

High Resolution vehicular emissions inventory in Shanghai China: Application of REMI model

*Sergio Ibarra Espinosa¹, Rita Yuri Ynoue¹, Maria de Fátima Andrade¹

1. Universidade de São Paulo

Accelerated industrial development of Shanghai, China, lead to a large number of vehicles into the streets, generating critical levels of pollution that remains high nowadays. This is the biggest city in China, in commercial and industrial aspects, with more than 20 millions urban habitants, which produced an intense demand of public and private transport. Air pollutant concentrations persistently remains high with risk to health of population (<http://semc.gov.cn/aqi/home/English.aspx>, Environmental Service of Shanghai). This study presents a bottom-up vehicular emissions inventory with the R Emission Inventory (REMI) Package (Ibarra *et al*, 2017a) for the mega city of Shanghai. REMI is package wrote in R language that estimates vehicular emissions inventory considering exhaust, cold-start, evaporative, dust resuspension and wear emissions. The road network (Figure 1) of Open Street Map is used as input, identifying the type of street, to perform a spatial traffic interpolation as shown by Ibarra *et al* (2017b). This approach assumes high density of light duty vehicles in downtown, and in contrast, less density of trucks in downtown. The emission factors used are COmputer Programme to calculate Emissions from Road Transport (COPERT) with an euro equivalency as shown by Wang *et al* (2010). Nevertheless, REMI offer the option to use local emission factors or a merge between local and COPERT emission factors. The age distribution is very important, so it was assumed that all vehicles were in circulation till 40 years of use. REMI is also suitable for cities with limitation of data, as showed by Ibarra *et al* (2017b) because it interpolates traffic and assign it into the road network directly. REMI outputs consists in vehicular emission with high spatial and temporal resolution, with hourly emissions at street level. This study will consider a detailed perspective of vehicles, including the use of motorcycles and it will be compared with Wang *et al* (2008). The resulting estimation will give detailed pollutant for each road, hour of the day and day of the week, allowing investigation of vehicular emissions for the biggest city of China.

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