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研究报告

刘芸,易齐涛,陈求稳,黄蔚,张涛.太湖西部河网中沉积物氮的空间分布特征[J].环境科学学报,2015,35(12):3890-3897

太湖西部河网中沉积物氮的空间分布特征

**The spatial distribution of nitrogen species in surface sediment in the west river networks of the Taihu Lake Basin, China**关键词: [氮](#) [空间分布](#) [沉积物](#) [水系](#) [太湖流域](#)基金项目: [南京水利科学研究院基金\(No.Y913017\)](#); [中国科学院重点部署项目基金\(No.KZZD-EW-10-02\)](#)

作者 单位

刘 芸 1. 中国地质大学(北京)地球科学与资源学院, 北京 100083; 2. 中国科学院生态环境研究中心, 北京 100085

易齐涛 中国科学院生态环境研究中心, 北京 100085

陈求稳 南京水利科学研究院生态环境研究中心, 南京 210029

黄 蔚 南京水利科学研究院生态环境研究中心, 南京 210029

张 涛 南京水利科学研究院生态环境研究中心, 南京 210029

摘要: 选取太湖主要入湖水系(西苕溪水系和宜溧-洮滆水系)为研究对象,于2014年1月完成水体及表层沉积物各102个样品的采集,分析了沉积物中氮(N)不同形态的空间分布特征及其影响因素.结果表明,西苕溪水系表层沉积物总氮(TN)含量高于宜溧-洮滆水系,均值分别为 $2164.91 \text{ mg}\cdot\text{kg}^{-1}$ 和 $983.52 \text{ mg}\cdot\text{kg}^{-1}$ ,两个水系间沉积物TN含量存在显著差异.西苕溪和宜溧-洮滆两个水系沉积物中无机氮(IN)以氨氮( $\text{NH}_4^+\text{-N}$ )为主,平均含量分别为 $120.90 \text{ mg}\cdot\text{kg}^{-1}$ 和 $49.85 \text{ mg}\cdot\text{kg}^{-1}$ ,而硝态氮( $\text{NO}_3^-\text{-N}$ )平均含量仅为 $9.60 \text{ mg}\cdot\text{kg}^{-1}$ 和 $13.95 \text{ mg}\cdot\text{kg}^{-1}$ .沉积物中有机氮(ON)含量及分布与TN相似,西苕溪和宜溧-洮滆水系ON均值分别为 $2034.41 \text{ mg}\cdot\text{kg}^{-1}$ 和 $917.77 \text{ mg}\cdot\text{kg}^{-1}$ ,占各自TN的百分比分别为93.90%和92.99%.表层沉积物各形态N之间及与上覆水体之间均具有显著的相关性,表明沉积物与上覆水体之间的浓度梯度可能会驱动IN向上覆水体进行释放.

**Abstract:** The objectives of this study were to evaluate the spatial distribution and the relationships of different nitrogen forms in water column and surface sediment in two main inflow rivers (West Tiaoxi and Yili-Taoge) of the Taihu Lake Basin, China. Water and sediment samples were collected from 102 sites, and different nitrogen forms were analyzed in laboratory. The results showed significant difference of sediment total nitrogen (TN) concentrations between the West Tiaoxi and Yili-Taoge rivers, with mean values of  $2164.91 \text{ mg}\cdot\text{kg}^{-1}$  and  $983.52 \text{ mg}\cdot\text{kg}^{-1}$ , respectively. Ammonium nitrogen ( $\text{NH}_4^+\text{-N}$ ) was the main form of inorganic nitrogen in surface sediment in both rivers, with the average concentrations of  $120.90 \text{ mg}\cdot\text{kg}^{-1}$  and  $49.85 \text{ mg}\cdot\text{kg}^{-1}$ . The average concentrations of organic nitrogen (ON) in sediment of the two rivers were  $2034.41 \text{ mg}\cdot\text{kg}^{-1}$  and  $917.77 \text{ mg}\cdot\text{kg}^{-1}$ , and the spatial distribution pattern of ON was similar to TN. The percentage of ON in TN of the two rivers were 93.90% and 92.99%, respectively. The Spearman correlation analysis showed that there were significant correlations between different nitrogen forms in the surface sediment, and between surface sediment and overlying water columns. The results implied that surface sediment could release inorganic nitrogen to the overlying water because of their nitrogen concentration gradients.

**Key words:** [nitrogen](#) [spatial distribution pattern](#) [sediment](#) [river network](#) [Taihu Lake Basin](#)

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服务热线: 010-62941073 传真: 010-62941073 Email: [hjkxxb@rcees.ac.cn](mailto:hjkxxb@rcees.ac.cn)

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