



NO emission from soil in tropical conditions

C. Delon (1), D. Serça (1), R. Dupont (1), P. De Rosnay (2), F. Timouk (2), E. Mougín (2)

(1)Laboratoire d'Aerologie, Toulouse, France (2) CESBIO, Toulouse, France
(delc@aero.obs-mip.fr/00.33.5.61.33.27.90)

Nitrogen oxide (NO_x) is one of the most important tropospheric ozone precursors, together with Volatile Organic Compounds (VOC). Atmospheric NO_x (NO + NO₂) concentration is, among others, dependant on NO emission from the surface. In tropical regions, NO emissions from soils are comparable to anthropogenic emissions (due to fossil fuel combustion). The processes of emission are the same that on temperate soils, but the reasons of emission are different: soils are submitted to a long dry period, and the first rains provoke very strong emissions (pulses). The objective of this study is (1) to find some new parameterizations for NO fluxes, and (2) to reproduce the seasonal variability and the pulse effect. First aspect is treated with a neural network, which gives a non linear equation linking soil temperature and humidity, meteorological parameters, but also soil texture, pH and fertilizer amount, to the NO flux. Different equations are tested: the first is built with in situ measurements collected in Hombori (Mali) during summer 2004 ("tropical only" data base), and the second equation is the result of a mixed data base between both tropical (Hombori) and temperate (northern and southern France) measurements. The second aspect of this study is the introduction of these equations in 1D modelling with a Surface Vegetation Atmosphere Transfer (SVAT) model. Modelling results are validated with Hombori measurements, and show, first, the capability of the network to give a universal equation that can be used for different types of climate and soil, and second, the possibility to reproduce the seasonal variation of the fluxes.