conferenceseries.com

Guangbin Zhang et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-037

4th World Conference on
CLIMATE CHANGE
October 19-21, 2017 | Rome, Italy

Stable carbon isotopes of CH_4 emission from three typical rice fields in China

Guangbin Zhang[1], **Ma Jing**[1], **Yang Yuting**[1,2], **Yu Haiyang**[1,2], **Shi Yaping**[1,2], and **Xu Hua**[1]
[1]Chinese Academy of Sciences, China
[2]University of Chinese Academy of Sciences, China

Little is known about the stable carbon isotopes of CH_4 emission ($\delta^{13}CH_4$emitted) from permanently flooded rice field and double-rice field. CH_4 fluxes and corresponding $\delta^{13}CH_4$emitted under various field managements (mulching, water regime, tillage, and nitrogen (N) fertilization) were simultaneously measured in three typical Chinese rice fields, a permanently flooded rice field in Ziyang City, Sichuan Province, Southwest China, a double-rice cropping field in Yingtan City, Jiangxi Province, Southeast China, and a rice-wheat rotation field in Jurong City, Jiangsu Province, East China, from 2010 to 2012. Results showed different seasonal variations of $\delta^{13}CH_4$emitted from the three fields during the rice-growing season. The values of $\delta^{13}CH_4$emitted were negatively correlated with corresponding CH4 emissions in seasonal variation and mean, indicating the importance of CH_4 production, oxidation and transport associated with isotopic fractionation effects to theδ13CH4emitted. Seasonal variations of $\delta^{13}CH_4$emitted were slightly impacted by mulching cultivation, tillage and N application but highly controlled by drainage. Meanwhile, tillage and N application, especially mulching cultivation, played important roles in mean CH_4 emissions and corresponding $\delta^{13}CH_4$emitted, resulting in low emissions with high values of $\delta^{13}CH_4$. Totally, mean values of $\delta^{13}CH_4$emitted from the three fields were similar, mostly ranging from −60% to −50%, which is in good agreement with previously published data from India and America. The results demonstrated that seasonal variations of $\delta^{13}CH_4$emitted mainly depended on the changes in CH_4 emission from paddy fields and further indicated that the methanogenic pathways, fraction of CH_4 oxidation, and transport isotope fractionation influenced by field managements had important effects on $\delta^{13}CH_4$emitted.

Biography

Guangbin Zhang major study was the processes of CH_4 emission from rice fields with the stable carbon isotope technique combining with microbes (methanogens and methanotrophs) analyses. Recently, he had carried out field experiments to study the mechanism of CH_4 emission from a special kind of rice fields that are permanently flooded with highest fluxes in southeast of China. In addition, pot and incubation experiments were performed to investigate the effect of nitrogen fertilization on production, oxidation and emission of the CH_4 by measuring the stable carbon isotopes, methanogens and methanotrophs. Meanwhile, integrated effects of nitrogen fertilization and straw application on N_2O emission from paddy soils were observed. He is very interested in Soil Ecology, Microbiology, Biogeochemistry, Environmental and Soil Chemistry, and his focus is on the cycling of C and N in the agricultural ecosystem and the responses to global climate change (CO_2 concentration and temperature enrichment).

gbzhang@issas.ac.cn

Notes: