Faezeh Borhani, J Pollut Eff Cont 2022, Volume 10

Emission models of short-lived and long-lived climate forcers from road transport: An overview

Faezeh Borhani

University of Tehran, Iran

A critical component of managing air pollution in the transportation sector is estimating and quantifying emissions from road vehicles. It introduces an exemplary method for the environmental evaluation of transportation system scenarios. Emission models are an important issue in this respect. There are several emission models available worldwide. This study focuses on emission models of short-lived climate pollutants from road transport (i.e., IVE, MOVES 2014a, COPERT 4 & 5 and EMFAC 2014). These models distinguish between static and dynamic models. It depends on the amount of data available for the transport fleet and its specifications. Monitoring emissions in a study area can, also, be a good method for calibration of such emission models. This paper presents an overview of models used in estimating emissions from road transportation systems in urban areas. It contrasts various emissions models that are utilized in transportation-related air pollution management scenarios. The study discusses, also the potential and limitation of each model. The difficulties of applying these models in developing countries are also discussed. Finally, the study determines the required steps towards realistic transportation emission modeling in developing countries.

Introduction: It can be difficult to assess emission model choices to reduce the climate effects of road transport, especially when they entail a trade-off between long-lived pollutants emissions (i.e., carbon dioxide (CO2), Nitrous oxide (N2O)) and short-lived pollutants emissions (i.e., Methane (CH4), Black carbon (BC), Monoxide carbon (CO), Sulfur dioxide (SO2), Nitrogen oxides (NOX), Particulate Matter (PM2.5 and PM10)). The Clean Air Act requires EPA to develop and regularly update emission factors for all emission sources. Pursuant to this charge, EPA's Office of Transportation and Air Quality (OTAQ) has developed a number of emissions and emission factor estimation tools for mobile sources, including NONROAD (for off-road mobile source pollutants) and MOBILE (for highway vehicles). Over the last few decades, numerous emission models have been developed for various purposes, from analyzing exposure near intersections or on the roadway, to understanding emission rates in a particular region. We examine common dynamic models (i.e., IVE, MOVES 2014a, COPERT 4 & 5 and EMFAC 2014) for emissions of short-lived pollutants.

Overview of study results: These models are user-friendly programs developed to estimate national road transport emissions. These have been downloaded by thousands of users worldwide for use in their research. The findings show that there is a level of access free to four emission models. IVE and MOVES2014a models are included inspection/maintenance (I/M) program. [Figure 1] provide an overview of the analysis of short-lived pollutants emissions models connected to transportation. Road transportation emissions of both long-lived pollutants (such as carbon dioxide) and short-lived pollutants (such as methane or black carbon) can be modeled. Overall, the use of average vehicle speed in these models (e.g., COPERT) results in a lack of ability to account for the variety of vehicle operations and emission characteristics.

Keywords: Emission models, Nitrogen oxides, Road transport.

Biography

Faezeh Borhani, a PhD candidate at "University of Tehran", one of the premier educational and research institutes in Iran. She is a hardworking, self-disciplined and conscientious researcher/engineer with 7 years of experience in designing and deriving technical solutions in the civil and environmental engineering field. She has been interested in doing research in the areas of meteorology and atmospheric sciences. In the last past 4 years, she focused on short-lived climate pollutants.

Received: September 10, 2022; **Accepted**: July 17, 2022; **Published**: November 20, 2022