The contribution of agriculture to early season trace gas pulses in sub-Saharan Africa and their effects on air quality.

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ABSTRACT: In seasonally-dry ecosystems, the onset of precipitation is typically responsible for large pulses of the ozone precursor nitric oxide (NO); these pulses can be particularly large from fertilized agricultural ecosystems. Agricultural NO emissions can drive ozone formation in rural areas, and recent modeling and remote sensing studies suggest that soils are a major driver of ozone production following precipitation pulses in western Africa. However, there are only two published studies of NO emissions from agricultural soils in sub-Saharan Africa. In addition, increases in nitrogen (N) additions of over an order of magnitude are underway in parts of sub-Saharan Africa, and can be expected to lead to increases in the greenhouse gas nitrous oxide (N_2O) and of NO. Here we propose a combination of field and modeling studies to quantify NO and N_2O emission pulses at the beginning of the rainy season in sites across western and eastern Africa. We will then link these pulse measurements to a chemical transport model to model the impacts of changing agricultural practices on ozone formation under current and future climates.