (CO) sources include incomplete fossil fuel combustion. CO concentrations have the potential to be high in urbanized areas where automobile traffic is heavy and vehicles are frequently idling. Elevated CO concentrations have been observed during peak traffic hours.

Ozone (O_3) is created when combustion by-products near the ground react with Nitrogen Oxides and other compounds to create photochemical smog. These reactions are stimulated on days of intense sunlight and warm temperatures.

2.0 AIR QUALITY STANDARDS

The Air Pollution Rules, 2014 (APR) were developed under Sections 26, 27, 49, 50 and 51 of the Environmental Management Act, Chapter 35:05 of 2000. Through the APR, the EMA seeks to manage the levels of specific air pollutants known to cause harm to human health and the environment, thereby, improving overall air quality. To this end, prescribed standards for air pollutants in Ambient Air (Schedule 1) and for the release of air pollutants for point sources (Schedule 2) have been established. The ambient air quality standards for the parameters that are currently monitored are identified in Table 1 below:

TABLE 1: AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS

Parameter	**Short-Term Maximum Permissible Levels**		**Long-Term Maximum Permissible Levels**	
	Maximum Permissible Levels	Averaging Time	Maximum Permissible Levels	Averaging Time
PM_{10}	75 µg/m^3	24 hours	50 µg/m^3	1 year
$PM_{2.5}$	65 µg/m^3	24 hours	15 µg/m^3	1 year
Carbon Monoxide (CO)	100 000 µg/m^3	15 minutes		
	60 000 µg/m^3	30 minutes		
	30 000 µg/m^3	1 hour		
	10 000 µg/m^3	8 hours		
Nitrogen Dioxide (NO_2)	200 µg/m^3	1 hour		
Sulfur Dioxide (SO_2)	500 µg/m^3	10 minutes		
	125 µg/m^3	24 hours		
Ozone (O_3)	120 µg/m^3	8 hours		

The standard for each pollutant may have different averaging times (for example, hourly and 8-hour averages). These different forms of the standard are created and enforced to address varied health impacts that occur as a result of shorter, high-level exposure versus longer, low-level exposure. The data that follow, show how air quality in Trinidad compared to the standards discussed above, for 2019 (January – October, 2019). The Air Quality Index (AQI) colour coding is shown to aid interpretation of air quality, but does not imply whether or not standards were actually met for each pollutant.

3.0 MONITORING NETWORK

At present, the distribution of commissioned ambient air quality monitoring equipment is in Port of Spain, Point Lisas and Signal Hill, Tobago. The Trinidad stations were located at the EMA's Port of Spain and Chaguanas offices during the periods October 2015 – May 2019 and October 2015 – October 2019, respectively. They are currently sited at the Water and Sewage Authority's Beetham Wastewater Treatment Plant and the Point Lisas Industrial Port Development Corporation Limited (PLIPDECO) House. At each location meteorological and pollutant-specific parameters are monitored. The stations are operated and maintained by the EMA. Data is collected via the internet, through the software installed on the stations.

Table 2 below, presents a summary of the monitoring stations and parameters monitored. Figure 1 illustrates the locations of the monitoring stations.

Criteria pollutants are measured using approved United States Environmental Protection Agency (US EPA) reference methods, to assess compliance with the standards listed in the APR. Table 3 lists the methods used for the various pollutants.

TABLE 2: MONITORING NETWORK

Area	Location Description	PM_{10}	$PM_{2.5}$	O_3	NO_x	CO	SO_2	Met
Point Lisas, Trinidad	PLIPDECO House, Orinoco Drive, Point Lisas Industrial Estate, Couva,	√	√	√	√	√	√	√
Port of Spain, Trinidad	Beetham Wastewater Treatment Plant, East Sea Lots, Beetham Highway	√	√	√	√	√	√	√
Signal Hill, Tobago	Signal Hill Secondary School, Signal Hill Road, Signal Hill	√	√	√	√	√	√	√

Notes:

PM_{10} – Particulate Matter ≤10 micrometers
$PM_{2.5}$ – Particulate Matter ≤2.5 micrometers
Met - Meteorological data
NO_x – Oxides of Nitrogen
O_3 - Ozone
CO – Carbon Monoxide
SO_2 – Sulfur Dioxide

TABLE 3: MONITORING METHODS

Pollutant	Method	Units
Carbon Monoxide	Non-dispersive Infrared Radiation	ppm, ppb, $\mu g/m^3$, mg/m^3
Oxides of Nitrogen	Chemiluminescence	ppm, ppb, $\mu g/m^3$, mg/m^3
Ozone	Ultraviolet Photometry	ppm, ppb, $\mu g/m^3$, mg/m^3
Sulfur Dioxide	Ultraviolet Fluorescence	ppm, ppb, $\mu g/m^3$, mg/m^3
Particulate Matter ≤10 micrometers	Beta Ray Attenuation; Scattered Light Spectrometry	mg/m^3
Particulate Matter ≤2.5 micrometers	Beta Ray Attenuation; Scattered Light Spectrometry	mg/m^3

Notes:

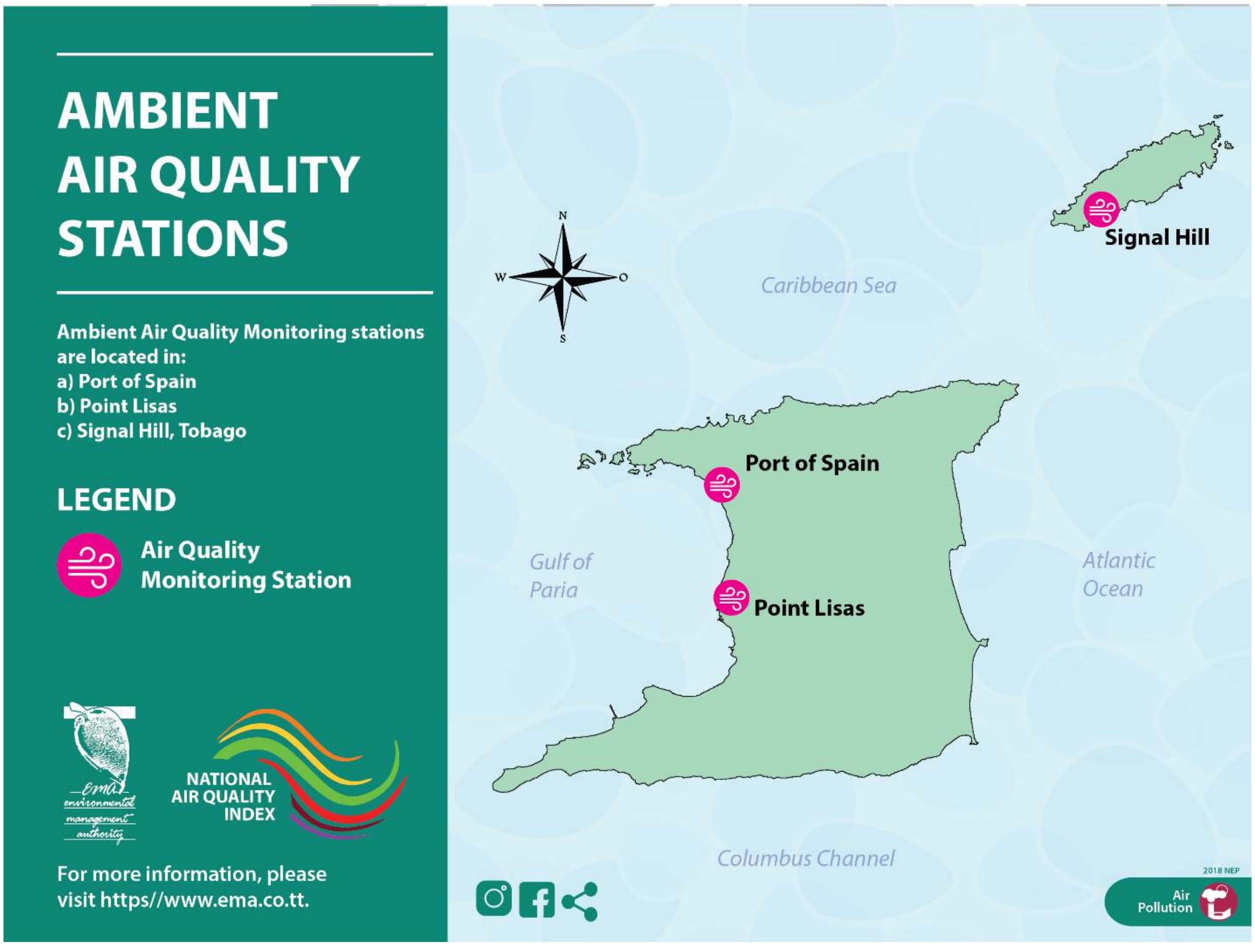
ppm – Parts per million

ppb – Parts per billion

mg/m^3 – Milligrams per Cubic Meter

$\mu g/m^3$ - Micrograms per Cubic Meter

FIGURE 1: MAP SHOWING THE LOCATIONS OF THE AMBIENT AIR QUALITY MONITORING STATIONS



4.0 PRINCIPLE OF OPERATION

4.1 Particulate Matter (PM_{10} and $PM_{2.5}$)

4.1.1 Beta Attenation Mass Monitor

The Met One Instruments, Inc. Model BAM-1020 Beta Attenation Mass Monitor automatically measures and records hourly ambient particulate mass concentration using the principle of beta attenuation. The concentration is determined in units of milligrams per cubic meter (mg/m3) or micrograms per cubic meter (μg/m3). The monitor consists of three (3) basic components: the central unit, the sampling pump and the sampling inlet hardware. Each component is self-contained and may be easily disconnected for servicing and replacement.

