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NO emissions from soils and impact on tropospheric chemistry in the framework of AMMA.

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NO is produced in the soil upon microbial processes referred to as nitrification and denitrification. The rate of nitrification and denitrification depends on the great variety of parameters linked to soil, vegetation and climate. Most of the NO inventories are elaborated with parameterizations using soil surface temperature and moisture, sometimes associated with fertilization rate, pH, climate and soil types and nitrogen content. The spatial and temporal resolution ususally used in these inventories do not allow the simulation of NO emission stimulation or "pulse effect", occurring in tropical regions at the end of the dry season. In the framework of AMMA, the objective of the present study is to propose a new parameterisation for the determination of NO emissions from soils, and to evaluate the impact of these emissions on the production of tropospheric ozone. This will be developed particularly for the centre of Mali (district of Hombori) where NO emission experimental data are available. The parameterisation proposed is the result of a neural network calculation including several environmental parameters to determine the NO emissions. Once obtained through the neural network, the emission algorithm is coupled to a meso-scale chemistry transport model (Meso-NH-Chemistry) allowing on line calculation of NO fluxes from soils in the surface scheme. Calculated NO fluxes range in the same proportion as measured NO fluxes, that is between 1 and 30 gN/ha/d for the period of beginning of July 2004, transition period between the dry and wet seasons. As a preliminary result, we found that surface emissions are linked to soil texture, which directly influence soil humidity response, and surface temperature. NOx concentrations at surface calculated from the neural network parameterization are 5 to 50 times higher than the ones calculated

using the Yienger & Levy (1995) parameterisation. Ozone concentrations in the lower troposphere increase significantly, from 1 to 10 ppb depending on time and altitude. The highest increase occurs below 3000m 3 to 6 hours after the strongest NO emissions.