

赵海超,王圣瑞,张莉,焦立新,李艳平,刘文斌.有机质含量及其组分对洱海沉积物磷吸附-释放影响[J].环境科学学报,2014,34(9):2346-2354

有机质含量及其组分对洱海沉积物磷吸附-释放影响

Effect of OM content and constituents on phosphorus adsorption-release of the sediment from Erhai Lake

关键词: [有机质](#) [沉积物](#) [磷](#) [释放](#) [吸附](#)

基金项目: [国家自然科学基金 \(No. U1202235, 41103070\)](#); [国家水体污染控制与治理科技重大专项 \(No.2012ZX07105-004\)](#)

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摘要: 研究了洱海不同湖区沉积物有机质含量、组分及其吸附-释放磷的特征, 试图揭示有机质含量及组分对沉积物磷吸附-释放行为的影响机制. 结果表明, 洱海沉积物磷释放潜能随着沉积物中有机质 (TOM) 含量的增加而增大, 而沉积物磷的最大释放速率 ($V_{\text{释, max}}$) 和最大释放量 ($Q_{\text{释, max}}$) 随沉积物中轻组有机质 (LFOM) 含量的增加而增大, 释放平衡时间随活性有机质 (ASOM) 含量的增加而缩短, 磷释放强度随LFOM占TOM比例的增加而减弱. 沉积物磷的最大吸附速率 ($V_{\text{吸, max}}$)、最大吸附量 ($Q_{\text{吸, max}}$) 和吸附效率随沉积物TOM含量的增加而增大, 吸附平衡时间随TOM含量的增加而缩短, 吸附强度随ASOM含量的增加而增强, 吸附-解吸平衡浓度 (EPC₀) 随ASOM含量的增加而降低. 沉积物磷释放后再吸附过程中磷释放的 $Q_{\text{释, max}}$ 和再吸附的 $V_{\text{吸, max}}$ 随TOM含量的增加而增大, 当TOM含量相当时, 则随沉积物ASOM含量的增加而降低, 再吸附强度随沉积物中LFOM含量的增加而降低. 沉积物磷吸附释放容量随有机质总量的增加而增加, 吸附释放平衡浓度随有机质活性的增加而降低, 释放强度和速率随有机质分解程度的增加而降低, 吸附强度和速率随有机质活性的增加而增加.

Abstract. The organic matter (OM) content, composition and their adsorption-release characteristics towards phosphorus (P) of the sediment from different regions of Erhai Lake were investigated to reveal the effect of their OM content and composition on the adsorption-release characteristics of sediment P. Experimental results indicated that the release potential of sediment P was enhanced with the increase of their total organic matter (TOM) content. The V_{max} and Q_{max} of the released sediment P increased with the increase of their light fraction of organic matter (LFOC), and the releasing equilibration time decreased with the increase of their active organic matter (ASOM). Their P releasing intensity was weakened with the increase of the LFOM/TOM ratio. The V_{max} and Q_{max} of sediment P adsorption and adsorption efficiency increased with the increase of their TOM content. The adsorption equilibrium time decreased with the increase of their TOM content, and the adsorption intensity was strengthened with the increase of their ASOM. EPC₀ content decreased with the increase of their ASOM. During the process of release and re-adsorption of sediment P, both their Q_{max} for P release and V_{max} for re-adsorption increased with the increase of their TOM. When the TOM content in the two sediments was equivalent, they decreased with the increase of their ASOC content and the re-adsorption intensity decreased with the increase of their LFOM content. Adsorption-release capacity of sediment P was enhanced with the increase of their TOM. The adsorption-release equilibrium concentration decreased with the increase of their OM activity intensity. The releasing intensity and rate decreased with the increase of their OM decomposing degree, and the adsorption intensity and rate increased with the increase of their OM activity intensity.

Key words: [organic matter](#) [sediment](#) [phosphorus](#) [release](#) [adsorption](#)

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