The inlet of the BAM-1020 can be configured for either PM10 or PM2.5 measurement. For PM10 measurements, a 10 micron inertial impactor is installed on the top of the inlet. For PM2.5 measurements, a 2.5 micron very sharp cut cyclone is installed in line between the 10 micron inertial impactor and the inlet tube.

Ambient temperature and pressure sensors are attached to the BAM-1020 monitors to meet the requirements of the applicable United States Environmental Protection Agency (USEPA) designated equivalent test methods.

4.1.2 Scattered Light Spectrometry

The Model T640 PM Mass Monitor is an optical aerosol spectrometer that converts optical measurements to mass measurements with sharp accuracy by determining sampled particle size via scattered light at the single particle level according to the Lorenz-Mie Theory.

Briefly, the sampling head draws in ambient air with different-sized particles, which are dried with the Aerosol Sample Conditioner (ASC) and moved into the optical particle sensor where scattered light intensity is measured to determine particle size diameter. The particles move separately into the T-aperture through an optically differentiated measurement volume that is homogeneously illuminated with polychromatic light. The polychromatic light source, an LED, combined with a 90° scattered light detection achieves a precise and unambiguous calibration curve, resulting in a large size resolution.

Each particle generates a scattered light impulse that is detected at an 85° to 95° angle where amplitude and signal length are measured; the amplitude (height) of the scattered light impulse is directly related to the particle size diameter.

The T-aperture and simultaneous signal length measurements eliminate border zone error, which is characterized by the partial illumination of particles at the border of the measurement range.

4.2 Carbon Monoxide (CO)

This component uses a high energy heated element to generate a beam of broad-band Infrared (IR) light with a known intensity at 4.7μm wavelength (measured during Instrument calibration). This beam is directed through a multi-pass cell filled with sample gas.

The sample cell uses mirrors at each end to reflect the IR beam back and forth through the sample gas to generate a 14 meter absorption path. Upon exiting the sample cell, the beam shines through a band-pass filter that allows only light at a wavelength of 4.7μm to pass. Finally, the beam strikes a solid-state photo-detector that converts the light signal into a modulated voltage signal representing the attenuated intensity of the beam.

4.3 Oxides of Nitrogen (NO_X)

The NO_x module utilises the principal of Chemiluminescence. The device measures the concentration of NO and NO_x in a gas sample and is able to calculate the concentration of NO2 by subtracting the concentration of NO from the concentration of NO_x. NO_2 cannot be measured directly because it does not react with O_3. O_3 is fed into the reaction cell and reacts with NO; light at a specific wavelength is emitted due to the chemical reaction. The light intensity produced is measured by a Photomultiplier Tube (PMT) and is directly proportional to the concentration of excited molecules.

4.4 Sulfur Dioxide (SO_2)

The measurement principle is based on absorption or detection of photons. Within the SO_2 reaction cell the SO_2 molecules are excited by ultraviolet light of wavelength 214 nm generated by low pressure zinc vapor lamp, refer to the equation 1 below. The SO_2 molecules absorb this light energy which is in turn is emitted as a light pulse (photon), refer to equation 2. These photons have a wavelength of 330 nm and are recorded by a photomultiplier tube (PMT) detector which measures its fluorescence and sends an analog signal.

$SO_2 + h\upsilon \rightarrow SO_2^*$ (1)

$SO_2^* \rightarrow SO_2 + h\upsilon$ (2)

The optical design of the sample chamber optimizes the fluorescent reaction between SO_2 and Ultra Violet (UV) light ensuring that only UV light resulting from the decay of SO_2 into SO_2 is sensed by the instrument's fluorescence. The analyzer uses two stages of optical filters to enhance performance:

Conditioning the UV light used to excite the 2 by removing frequencies of light that are not needed to produce SO_2

Protecting the PMT detector from reacting to light not produced by the SO_2 returning to its ground state.

Other measures/ design to assure the PMT only detects the light emitted by the decaying SO_2^* include:

The pathway of excitation UV and field of view of the PMT are perpendicular to each other.

The inner surfaces of the sample chamber are coated with a layer of black Teflon to absorb light of other wavelengths.

4.5 Ozone (O_3)

The ozone analyzer measures each of the variables: Sample Temperature, Sample Pressure, the intensity of the UV light beam with and without O_3 present, inserts known values for the length of the absorption path and the absorption coefficient, and calculates the concentration of O_3 present in the sample gas.

In the most basic terms, it uses a high energy, mercury vapor lamp to generate a beam of UV light. This beam passes through a window of material specifically chosen to be both non-reactive to O_3 and transparent to UV radiation at 254 nm and into an absorption tube filled with Sample Gas. Because ozone is a very efficient absorber of UV radiation, the absorption path length required to create a measurable decrease in UV intensity is short enough (approximately 42 cm) to pass the light beam only one time through the absorption tube. Therefore, no complex mirror system is needed to lengthen the effective path by bouncing the beam back and forth.

Finally, the UV passes through a similar window at the other end of the absorption tube and is detected by a specially designed vacuum diode that only detects radiation at or very near a wavelength of 254 nm. The selectivity of the detector is high enough that no extra optical filtering of the UV light is needed. The detector assembly reacts to the UV light and outputs a voltage that varies in direct relationship with the light's intensity. This voltage is digitized and sent to the instrument's central processing unit (CPU) to be used in computing the concentration of O_3 in the absorption tube.

4.6 Meteorological Parameters

The Wind Sensor (WS) family is a range of low cost smart combination of weather sensors for the acquisition of a variety of measurement variables, as used for example for environmental data logging in road traffic management systems. The WS500 model has a combination of sensors for various measurement variables as follows:

- Wind Direction
- Wind Speed
- Air Temperature
- Relative Humidity
- Air Pressure
- Compass

TABLE 4: SENSORS OF THE WS500 AND MEASUREMENT DESCRIPTION

SENSOR	MEASUREMENT DESCRIPTION
Wind	The wind meter uses 4 ultrasonic sensors which take cyclical measurements in all directions. The resulting wind speed and direction are calculated from the measured run-time sound differential. The sensor delivers a quality output signal indicating how many good readings were taken during the measurement interval.
Compass	The integrated electronic compass can be used to check the north-south adjustment of the sensor housing for wind direction measurement. It is also used to calculate the compass corrected wind direction.
Air Temperature and Humidity	Temperature is measured by way of a highly accurate NTC-resistor while humidity is measured using a capacitive humidity sensor. In order to keep the effects of external influences (e.g. solar radiation) as low as possible, these sensors are located in a ventilated housing with radiation protection. In contrast to conventional non-ventilated sensors, this allows significantly more accurate measurement during high radiation conditions. Additional variables such as dew point , absolute humidity and mixing ratio are calculated from air temperature and relative humidity, taking account of air pressure.
Air Pressure	Absolute air pressure is measured by way of a built-in sensor (MEMS). The relative air pressure referenced to sea level is calculated using the barometric formula with the aid of the local altitude, which is user-configurable on the equipment.

5.0 HEALTH IMPACTS OF MONITORED POLLUTANTS

5.1 Carbon Monoxide (CO)

Carbon Monoxide (CO) is a colourless, odourless gas emitted from combustion processes. CO can cause harmful health effects by reducing oxygen delivery to the body's organs and tissues and can result in death at very high levels.

Elevated levels of CO in ambient air can occur in areas with heavy traffic congestion, since the majority of CO emissions come from vehicle exhausts. People with cardiovascular disease or respiratory problems might experience chest pain and increased cardiovascular symptoms, particularly while exercising if CO levels are high. High levels of CO can affect alertness and vision even in healthy individuals (Idaho Department of Environmental Quality, 2006).

5.2 Nitrogen Dioxide (NO_2)

The term "NO_x" refers to Oxides of Nitrogen, which includes nitric oxide (NO) and NO_2. NO_2 is used as the indicator for the larger group of oxides of nitrogen. NO_2 forms quickly from emissions from internal combustion engines e.g., cars, trucks, buses, and off-road equipment. Other sources include emissions from power plants. NO_2 is linked with a number of adverse effects on the respiratory system.

