

Rosaly Nunez – Research Program;

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Hypothesis

- As we all know, there are a few sources happening around Governors island that is contributing to form Black Carbon such as:
- The ventilator coming from the battery tunnel
- All the construction that has been happening all over the island, even in our class back yard.
- The data from the Black Carbon sensor outside of the schools building, specifically outside of classrooms 320's window will determine how high the levels are during the day time when students are in school, and how low the concentrations are during the night.

Background Information

- •Black Carbon (BC) is a form of particulate matter that has recently emerged as a major contributor to global climate change,
- •BC particles strongly absorb sunlight and give soot its black color.
- •It is produced both naturally and by human activities as a result of the incomplete combustion of fossil fuels, bio fuels, and biomass. Primary sources include emissions from diesel engines, cook stoves, wood burning and forest fires.
- •BC remains in the atmosphere for only a few weeks, so cutting its emissions would immediately reduce the rate of warming and reducing exposure to BC provides public health co-benefits. (C2ES, 2010)





Background Information

- ➤ Particulate matter is the term used for a mixture of solid and liquid particles emitted into the air that ranges approximately from 0.005 to 100 micrometers (MDOH, 2011).
- Particulate Matter is small enough to be inhaled and accumulate in the respiratory system, into our lungs to blood supply, carried through our bodies. (AQMD, 2001).

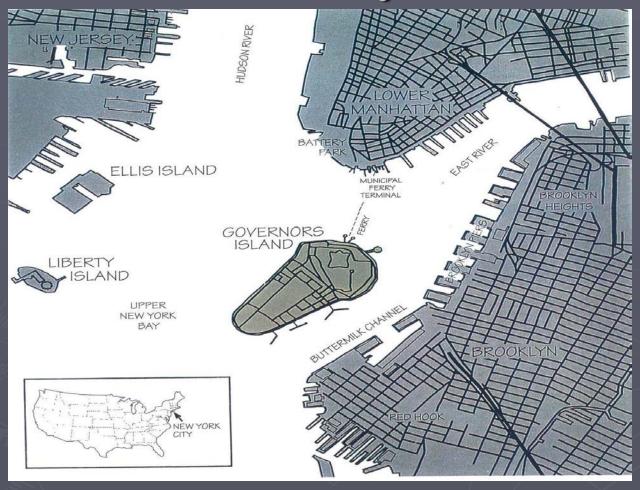
- Soot ranks as the second-largest <u>human contributor to</u> <u>climate change</u>, according to a <u>new analysis</u> released Tuesday, Jan. 15, 2013, exerting twice as much of an impact as previously thought.
- ▶ Black carbon, or soot, contributes to warming because the fine particles absorb heat when they are in the air and when they darken snow and ice. (Eilperin, 2013)



- •It has already been proven that particulate matter accumulates into our bodies, and penetrate into cells. (Gonzalez, 2011).
- •So imagine if we are breathing in high concentration levels of Black carbon in this classroom.



Locality



New York Harbor School, located on Governors Island

Scientific Problem How do the levels of BC compare during the night and day time?		
There are high concentrations of Black Carbon outside 320's classrooms window throughout the day time than at night because there is less human activity during the night time.		
Objectives		
Determine the black carbon concentration levels on Governors Island		
Determine how dangerous the BC levels are to breathe in		
Compare and contrast the data to other research and sources		
Constants		
Location of sensor and data collection time		
Assumptions		
Limitations		
1 Black Carbon Sensor– can only set up my experiment in one box		

Materials

Materials	Quality	Description
Black Carbon Sensor aetholometer	1	to determine the concentrations of BC
Classroom & window	1	to have a location to experiment from
Notebook	1	copy down any notes and important information for this project
Computers	2	to do research and organize data, presentations and drafts at home and in class

Procedure

The average of the levels of BC on the days of the week shown in fig. 2 had higher averages than the night averages. The day's avg. was 1197 ng/m^3 which was 394.5 ng/m^3 higher than the avg. during the night's meaning that the night's avg. was 802 ng/m^3. "It is produced both naturally and by human activities as a result of the incomplete combustion of fossil fuels, bio fuels, and biomass. Primary sources include emissions from diesel engines, cook stoves, wood burning and forest fires" (Eilperin, 2013). In addition to this quote, BC is most likely higher during the day time because there is more human activity going on Govenors Island such as more pollution coming out of the ventilator from the Battery Tunnel from all the cars and trucks driving under it, and all the construction going on around the island throughout the day.

Data

Night vs. Day

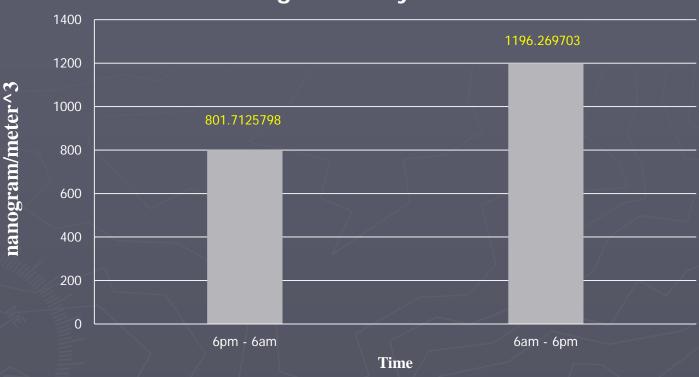


Fig 02: February 2, 2012 to February 9, 2012 (How do the levels of BC compare during the day and night time): This graph shows the average levels of Black carbon of the week of February 2nd to February 9th of 2012. The average concentration of Black Carbon during the day time of this week, starting from 6 am to 6 pm was 899 ng/meter^3. The average concentration of Black Carbon during the night time of this week, starting from 6 pm to 6 am was 758 ng/meter^3. The day average of the week was 141.5 ng/meter^3 higher than the average of the night.

Discussion

▶ The average of the levels of BC on the days of the week shown in fig. 2 had higher averages than the night averages. The day's avg. was 1197 ng/m³ which was 394.5 ng/m³ higher than the avg. during the night's meaning that the night's avg. was 802 ng/m³. "It is produced both naturally and by human activities as a result of the incomplete combustion of fossil fuels, bio fuels, and biomass. Primary sources include emissions from diesel engines, cook stoves, wood burning and forest fires" (Eilperin, 2013). In addition to this quote, BC is most likely higher during the day time because there is more human activity going on Govenors Island such as more pollution coming out of the ventilator from the Battery Tunnel from all the cars and trucks driving under it, and all the construction going on around the island throughout the day.

Conclusion

► The data from the Black Carbon (BC) sensor outside of the New York Harbor School's building, specifically outside of classrooms 320's window proved how high the levels are during the day time when students are in school, and how low the concentrations are during the night time. Looking at figure 2, the observer is able to tell how much of a difference the BC levels are between the day and night. During the average day of the week shown in fig. 2, students were at school and other workers were working in other areas on Governors island who were exposed to 394.5 ng/m³ more BC levels. This is because the average concentration of BC during the day time on the week of February 2nd to February 9th of 2012 was 1197 ng/m³ and during the night time it was 802 ng/m³.

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