Geophysical Research Abstracts, Vol. 9, 01947, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01947

Impact of NO emissions from soils on ozone formation under tropical conditions.

C. Delon, D. Serça, R. Dupont, C. Mari, J.P. Chaboureau.

Laboratoire d'Aerologie, 14 avenue Edouard Belin, 31400 Toulouse, France

(delc@aero.obs-mip.fr, Fax: 0033.5.61.33.27.90)

NO is produced in the soil upon microbial processes, which depend on the great variety of parameters linked to soil, vegetation and climate. Most of the existing NO inventories lead to an underestimation of fluxes at the regional and global scale, and therefore to a biased estimation of the NO impact on tropospheric chemistry. This is due to the fact that inventories are fixed and not related to environmental parameters (physical and meteorological parameters).

In the framework of AMMA, the objective of the present study is to find an appropriate way of evaluating the impact of NO emissions on tropospheric chemistry. The determination of NO emissions from soils has been made with a new algorithm developed from a neural network approach. This algorithm allows the introduction of several influent parameters in the calculation of NO fluxes from soils, and is tested on line in a 3D chemistry transport model (Meso-NH-Chemistry) over West Africa. The algorithm is built from data measured on diverse types of soils and climates (tropical and temperate) and is representative of a large panel of climatic conditions.

Compared to parameterisations generally used at the global and regional scales, the neural network parameterisation can give higher NOx and ozone levels, closer to the ones measured in aircrafts and ground stations during the AMMA field campaign in August 2006.

Simulated NO fluxes from soil have the same order of magnitude than the ones measured in Mali and Benin during wet seasons of 2005 and 2006. The estimation of NO fluxes from soils is compared to NO emission by lightning in the free troposphere.

The use of the neural network algorithm in the 3D CTM gives a right estimation

of ozone and NOx levels, and remains a promising way of estimating correctly soil emissions in a region where almost no data are available.