NO_x react with ammonia, moisture, and other compounds to form small particles. These small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death. (US EPA, 1998)

O_3 is formed when NO_x and VOCs react in the presence of heat and sunlight. Excessive ozone in the air can cause breathing problems, trigger asthma, reduce lung function and cause lung diseases in humans. (WHO, 2016)

Emissions control measures intended to reduce NO_2 concentrations can generally be expected to reduce population exposures to all gaseous NO_x. This may have the important co-benefit of reducing the formation of O_3 and fine particles both of which pose significant public health threats.

5.3 Ozone (O_3)

Ozone (O_3) is not emitted directly into the air, but is created by chemical reactions between Oxides of Nitrogen (NO_x) and Volatile Organic Compounds (VOC) in the presence of sunlight. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapours, and chemical solvents are some of the major sources of NO_x and VOC. Breathing O_3 can trigger a variety of health problems, particularly for children, the elderly, and people of all ages who have lung diseases such as asthma. Ground level O_3 can also have harmful effects on sensitive vegetation and ecosystems. (US EPA, 2017)

5.4 Sulfur Dioxide (SO_2)

Sulfur Dioxide (SO_2) is one of a group of highly reactive gases known as "Oxides of Sulfur". It is a colourless, reactive gas produced by burning fuels containing sulfur and by industrial processes. The largest source of SO_2 in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities. Smaller sources of SO_2 emissions include, industrial processes, such as, extracting metal from ore, natural sources such as volcanoes, ships and other vehicles and heavy equipment that burn fuel with a high sulphur content. (US EPA, 2017)

Current scientific evidence links short-term exposures to SO_2, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects, including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates, for example, while exercising or playing. SO_2 emissions that lead to high concentrations of SO_2 in the air also lead to the formation of other Oxides of Sulfur (SO_x), which can react with other compounds in the atmosphere to form small particles. These particles contribute to Particulate Matter (PM) pollution and can penetrate deeply into sensitive parts of the lungs causing additional health problems. (US EPA, 2017)

5.5 Particulate Matter (≤10 micrometers)

Particulate Matter also known as particle pollution or PM is defined by the US EPA as a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals and soil or dust particles. (US EPA, 2017)

The size of particles is directly linked to their potential for causing health problems. The US EPA groups particle pollution into two categories:

- "Inhalable coarse particles," such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter.
- "Fine particles," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. (US EPA, 2016)

Another source of PM in Trinidad and Tobago is Saharan Dust which results in elevated PM levels when present in the atmosphere. PM_{10} includes both fine and coarse particles and can aggravate respiratory conditions such as asthma. Persons with respiratory conditions should avoid outdoor exertion if PM_{10} levels are high. Chronic exposure to particles contributes to the risk of developing cardiovascular and respiratory diseases, as well as of lung cancer. (WHO, 2016)

5.6 Particulate Matter (2.5 micrometers)

Particles smaller than 2.5 micrometers in diameter are called "fine particles" or $PM_{2.5}$. $PM_{2.5}$ generally comes from wood burning, agricultural burning and vehicle exhaust including cars, diesel trucks and buses (Idaho Department of Environmental Quality, 2006). Secondary sources include the formation of fine particulate in the atmosphere by complex reactions of chemicals such as SO_2 and NO_x, which are pollutants emitted from power plants, industries and automobiles. Saharan Dust is also a source of PM 2.5 in Trinidad and Tobago, when it is present in the atmosphere.

$PM_{2.5}$ exposure can lead to serious health effects since the particles can penetrate and lodge deep inside the lungs. Fine particles are most closely associated with increased respiratory disease, decreased lung function and even premature death. Older adults, children and people with some illnesses are most sensitive and more likely to develop heart and lung problems associated with $PM_{2.5}$ (Idaho Department of Environmental Quality, 2006). Chronic exposure to particles contributes to the risk of developing cardiovascular and respiratory diseases, as well as of lung cancer. Small particulate pollution have health impacts even at very low concentrations.(WHO, 2016)

6.0 MONITORING RESULTS

6.1 Particulate Matter (≤10 micrometers and 2.5 micrometers)

FIGURE 2: PARTICULATE MATTER (PM_{10}) CONCENTRATIONS FOR CHAGUANAS, JANURAY – OCTOBER 2019

Monthly 24-hour Average Concentrations versus Maximum Permissible Level (75 µg/m^3)

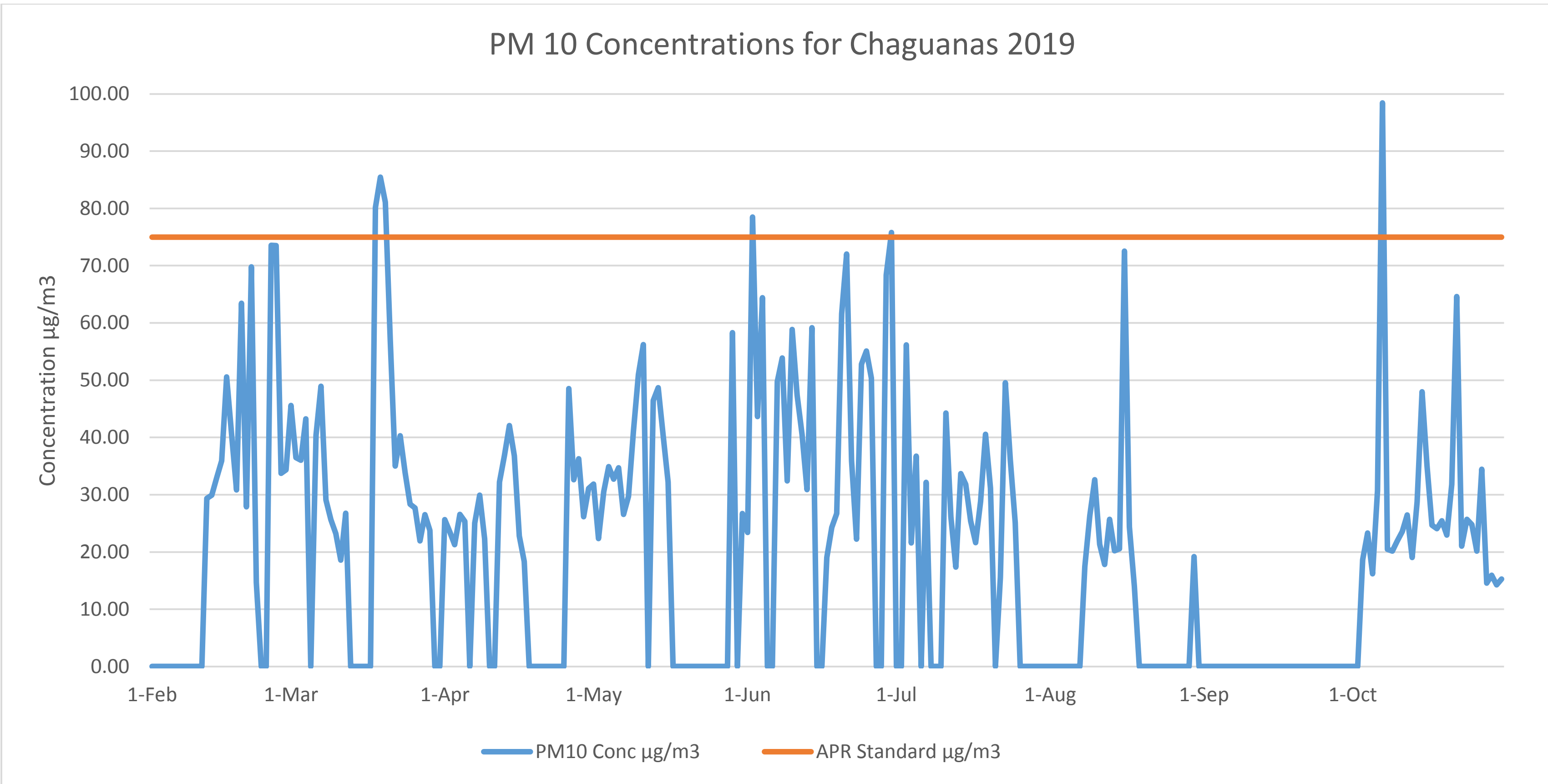


FIGURE 3: PARTICULATE MATTER ($PM_{2.5}$) CONCENTRATIONS FOR CHAGUANAS, JANURAY – OCTOBER 2019

Monthly 24-hour Average Concentrations versus Maximum Permissible Level (65 µg/m³)

