

## ГЕОЛОГИЯ. ГЕОЭКОЛОГИЯ

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### СОДЕРЖАНИЕ ТЯЖЁЛЫХ МЕТАЛЛОВ В КОМПОНЕНТАХ МАЛОЙ РЕКИ, НЕ ПОДВЕРЖЕННОЙ ВЛИЯНИЮ АНТРОПОГЕННОЙ ДЕЯТЕЛЬНОСТИ

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В статье рассмотрено содержание тяжёлых металлов в поверхностных водах, донных отложениях и мшанках карьера серебряного (*Sargassum angulatus gibelio*) из верховий реки Ольговы. Результаты проведенных лабораторных исследований показали, что содержание биогенных веществ ( $\text{NH}_4^+$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$ ) в воде реки не превышает предельно допустимых значений. Тяжёлые металлы (Fe, Mn, Zn, Pb, Cu и Ni) в речной воде, за исключением железа и марганца, накапливаются в пределах ПДК. Высокие концентрации Fe и Mn объясняются особенностями буровинной геологической провинции. Повышенное содержание цинка в донных отложениях объясняется повышенной геологической активностью данного металла. Содержание тяжёлых металлов в мшанках карьера в верховьях реки Ольговы по сравнению с другими реками России является одним из наиболее низких. Предположительно, в мшанках больше всего накапливаются цинк и железо. Полученные данные о составе и количестве воды, донных отложений, а также концентрации металлов в мшанках карьера серебряного можно считать фоновыми для региона вследствие отсутствия антропогенной нагрузки на водоток.

**Ключевые слова:** река Ольговы, тяжёлые металлы, поверхностные воды, донные отложения, карьер серебряный, *Sargassum angulatus gibelio*, Среднеамурская провинция.

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#### Введение

Использование водных ресурсов для удовлетворения нужд человека обычно сопровождается ухудшением их качества. Это выражается не только в изменении физико-химического состава вод, но и количественных и качественных характеристик гидробионтов, населяющих водоёмы и водотоки [29]. Разные реки испытывают различную антропогенную нагрузку в зависимости от своего хозяйственного назначения. Это может быть забор воды для нужд населения и хозяйства, сброс сточных вод предприятиями и жилищно-коммунального

комплекса, использование рек в качестве судоходных артерий, строительство гидротехнических инженерных сооружений и так далее [14, 34]. При исследовании рек, испытывающих антропогенную нагрузку, неизбежно встаёт вопрос о сравнении полученных результатов с фоновыми для данной местности значениями. Такими точками сравнения могут стать малые реки, не подверженные влиянию антропогенной деятельности [13].

Для экологической оценки состояния воды малых рек немаловажную роль играет информация о содержании различных элементов в гид-

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