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### 秦淮河干流沉积物磷形态沿程分布特征

## Forms and distribution of phosphorus in Qinhuai River sediments along an urbanization gradient

关键词: [秦淮河](#) [沉积物](#) [磷形态](#) [钙](#)

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**摘要:** 应用化学连续提取法,分析了秦淮河干流14个表层沉积物样品的磷形态沿程变化特征及其影响因素.结果发现,秦淮河干流由上游至南京市区段,随城市化程度的提高,河流沉积物总磷和各种形态磷沿程增加的趋势十分明显.Ca-P和Fe-P平均含量分别占TP的26.8%和25.7%,是主要的磷形态.易吸附态磷(L-P)在TP中的比例最低,但在城区由于TP的高度富集,其含量均超过 $15 \text{ mg} \cdot \text{kg}^{-1}$ .沉积物中的总磷含量在城区河段显著增加,但只有很少部分转化为稳定形态的磷,人口密集区生活污水等各种来源排放的磷仍然深刻影响着城市河流的水环境质量.随城市化程度的提高,秦淮河中下游沉积物样品中钙富集的趋势明显,与之相对应的是沉积物Ca-P含量均超过 $200 \text{ mg} \cdot \text{kg}^{-1}$ ,相关分析和通径分析结果表明,二者之间存在成因上的联系.钙的富集提高了沉积物的固磷能力,将上覆水体中的磷转化为钙结合态磷.城区河流沉积物中钙含量的升高,对于河流生态系统磷的迁移转化有重要影响.

**Abstract:** Fourteen surface sediment samples collected along main stream of Qinhuai River in Eastern China were analyzed for phosphorus forms by chemical sequential extraction. Factors affecting the spatial variation of phosphorus forms were discussed. The contents of total P (TP) and all P forms in riparian sediments increased remarkably from headwaters to the urban section of the river. Mean contents of Ca-P and Fe-P were 26.8% and 25.7% of TP, respectively, representing dominant forms of P in sediments. L-P contents were the lowest compared to other P forms, but they were higher than  $15 \text{ mg} \cdot \text{kg}^{-1}$  in sediments of the river's urban section due to the highly enrichment of TP. It could be deduced that only a small portion of sediment P that was derived from urban sewage turned into stable forms of P. Calcium was distinctly enriched in urban sediments and the contents of Ca-P exceeding  $200 \text{ mg} \cdot \text{kg}^{-1}$  were observed in all urban samples. Correlation analysis and path analysis were performed and the results indicated that the formation of Ca-P was directly linked to the enrichment of Ca. Increased levels of Ca enhanced the capability of sediments in trapping P from overlying waters. The enrichment of Ca in urban river sediments played a crucial role in governing P cycling in river ecosystems.

**Key words:** [Qinhuai River sediment](#) [phosphorus forms](#) [calcium](#)

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