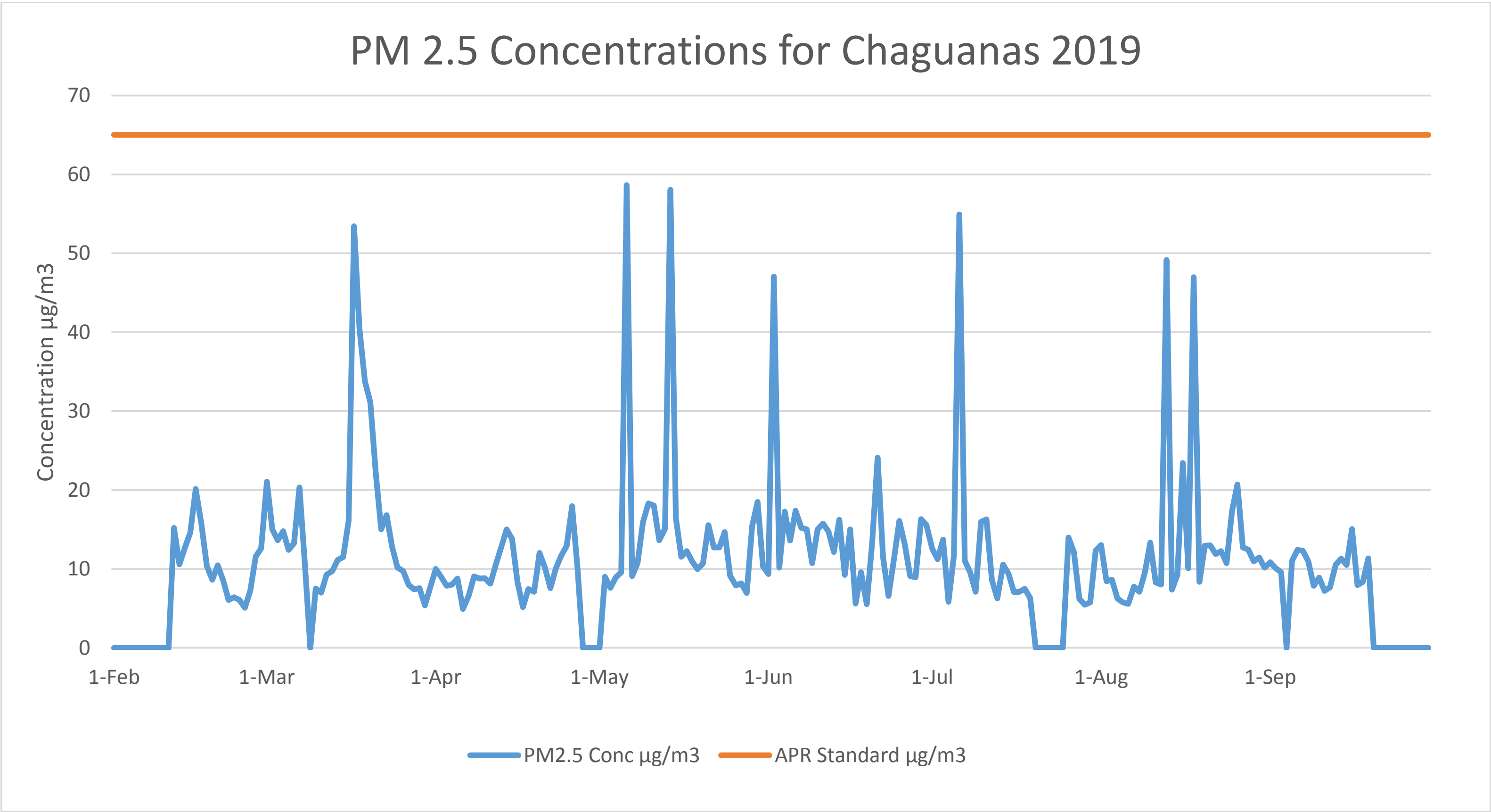
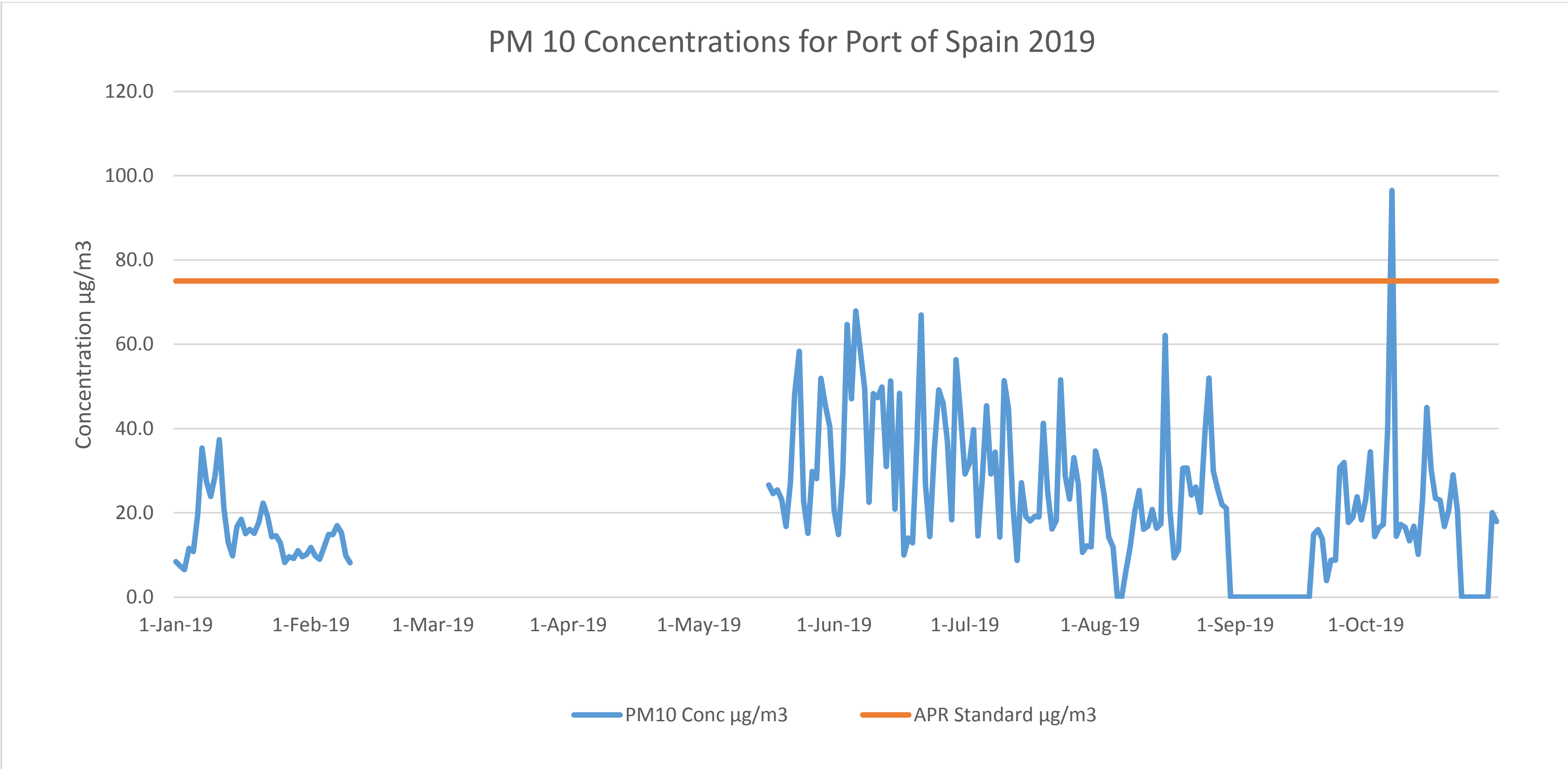


FIGURE 4: PARTICULATE MATTER (PM_{10}) CONCENTRATIONS FOR PORT OF SPAIN, JANURAY – OCTOBER 2019

Monthly 24-hour Average Concentrations versus Maximum Permissible Level (75 µg/m^3)

