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Guest editorial

Air pollution related to transport

This special issue section contains peer-reviewed papers derived from the Proceedings of the Second International Symposium on Environment and Transport, including the 15th conference Transport and Air Pollution, held in Reims, France, 12–14 June 2006. This conference followed the Transport and Air Pollution conferences held since 1986 in Avignon, France, Graz, Austria and Boulder, USA, and the Environment & Transport conference in Avignon in 2003. It was aiming at contributing to a systemic approach to environmental and transportation issues.

Emissions from transport are an often dominant source of air pollution, and contribute significantly to greenhouse gases and energy use. To assess the present and future state of emissions from transport and to evaluate different policies for reducing emissions require the development and application of emission models, accurate, reliable, consistent and credible. However, comparisons between the results from different emission models and different national inventories have highlighted substantial differences. The European project Artemis (Assessment and Reliability of Transport Emission Modelling and Inventory Systems) was conceived to address the need to develop a harmonised emission model for road, rail, air and ship transport, and to provide consistent emission estimates at the national, international and local levels. Two papers of this issue stem from this project.

The driving or test cycle is the only link between the emission measurement and the driving conditions. The willingness to estimate emissions on a very local scale (i.e. one street for a given traffic condition) increases dramatically the need to understand and model the link between emissions and very local driving conditions through "microscopic" kinematic parameters. After a large review of the driving and emission behaviour, the concept of traffic situation implemented in the Artemis model is presented here.

Cars with catalysts show a significant increase in exhaust emissions at engine start, but some current extra emission estimation methods are not suited to providing correct estimations in all cases. Experimental data are usually available for completely cooled engines, after an engine stop time of at least twelve hours, and data including shorter stop times are very rare. As shorter stop times are quite common, it is pertinent to investigate the influence of such stop times.

The usage of air conditioning systems under average European conditions is roughly estimated to cause an increase of fuel consumption of some percents in 2020. No model has been developed recently to assess the global influence of European passenger car auxiliaries on pollutant emissions, as done in the framework of Mobile 6, but for the US vehicle fleet and environmental conditions. It is the aim of a study presented here.

The willingness to reduce drastically greenhouse gas emissions calls for reflection now on the technological progress that can be made, the organisation of our society and the lifestyles that generate transport and emissions. As the usual emission calculations reveal nothing about users and their motivations, the research focusing on the analysis of individual mobility can improve the understanding of CO_2 emissions by answering the following questions (from the French case): What socio-demographic groups require transport? What types of mobility are involved (local, long distance)? What modes are used and for what activities? What are their contributions to the global evaluation?

Air pollution is often associated with urbanization and industrialization. Diverse and poorly planned urban development, urban sprawl, forces higher rates of motor vehicle use and in return increases levels of pollutant emissions. There is a need to develop advanced tools which can predict the impact of future urban growth in all scales and recommend optimum approaches for achieving more sustainable environments. The paper presented in this issue introduces the development of an advanced interactive scenario-based land use and atmospheric chemistry modelling system coupled with a GIS framework, applied to the southwestern region of California.

The European directive on air pollution levels for PM10, NO_2, CO and benzene has had far reaching consequences for city administrations. The evaluation tool for meeting the directive on air pollution limits delivered to the municipalities in Sweden is evaluated here. A comparison between measured and simulated concentrations shows that this tool is able to calculate a lot of statistics and to separate the contributions of the street itself and of the long range transport.

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