

Title: Modeling and Simulation of pollutant dispersion in urban cities: Case of the city of Douala- Cameroon

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The use of fossil fuels in automotive vehicles is remains a major source of pollution in urban cities all over the world leading to adverse health problems depending on the concentration of the various pollutants in a particular area. This study was carried out around the campus of the Douala University where the road traffic is dense and a considerable staff and student population is considered. To meet the objectives of the research a number of computational fluid dynamic (CFD) considerations were taken such as; treating of working fluid as perfect gas, the flows as steady incompressible flows, constant heat capacities, line source, cross wind (wind normal to inlet) to name a few. The experimental test was done using the [KIMO-KIGAZ 700 (060322)]. During which we recorded stabilized values of CO₂ with respect to our models and these values are plotted with the simulated values. Five models were established to simulate pollutant dispersion. The models were generated in GAMBIT and the simulation done in FLUENT, where the K- ϵ equations are solved and the results are post processed. Some of the input data in FLUENT was obtained from experimental data in literature and others from default values in FLUENT. It was found that the concentrations varied with respect to the distance from the road, the number of buildings (street canyons) and the speed of wind. The model entitled CAMPUS had the highest net concentration of CO₂ 255 ppm and the least at CAMPUSBATI model 34 ppm. The study could also be extended to the other pollutants like CO, NO_x and others. Also, wind tunnel modeling techniques could be employed.

Biography

Ivan Aquigeh Newen is a final year PhD student in the University of Douala. Holder of a Masters degree in engineering sciences from the same University. Holder of a teacher grate one diploma for technical education, same University. Distance course certificate on the introduction to sustainable engineering from Institute of technology Karlskrona (Sweden). This study was motivated by my broad knowledge in fluid dynamics, automotive and sustainable engineering.