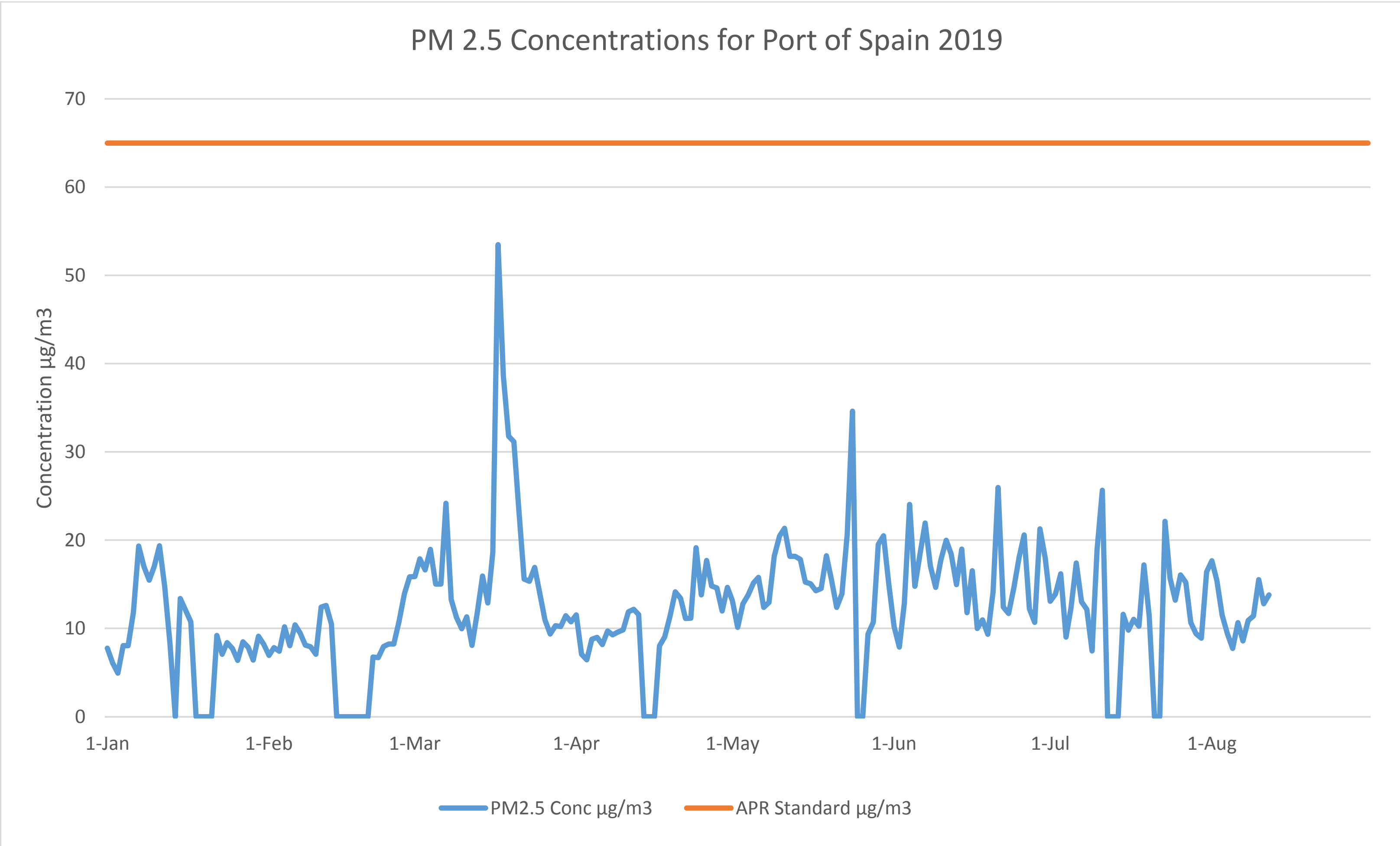


N.B

- PM_{10} data unavailable during February – May 2019 due to equipment downtime.

FIGURE 5: PARTICULATE MATTER ($PM_{2.5}$) CONCENTRATIONS FOR PORT OF SPAIN, JANURAY – OCTOBER 2019

Monthly 24-hour Average Concentrations versus Maximum Permissible Level (65 µg/m^3)



Summary Particulate Matter Ambient Air Quality Data for 2019

Particulate Matter (PM_{10} and $PM_{2.5}$)

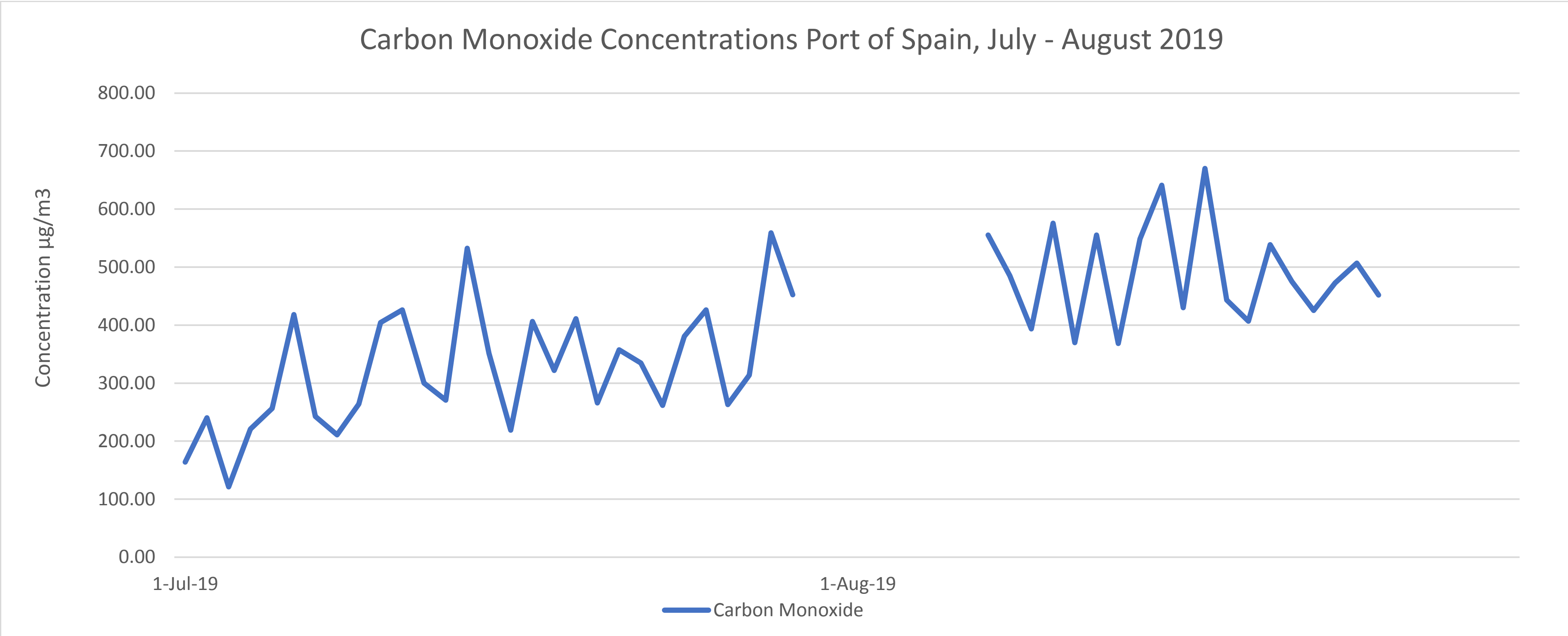
SUMMARY DATA for CHAGUANAS	PM_{10}	$PM_{2.5}$
Annual Average	35.71 µg/m^3	12.89 µg/m^3
No. of Exceedances with 24-hour APR Standard	4 days	0 days

SUMMARY DATA for PORT OF SPAIN	PM_{10}	$PM_{2.5}$
Annual Average	25.09 µg/m^3	13.69 µg/m^3
No. of Exceedances with 24-hour APR Standard	1 days	0 days

Note: Summary data is for the period January – October 2019. Port of Spain PM_{10} monitor was down during the months of March- May for repairs.

