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Abstract:

The emissions and the spatial distribution of the major stationary sources of NOx, SOx, and PM in Brazil were estimated in this work. A total of 16 refineries, 96 cement industries, 64 pulp and paper industries and 1730 thermo power plants (natural gas, sugarcane bagasse, residual fuel oil, diesel oil and coal) were included in the inventory. The emissions were calculated based on emission factors (EF) within a range varying from lower to higher limits proposed by the AP-42 standards of the US Environmental Protection Agency. The estimates were 857±415 Gg/year for NOx, 1,51±1,23 Tg/year for SOx, and 10,4±10,1 Tg/year for PM. Refineries, cement industries and diesel power plants are the dominating sectors for NOx emissions, with 28% (26), 39% (24), and 21% (36), respectively, considering lower(higher) EF. Refineries dominate the emission of SOx (42%), followed by diesel (18%), fuel oil (18%), Coal 15%, and Cement (8%) under lower
EF. At higher EF refineries emitted 44%, followed by coal power plants (33%) and cement industries (15%). In terms of PM, under lower EF limits, coal power plants represent 65% of emissions, followed by refineries (21%). On the other hand, at higher EF limits, the cement industry sector dominates, with 78%, followed by coal power plants with only 11%. Comparing the emissions by stationary sources, estimated by intermediate values of EF, with the vehicular emissions, estimated by the Brazilian Ministry of the Environment (MMA), emissions of NOx are slightly lower than vehicular, while the emissions of SOx and PM are 300 times higher than vehicular. The contribution of stationary sources are still significant, even if lower limits of EF are assumed. The spatial analysis indicates that, although most of attention is being given to vehicle emissions, a significant fraction of Brazilians is exposed to pollutants emitted by stationary sources.