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The effect of manure on nitrous oxide flux in agricultural soils

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Nitrous oxide plays important roles in atmospheric chemical processes. Nitrous oxide is known as a greenhouse gas, and is one of several gases responsible for global warming. In addition to its contribution to global warming, nitrous oxide plays the most important role in ozone depletion in the stratosphere.

Agricultural soils is major source of atmospheric nitrous oxide. Because N fertilizer stimulates these N oxide gases emission derived from both nitrification and denitrification processes in soils. However, the strength of its still have a large uncertainty. The rates at which nitrous oxide emission is induced by fertilization widely ranged 0.003 ? 0.03 (IPCC, 2007). Its variation was considered to depend on fertilizer types, plant species, soil types and the environmental factors during measurement period. However, there are fewer reports on nitrous oxide emission from organic fertilizer application than from chemical fertilizer application. To investigate the effect of organic fertilizer application on nitrous oxide flux, a wider variety of organic materials needs to be assessed.

In this study, to quantify the various organic materials and various nitrogen fertilization effect on nitrous oxide flux, we develop a hierarchical Bayesian model. We modelled N oxide gases flux assumed as lognormal distribution and incorporated random effect in block (chamber position) to take the variability of flux into account. By using this model, we quantify the response of nitrous oxide flux with various organic materials application from lysimeter field to the environmental factors. Also, this approach enables to quantify uncertainty, which is represented as probability density functions.

In the presentation, we will discuss about the difference in response of nitrous oxide flux among application of organic materials .

Keywords: Nitrous oxide flux, Hierarchical Bayes model