6.2 Carbon Monoxide (CO)

FIGURE 6: CARBON MONOXIDE (CO) CONCENTRATIONS FOR PORT OF SPAIN, JULY – AUGUST 2019



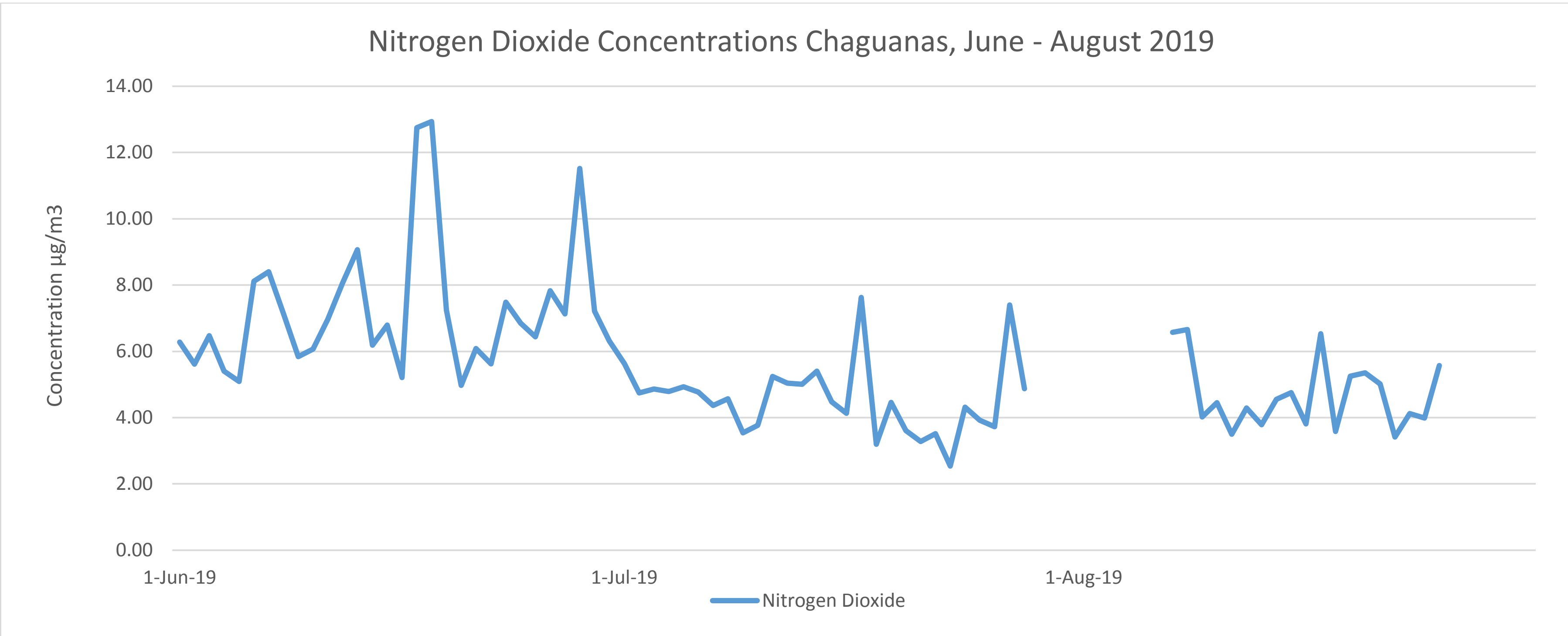
N.B

- Carbon Monoxide data is not available from the Chaguanas station due to improper functioning of analyzer.

- No exceedance with the APR standard

6.3 Nitrogen Dioxide (NO_2)

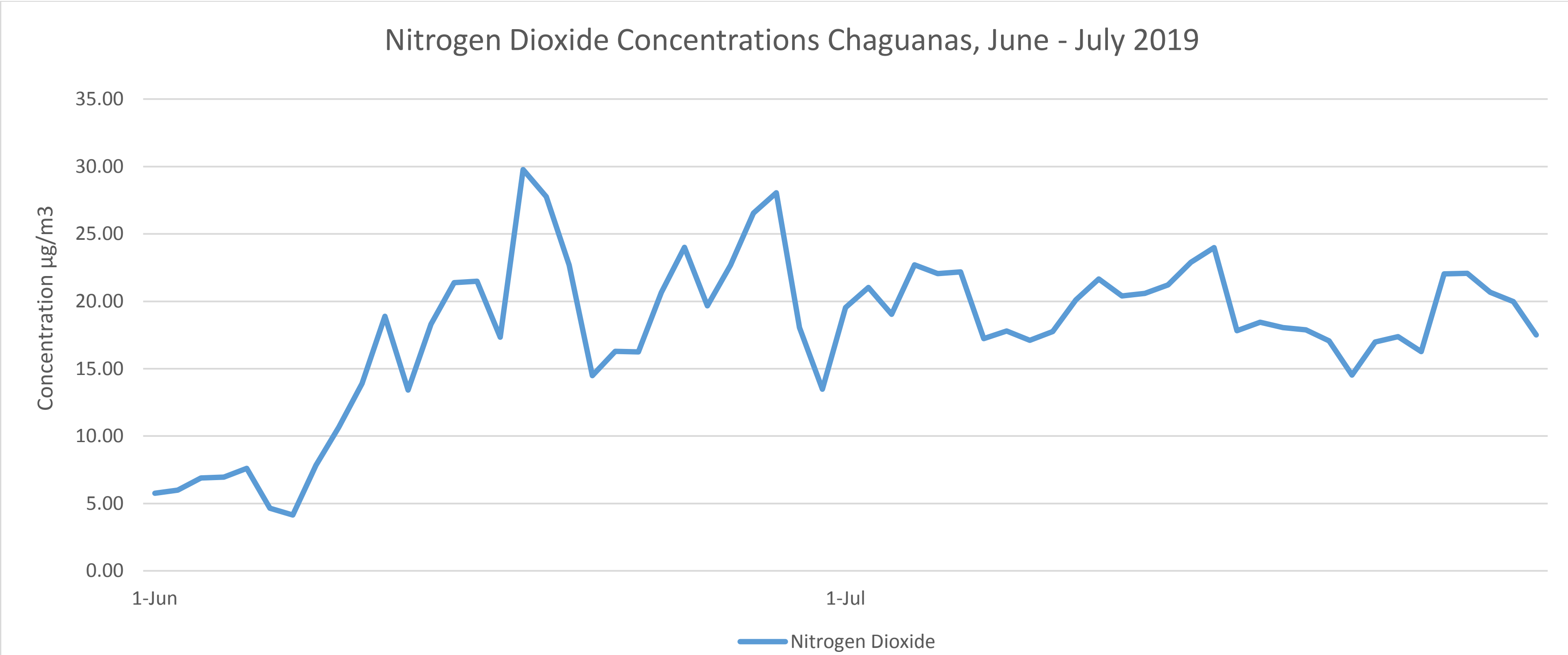
FIGURE 7: NITROGEN DIOXIDE (NO_2) CONCENTRATIONS FOR PORT OF SPAIN, JUNE – AUGUST 2019



N.B

- Nitrogen Dioxide data available only during the period June – August 2019 due to equipment downtime during the other months.

FIGURE 8: NITROGEN DIOXIDE (NO_2) CONCENTRATIONS FOR PORT OF SPAIN, JUNE – JULY 2019

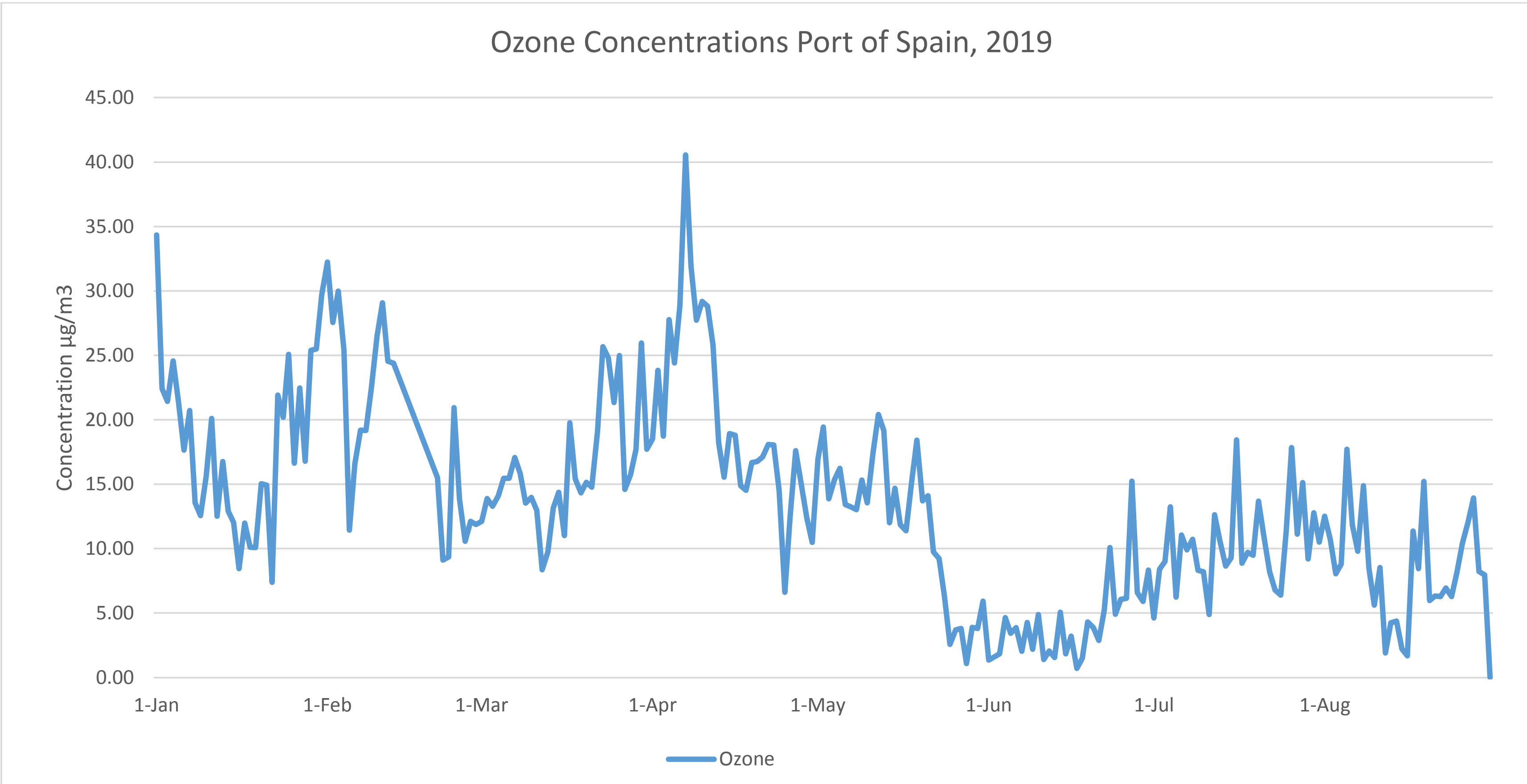


N.B

- Nitrogen Dioxide data available only during the period June – July 2019 due to equipment downtime during the other months.

