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The N$_{2}$O and NO emissions of three types of agricultural system in North China Plain

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The two anthropogenic induced N-trace gases, a powerful greenhouse gas N_2O and an important atmosphere pollution gas NO, which are getting more and more concerned. It is reported that agricultural soil is the main sources of the two gases, which globally contribute to 1.7-4.8 Tg N yr^{-1} and 1.6 Tg N yr^{-1}, respectively. North China Plain is a seriously intensive agriculture area of china, with 300,000 km^2 which produces approximate one-fourth of China's total grain yield. The winter wheat - summer maize rotation (W-M), winter wheat - scallion rotation (W-S), greenhouse vegetable (GV) are three typical cultivation systems in this region. In the Recent 40 years, the conflicts between the demand of high yield and excess fertilizer application have been getting increasingly outstanding. Under such circumstances, we have conduced one and a half years to two years field measurement to investigate the N_2O and NO emissions. The mean accumulated N_2O emissions were 4.4, 4.4, 23.5 kg N ha^{-1} yr^{-1}, emission factors were 0.65%, 0.52%, 0.90% for the W-M, W-S, and GV systems, respectively. The mean accumulated NO emissions were 2.0, 0.7, 3.6 kg N ha^{-1} yr^{-1}, emission factors were 0.3%, 0.07%, 0.14% for the relative systems, respectively. The emission patterns was typically event driven pattern, except the GV system which mainly caused by basal fertilizer application. Obviously, fertilizer application was the main driven factor. What's more, environment factors (e.g. WFPS, soil texture) also affected the two gases emissions. The denitrification was the domain process during the entire growing period for W-S and GV systems, however, referring to W-M system, both nitrification and denitrification played an important role during the entire period. The nitrification inhibitors application may be an available strategy to mitigate the two N- trace gases emissions.