

## High spatial resolution vehicular emissions inventory for China using VEIN model

\*Sergio Ibarra Espinosa<sup>1</sup>, Xuelei Zhang<sup>1</sup>, Aijun Xiu<sup>1</sup>, Edmilson Dias de Freitas<sup>2</sup>

1. Research Group of Regional Atmospheric Environment, Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences, P. R. China, 2. Department of Atmospheric Sciences, University of São Paulo, Brazil.

Vehicular emissions are an important source of pollution in China. These and other anthropogenic emissions, with poor meteorological conditions enhance critical episodes of high concentrations of air pollutants (Wang S. and Hao J., 2012). Environmental policies seek to improve air quality by diminishing and cutting emissions, making the emissions characterization of crucial importance. Even more, air quality modelers need emissions inventories as inputs, which usually suffer of limited temporal and spatial representation and over simplification. Under these circumstances, it is not expected good air quality simulations. In other words, garbage-in, garbage-out.

This study aims to improve the temporal and spatial representation of vehicular emissions. This will be achieved using the VEIN model (Ibarra-Espinosa *et al.*, 2017), initially with a top-down approach. The method and data is described as follows: stock vehicles will be obtained for 31 provinces (National Bureau of Statistics (NBS), 2016) considering vehicle survival pattern and average age of use of the fleet (HAO *et al.*, 2011; Wang H. *et al.*, 2012). NBS data is aggregated without discriminating taxis and motorcycles, therefore, the vehicular composition and activity will be obtained with the percentages of Wang H. *et al.* (2008): Passenger Cars (PC), Taxi, Motorcycle, Moped, Bus, Small Trucks, Medium Trucks and Heavy Trucks by type of fuel. Furthermore, we will divide traffic at peak and off peak hours and by Freeways, Arterial and residential roads, shown on Fig.1, in each province to obtain the representative speed in each case, based on the driving cycles obtained by Wang Q. *et al.* (2008). We will use Copert (Ntziachristos and Samaras, 2016) emissions factors inside VEIN correcting by chemical composition of fuel and deterioration factors. Cold starts and evaporative emissions will be obviously included. To ensure consistency with the emissions and fuel consumed on each province, activity will be calibrated in order that fuel consumption estimation or CO<sub>2</sub> estimations matches with statistics of automotive fuel sales or CO<sub>2</sub> emissions, depending on the availability of data. Top-down emissions will be spatially disaggregated by length of type of road from OpenStreetMap in each province as shown by Andrade *et al.* (2015).

Vehicular, Emissions, VEIN, China

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