6.4 Ozone (O_3)

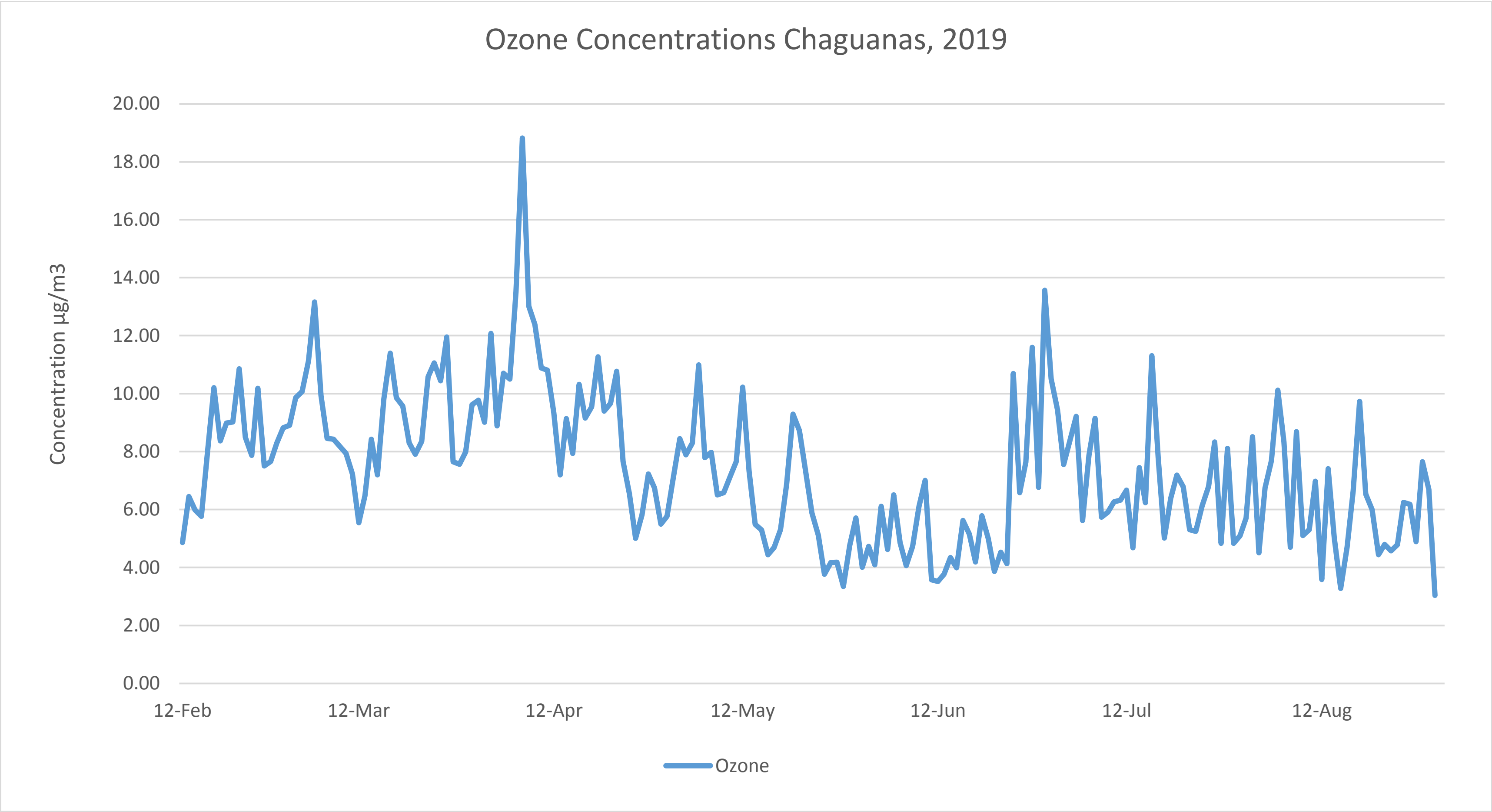
FIGURE 9: OZONE (O_3) CONCENTRATIONS FOR PORT OF SPAIN, 2019



N.B

- No exceedance with the APR standard.

FIGURE 10: OZONE (O_3) CONCENTRATIONS FOR CHAGUANAS, 2019

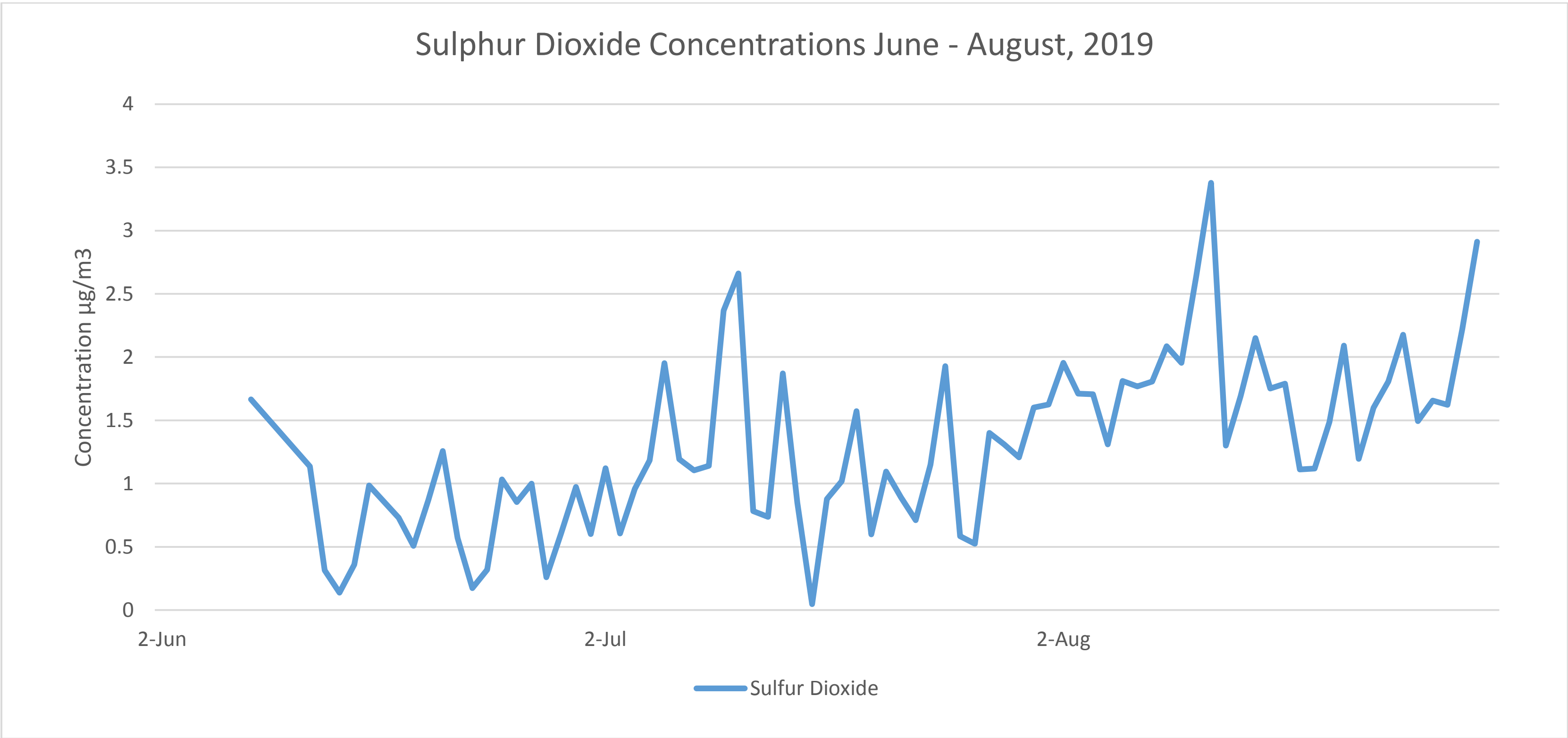


N.B

- No exceedance with the APR standard.

6.5 Sulfur Dioxide (SO_2)

FIGURE 11: SULFUR DIOXIDE (SO_2) CONCENTRATIONS FOR PORT OF SPAIN, JUNE – AUGUST 2019



N.B

- Sulfur Dioxide data available only during the period June – August 2019 due to equipment downtime during the other months.

