Geophysical Research Abstracts, Vol. 9, 03883, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-03883

Fossil fuel, Biofuel and Biomass burning emission inventories for gases and particles in Africa with tentative validations with global TM4 and regional RegCM aerosol modeling for the year 2000.

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Africa is a major anthropogenic combustion aerosol source in the world with ensuing strong impacts on global/regional chemistry and on the environment. Fossil fuels (traffic and industry, FF), biofuels (wood and charcoal burning BF) and biomass burning (savannah and forest fires, BB) are the main combustion sources. First, our focus and main objective were to derive BB emissions for gases and particles. A specific methodology has been developed purposely for Africa, based on SPOT vegetation satellite data and the Global Land Cover vegetation map. An important work performed in the frame of the AMMA program was to derive specific parameters (biomass density, combustion efficiency and emission factors) for each GLC vegetation class. This study has been based on Liousse et al., (2004) and Michel et al., (2005) with inputs of Mayaux (JRC-Ispra). BB inventories have been obtained for the year 2000 with a spatial resolution of 0.5deg x 0.5deg and a monthly temporal resolution for gases and particles. Then, the black carbon and organic carbon inventories (L06) have been introduced within the regional climate model RegCM3 endowed with a carbonaceous aerosol module (Solmon et al. 2006), to be evaluated from comparisons between modelled results and available measurements all over Africa. The Liousse et al., (1996) BB inventories (L96), based on statistical data typical of the years 1980-1990 were also tested for comparisons. Let us note that the most recent BF and FF emission inventories have been taken from Junker and Liousse (2006). This modeling exercise shows

the strong need for emission inventory, together with time-coherent meteorological and experimental data. The methodology used to derive BB emissions over Africa within the L06 inventory associated with RegCM3 model simulations appears successful to capture the major trends observed over Africa using both surface, vertical measurements and satellite data.

This methodology is applied to derive the emission inventories for the AMMA period (2005-2007) with a spatial resolution of 25kmx25km and a weekly temporal resolution. First results are presented with a zoom over the Djougou (Benin) area. Finally, we will discuss the update of the African fossil fuel and biofuel emission inventory, which is in progress for present and future projections. These are key issues in climate studies considering the explosive demography and urbanization of Africa.