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Study on methane diurnal emission nearby Cuona Lake in Naqu of Tibet with different humidity

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Key words methane diurnal emission, Cuona lake, wetland, humidity, Naqu, Tibet

Introduction It shows that the 70~80 percentage of atmospheric CH₄ is from biogenic sources. And it is believed that paddy fields and wetlands are the dominant sources of atmospheric CH₄ (Hu, 2005). We made a study on methane emission from the wetland nearby Cuona Lake in Naqu of Tibet with different humidity by field investigation, which can contribute to evaluating methane emission from wetlands in Tibet.

Materials and methods The field experiment site was located in nearby Cuona Lake in Naqu of Tibet. On August 2006, 3 treatments of CH₄ flux were imposed with 3 replicates according to the distance from the lake. Treatments were: (1) Lake level treatment (LT); (2) Wet treatment (WT), 100 meter far from the lake; (3) Dry treatment (DT), 500 meter far from the lake. LH, WH and DH were the humidity of 3 treatments, respectively. Using the enclosed chamber technique, CH₄ fluxes were measured. The chamber was a cylinder of 40 centimeter high and its base diameter was 30 centimeters. When measured, the base was inserted 5-centimeter underground, and sealed by distilled water. Samples collected by syringe were transferred into plastic gas bags for measurement by HP6890GC.

Results By the curve, it was proved that LH, WH and DH gradually decreased with the distance from lake. But it wasn't significant for all of treatments' diurnal humidity variation. CH₄ flux of all treatments with time was as follows: WT > DT > LT. The trend of CH₄ diurnal flux of all treatments was accord with each other. A peak appeared in 3 curves respectively. WT peak and DT peak appeared at 15 pm, and LT peak was at 17 pm.

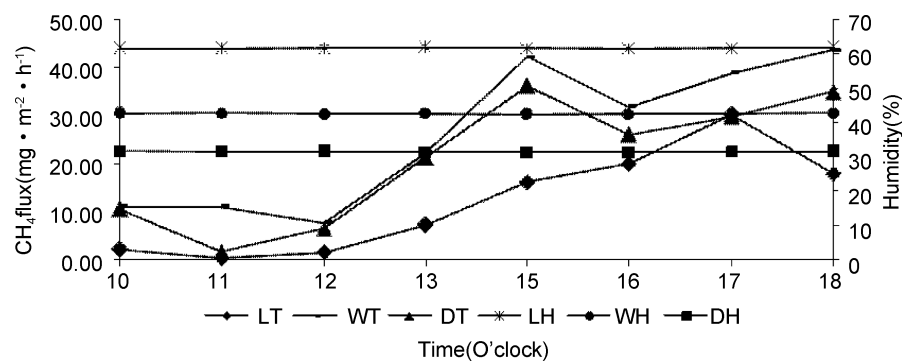


Figure 1 Diurnal CH₄ flux and humidity dynamic nearby Cuona lake in Naqu of Tibet.

Conclusions CH₄ emission flux of all treatments was positive, which shown that this wetland was the source of atmospheric CH₄. The CH₄ flux of LT was smaller, which may result in the inhabitation of CH₄ emission due to excessive humidity of the lake-level. Because of the far distance between DT and lake and smaller humidity, it didn't result in much higher CH₄ flux. With the moderate distance between WT and lake and with appropriate humidity, it could accelerate CH₄ emission.

Reference

Hu Qiwu, Wu Qin, Li Dong, Cao Guangmin, 2005. Comparative study on methane emissions from alpine grasslands with different soil water content. *Chinese Journal of Ecology* 24 (2), 118-122.