- Sulfur Dioxide data is not available from the Chaguanas station due to improper functioning of analyzer.

7.0 AIR QUALITY INDEX

The Air Quality Index (AQI) is an index for reporting daily air quality. It gives an indication of how clean or polluted the air is in relation to the permissible levels. The generation of an AQI value involves a conversion of measured pollutant concentrations to a number on a scale of 0 to 500. The AQI values are categorized by the Level of Health Concern, with each category assigned a colour. The higher the AQI value, the greater the level of air pollution and the greater the health concern (Table 5). For example, the colour orange means that sensitive groups (elderly persons, infants or persons with respiratory ailments or heart disease) may experience health effects, while red means that everyone may begin to experience health effects with sensitive groups experiencing more serious health effects.

The AQI can be viewed on the Air Quality Management Information System (AQMIS) website using the following link: http://ei.weblakes.com/rttpublic or accessed from the EMA's website, www.ema.co.tt. (See Figure 12 and 13)

TABLE 5: Pollution Concentration Breakpoints for Each Category of the AQI

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air Quality is considered satisfactory and air pollution poses little or no risk
Moderate	51-100	Air Quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101-150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Health alert: everyone may experience more serious health effects.
Hazardous	>300	Health warnings of emergency conditions. The entire population is more likely to be affected.

FIGURE 12: AQI Webpage, Point Lisas

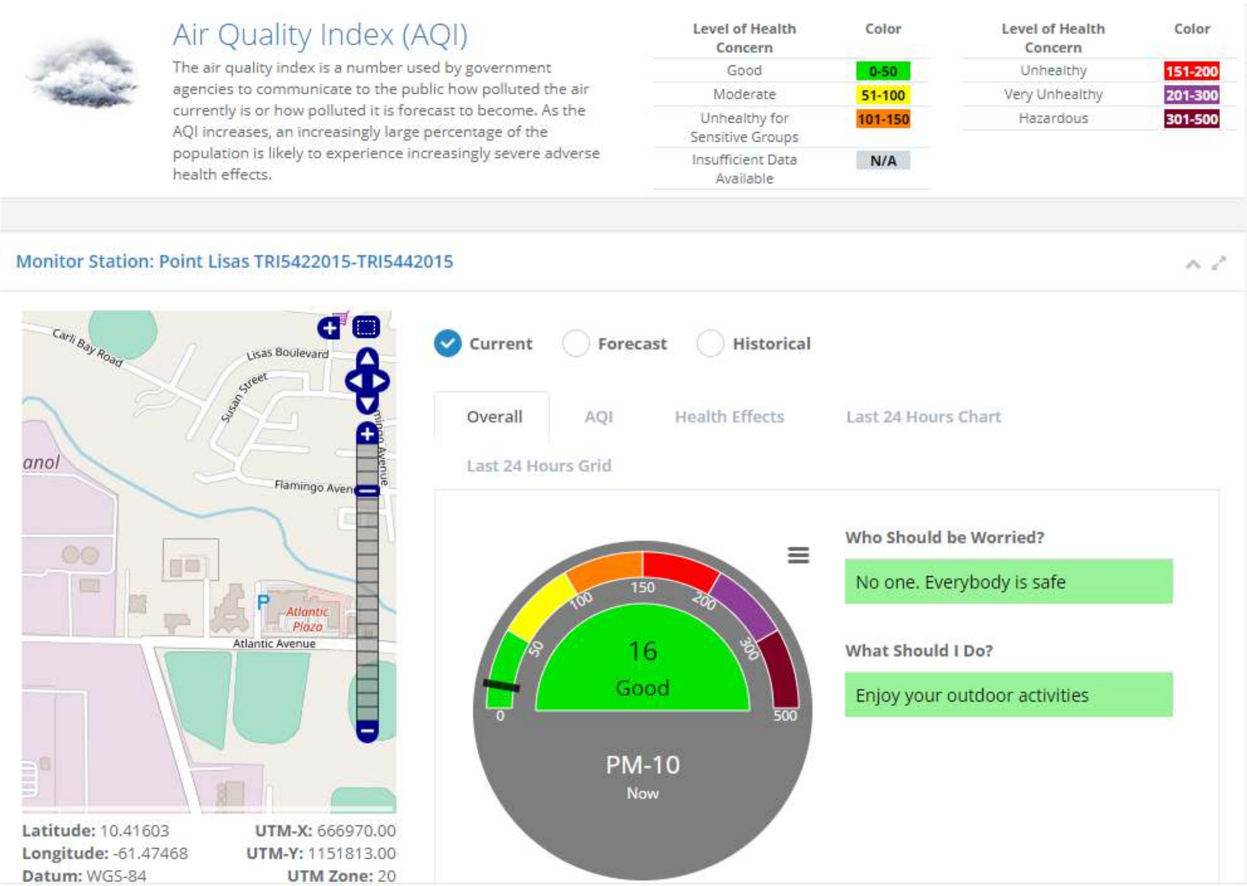


Figure 13: AQI Webpage, Port of Spain

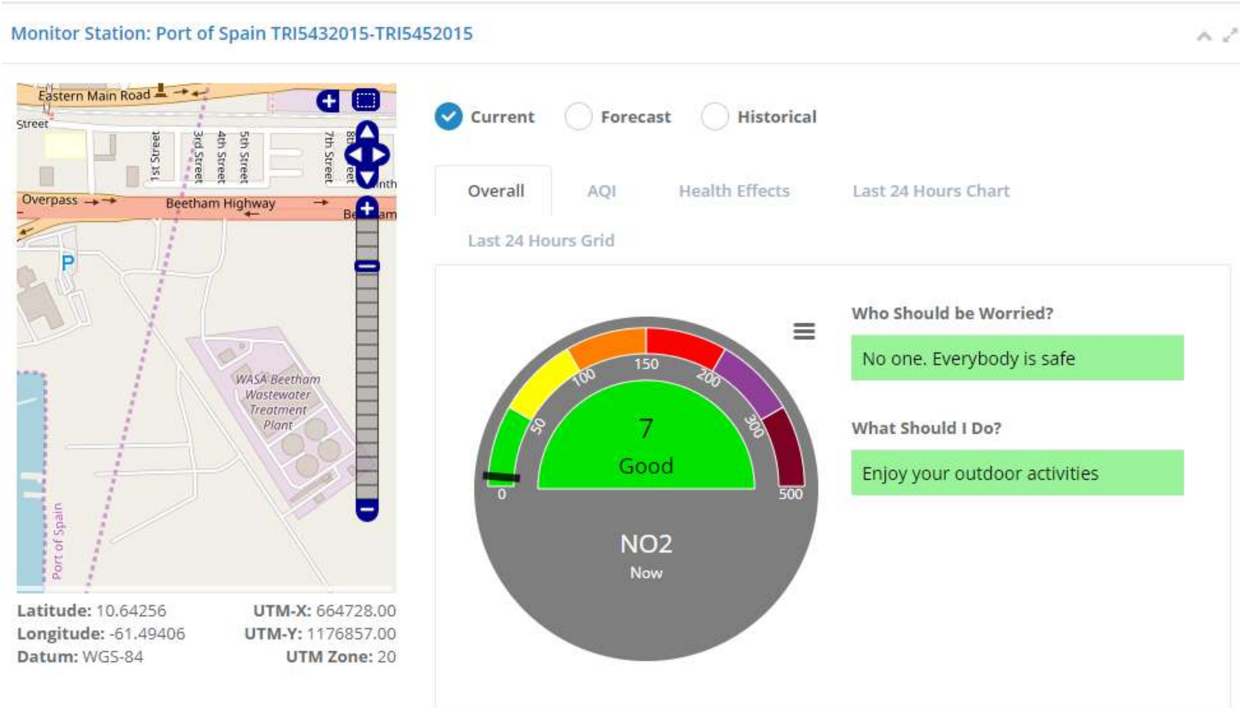


TABLE 6: Summary of Point Lisas AQI for 01-May-2019 - 07-Nov-2019

AQI Category	CO	NO_2	O_3	PM_{10}	$PM_{2.5}$	SO_2
Good	67	113	133	47	122	66
Moderate	0	0	0	36	16	0
Unhealthy (Sensitive)	0	0	0	2	3	0
Unhealthy	0	0	0	1	1	0
Very Unhealthy	0	0	0	0	0	0
Hazardous	0	0	0	0	0	0

TABLE 7: Summary of Port of Spain AQI for 01-May-2019 - 07-Nov-2019

AQI Category	CO	NO_2	O_3	PM_{10}	$PM_{2.5}$	SO_2
Good	92	132	72	84	81	100
Moderate	0	0	0	56	6	0
Unhealthy (Sensitive)	0	0	0	1	0	0
Unhealthy	0	0	0	0	0	0
Very Unhealthy	0	0	0	0	0	0
Hazardous	0	0	0	0	0	0