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AIR QUALITY MODELING AND SATELLITE-BASED EMISSION INVENTORIES

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ABSTRACT

The consequences of the urbanization process increase with the fastness of the urbanization process. In this context, Brazil is an unique example of such fastness, since in recent decades it has experienced one of the more accelerated rural-urban transition recorded by mankind. In a few decades it became an entirely urban country, with a significant proportion of the population living in large cities. Currently about 85% of the Brazilian population lives in cities, reaching over 95% in the South and Southeast. This percentage was just over 30% in the mid-20th century. Such a rapid transition caused disastrous environmental consequences in urban and vicinity areas. The bad air quality is among such consequences, with the vehicle emissions being suggested as the main responsible for the deterioration of air quality. In this context, numerical models have been recognized as an important tool in order to understand and mitigate the impacts of new technologies on the air quality. However, the reliability of modelling studies depends on the use high quality spatialized emission inventories. In this work it is showed that satellite-based information can be a strong ally in order to design future spatially high resolution emission inventories. Using satellite data as a proxy, it was built a spatial distribution of vehicular emissions in urban and rural areas. Brightness of nocturnal lights was used to represent the vehicular activity in urban and nearby areas while a map of different classes of land use and land cover was used in order to identify vehicular activities in rural areas. The results of this work suggest that a combination of different remote sensing techniques is the key to a better representation of spatially distributed sources of pollutants which emissions need to be incorporated into a computational model.



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