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有机质对湖泊沉积物不同形态氮释放动力学影响研究

The effects of organic matter on the release kinetics of nitrogen with different forms in the lake sediments

关键词: [有机质](#) [沉积物](#) [氮形态](#) [释放](#)

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摘要: 模拟研究了有机质对太湖贡湖和五里湖沉积物不同形态氮释放动力学的影响,并从沉积物有机质官能团、各形态可转化态氮含量以及离子释放量变化等方面对其机理进行了探讨.结果表明,随着沉积物有机质含量增加,其各形态氮释放平衡时间延长,释放量呈先快速增加后缓慢趋于平衡的趋势;氨氮最大释放量呈下降趋势,硝氮和溶解性有机态氮最大释放量呈先增加,后快速下降趋势;相比之下,污染严重的五里湖,有机质对沉积物各形态氮释放量的影响大于污染较轻的贡湖.随有机质含量增加,沉积物SOEF-N含量增加,IEF-N、SAEF-N和WAEF-N含量降低;HPO₄²⁻和SO₄²⁻释放量降低,溶解性有机碳释放量呈先增加后降低趋势.随着有机质含量增加,沉积物脂肪族官能团减少,极性官能团增加.沉积物有机质含量增加,通过改变其极性官能团,影响各种离子释放量和使可转化态氮向稳定态转化,抑制各形态氮释放.

Abstract. The effects of organic matter (OM) on nitrogen (N) release kinetics of the sediments from the Gonghu Lake and Wuli Lake were studied, and its mechanism was also discussed from the points of the amounts of different N forms, the changes of the anions released and the organic structures in the studied sediments. The results showed that the equilibrium time of different N forms release was prolonged with the increasing of the OM contents in the studied sediments, and the amounts of the N forms released increased first and then reached equilibrium gradually. The peak value of the NH₄⁺-N released tended to decrease and those of NO₃⁻-N and dissolved organic N released increased first and then decreased quickly with their OM contents decreasing. The effect of organic matter on different N forms released from heavily polluted Wuli Lake was more than that from the slightly polluted Gonghu Lake. The contents of IEF-N, SAEF-N and WAEF-N all decreased with their OM contents increasing, but the SOEF-N content increased. The amounts of HPO₄²⁻ and SO₄²⁻ released decreased, and those of the dissolved organic carbon released increased first and then decreased with their OM contents increasing, The aliphatic series combine decreased, but polar functional groups increased with the OM contents increasing in the sediments. Therefore, the N release process from the sediment was restrained through the changing from transferable N to steady N forms due to the changes of polar functional groups in organic matter and the effects of different iron release by their OM contents increasing in sediments.

Key words: [organic matter](#) [lake sediments](#) [nitrogen](#) [release](#)

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