

# Study on the distribution of ground level PM concentrations of urban air in most frequented places of Tirana City

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In Albania, reliable data and information on air quality in urban areas in most cases is fragmentary or lacking.

This work presents data regarding particulate matter, PM 1, 2.5, 4 and 10 as well as TSM for the city of Tirana. Tirana has undergone a dramatic demographic growth. During the last 25 years the population of Tirana has quadrupled. Construction has been rapid and, in most cases, chaotic and unstudied. Vehicle fleet in Tirana, in 2020, reaches up to 249.396, 47% of them are more than 11 years old. As a result, the created environmental pressure has been very high. Vehicles, construction sites and non-compliance with environmental standards has created serious problems in urban air quality. Studies suggest that long term exposure to fine particulate matter may be associated with increased rates of chronic bronchitis, reduced lung function and increased mortality from lung cancer and heart disease. It is also reported that long term exposure to air pollution increases the severity of Covid-19. In the city of Tirana it is surprising that the most popular places, such as cafes and restaurants, are those located along roads and intersections, where city traffic is extremely heavy. The obtained results show high values of PM concentration, exceeding several times the values recommended by WHO. It was observed that in cafes and restaurants located along the streets with low traffic, but where vegetation (tall trees) and buildings were present, PM values were up to 10 times higher than maximum recommended level by WHO. The higher values can be explained due to isolation of air masses from trees and buildings, thus preventing air flow, leading to high PM values. Measurements performed immediately after rain showed very low PM concentration, all below the maximum allowable limit. Meanwhile, on days without rain, even during the early morning hours 3:00 to 5:00, when car traffic is very low, PM 2.5 in all locations exceeded 2 to 8 times the maximum recommended value by the WHO (10  $\mu\text{g}/\text{m}^3$ ). The city of Tirana needs a strategy that will aim to improve air quality. Correlating the frequency of various health problems, such as heart attacks, cerebral haemorrhages, bronchitis and Covid-19 etc. to PM values would be a very important information to reach useful conclusions.

## References

- [1] Haiyue Fu, Yiting Zhang, Chuan Liao, Liang Mao, Zhaoya Wang & Nana Hong, Scientific Reports volume 10, (2020), Article number: 15639
- [2] Robert B. Hamanaka and Gökhan M. Mutlu, Front. Endocrinol., 16 November 2018  
<https://doi.org/10.3389/fendo.2018.00680>
- [3] World air quality report 2021.