应用生态学报 » 2011, Vol. 22 » Issue (09): 2363-2369 DOI:

不同水旱轮作体系稻田土壤剖面N_2O的分布特征

刘平丽,张啸林,熊正琴**,黄太庆,丁敏,王金阳

南京农业大学资源与环境科学学院，江苏省低碳农业与温室气体减排重点实验室，南京 210095

Distribution characteristics of soil profile nitrous oxide concentration in paddy fields with different rice-upland crop rotation systems.

LIU Ping-li, ZHANG Xiao-lin, XIONG Zheng-qin, HUANG Tai-qing, DING Min, WANG Jin-yang

Jiangsu Province Key Laboratory of Low Carbon Agriculture and GHGs Mitigation, College of Resources and Environmental Sciences, Nanjing Agricultural University, Nanjing 210095, China

全文: PDF (567 KB) HTML (1 KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 通过原位采集淹水和排水状态下土壤剖面4个层次的气体,研究氧化亚氮（N_2O）在水旱轮作体系稻田土壤剖面中的动态分布特征.试验设置小麦-单季稻和油菜-双季稻两种轮作体系,包括施N和不施N两种施肥方式.结果表明:施用N肥极显著促进了土壤剖面N_2O的产生（$P<0.01$）,不同层次间N_2O浓度相关性极显著（$P<0.01$）,小麦、油菜生长期施N和无N处理下层30 cm和50 cm处N_2O浓度均高于表层7 cm和15 cm处;早稻无N处理则为表层7 cm和15 cm处高于下层30 cm和50 cm处（$P<0.05$）,其他水稻处理各层次间无显著差异.无N处理土壤N_2O峰值出现在旱作向水稻的转变期,施N处理则出现在旱作第2次追肥后,季节转变期也有较高的N_2O浓度.

关键词: 氧化亚氮 土壤剖面 稻田 油菜 小麦 耕作制度

Abstract: To investigate the dynamic distribution patterns of nitrous oxide (N_2O) in the soil profiles in paddy fields with different rice-upland crop rotation systems, a special soil gas collection device was adopted to monitor the dynamics of N_2O at the soil depths 7, 15, 30, and 50 cm in the paddy fields under both flooding and drainage conditions. Two rotation systems were installed, *i.e.*, wheat-single rice and oilseed rape-double rice, each with or without nitrogen (N)application. Comparing with the control, N application promoted the N_2O production in the soil profiles significantly ($P<0.01$), and there existed significant correlations in the N_2O concentration among the four soil depths during the whole observation period ($P<0.01$). In the growth seasons of winter wheat and oilseed rape under drainage condition and with or without N application, the N_2O concentrations at the soil depths 30 cm and 50 cm were significantly higher than those at the soil depths 7 cm and 15 cm; whereas in the early rice growth season under flooding condition and without N application, the N_2O concentrations at the soil depth 7 cm and 15 cm were significantly higher than those at the soil depths 30 cm and 50 cm ($P<0.05$). No significant differences were observed in the N_2O concentrations at the test soil depths among the other rice cropping treatments. The soil N_2O concentrations in the treatments without N application peaked in the transitional period from the upland crops cropping to rice planting, while those in the treatments with N application peaked right after the second topdressing N of upland crops. Relatively high soil N_2O concentrations were observed at the transitional period from the upland crops cropping to rice planting.

Key words: N_2O soil profile paddy field oilseed rape wheat cropping system

服务

- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- E-mail Alert
- RSS

作者相关文章

引用本文:

. 不同水旱轮作体系稻田土壤剖面N_2O的分布特征[J]. 应用生态学报, 2011, 22(09): 2363-2369.

. Distribution characteristics of soil profile nitrous oxide concentration in paddy fields with different rice-upland crop rotation systems.[J]. Chinese Journal of Applied Ecology, 2011, 22(09): 2363-2369.

链接本文:

http://www.cjae.net/CN/ 或 http://www.cjae.net/CN/Y2011/V22/I09/2363

没有本文参考文献

[1] 纪洋,张晓艳,马静,李小平,徐华,蔡祖聪 . **控释肥及其与尿素配合施用对水稻生长期N_2O排放的影响**[J]. 应用生态学报, 2011, 22(08): 2031-2037.