Soil greenhouse gas fluxes and net global warming potential from intensively cultivated vegetable fields in southwestern China

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Soil greenhouse gas fluxes and net global warming potential from intensively cultivated vegetable fields in southwestern China

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Vegetable cropland in China has increased from 3 million ha in 1980 to 18.4 million ha in 2009, and the field management has been characterized with intensive fertilization and high density of cultivation. Therefore, the net effect of vegetable production on global warming deserves attention. Greenhouse gas fluxes were thus measured over approximately 18 months in two typical subtropical vegetable fields with intensive management and contrasting soil properties. Intensive fertilization consistently stimulated N_2O emission, while imposed complicated impact on soil respiration with CO_2 emission enhanced in one field and suppressed in the other field. The fertilizer-induced N_2O emission factors averaged 1.4 to 3.1% with large seasonal variations which could be explained by the interaction of soil temperature and moisture up to 71 to 94%. All the vegetable cropping systems were net sources of atmospheric radiative forcing, and the net global warming potential over the entire study period ranged from 1786 to 3569 g CO_2 equivalence m^{-2} for fertilized soils with net CO_2 emission contributing 53 to 67% and N_2O emission occupying the remaining 33 to 47%. The result suggests that sustainable management practices are pressingly needed to explore for vegetable farming to satisfy the increasing demand for vegetable while to mitigate its global warming effect through reducing fertilizer-induced N_2O emission as well as increasing carbon sequestration in vegetable fields.

Modelling N_2O emissions from Andosols in an intensive dairy farming region, Japan

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Estimates of agricultural Nitrous oxide (N_2O) emissions are needed to develop economical efficient as well as effective policies in mitigating and reducing greenhouse gas emissions in farming systems. In Japan compared with the beginning of 70's, the livestock sector grew two times in recent years to meet the increasing demand in meat and dairy productions and the N_2O emission related to manure increased However, the potential of alter-