Emissions in South American M-cities

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Although, only Buenos Aires' and Sao Paulo's populations exceed 10 million inhabitants, more than 80% of South Americans live in densely populated urban areas. Many of such urban areas show deteriorating air quality due to increasing emissions and unfavorable dispersion conditions. The Inter American Institute for Global Change Research (IAI, http://www.iai.int) has provided the means to establish the South American Emissions Mega-cities and Climate (SAEMC, http://saemc.cmm.uchile.cl) project, which is a Collaboration Research Network for the period 2006-2010, involving researchers in Argentina, Brazil, Chile, Colombia, United States of America and Peru. SAEMC represents an unprecedented opportunity for strengthening and coordinating regional research capabilities, connecting regional and global efforts, and providing sound scientific basis for sustainable policies. One of the foci of SAEMC has been the development and compilation of a data base for past, present and future emission scenarios for South American mega-cities. In some cities, e.g., Santiago and Sao Paulo, there are official inventories that have been scrutinized and improved via inverse modeling techniques. For other cities, e.g., Buenos Aires and Bogotá, new inventories have been built up based on state-of-the-science approaches. Emission factors have been derived and compiled for mobile emissions at several cities, showing distinctive features for these cities. Past and future emission scenarios are available for some cases. All in all, this project provides an up-dated emission data base with standard methodologies for South American mega-cities. In this presentation, I will overview the emission data compilation and acquisition, and compare with available data from global inventories.This analysis will be focused on the utility of these data within the framework of chemical weather forecasting and climate change studies.

Estimation of the contaminant load transported by an AMD-affected river (SW, Spain)

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The Meca river (315 km^2), a tributary of the Odiel river, is affected by AMD coming from Tharsis mines and shows acidic water with pH close to 3. This river is regulated by the Sancho reservoir (58 hm^3), with pH close to 4.30 [1] which is used for industry, and occasionally, for drinking water supply, after treatment.

To calculate the contaminant load transported by Meca river from Sancho reservoir, have been established relationship between stream discharge and element concentrations. The streamflow data have been obtained applying the SWAT model, that has been calibrated and validated [2]. Furthermore, it has been realized several samplings to control the Meca river quality.

The Meca river transports large amounts of contaminants: 418 ton/year of Al, 121 ton/year of Zn, 8024 ton/year of SO_4^{2-}, etc. This agrees with data obtained from the Odiel river basin [3]. As a result, the Sancho reservoir water has high concentrations of toxic elements such as Al (2.96 mg/L), Zn (1.85 mg/L), Mn (1.71 mg/L), etc.

[1] Sarmiento et al. (2008) STOTEN. doi:10.1016/j.scitotenv. 2008.11.011 [2] Galván et al. (2009) J. Hydrol, (in review). [3] Olías et al. (2006) Appl. Geochem. 21, 1733-1749.