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Modelling N2O fluxes from soils over Africa using RegCM-CLM coupled models

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Nitrous oxide (N2O) is an important greenhouse gas as it presents a high global warming potential, around 300-fold higher than CO_2 for an approximate residence time of 120 years in the atmosphere (IPCC, 2013). At the global scale, N2O represents 7% of the actual global warming and its atmospheric concentration is increasing at a rate of 0.75 ppb per year (IPCC, 2013). Terrestrial soils are major sources of global N2O emissions, but these emissions have been mostly evaluated in temperate regions and agricultural landscapes. In Africa, N2O emissions have often been neglected, due to the unfavourable hot and dry climate on denitrification process. However, the scarcity of experimental and modelling studies in African areas leads to high uncertainties on N2O emissions estimation on the continent.

Our study aims at proposing an estimation of N2O emissions from soils in Sub Saharan Africa (SSA) using the coupled models RegCM4 (Regional Climate Modelling) and CLM (Community Land Model) developed at ICTP (International Center for Theoritical Physics) and NCAR (National Center for Atmospheric Research). Model results will be compared to experimental results collected by the French Laboratoire d'Aérologie (LA) and to literature results. Contrasted emission situations will be identified in relation to contrasted climates and agricultural practices. Underlying processes of emissions will also be highlighted.