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## Microplastic pollution in urban rivers within China's Danxia landforms: Spatial distribution characteristics, migration, and risk assessment



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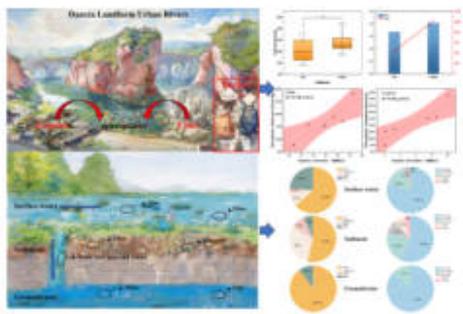
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### HIGHLIGHTS

- The level of microplastic pollution is moderate.
- The major sources of microplastic pollution were wastewater discharge and human activities, especially tourism.
- Hydrodynamic processes and urban discharges result in the downstream accumulation of microplastics.
- Compared to cities, counties are at greater risk of ecological harm.
- The primary source of microplastics in groundwater is vertical migration from surface water.

### GRAPHICAL ABSTRACT



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### ABSTRACT

The potential deleterious effects of microplastics on environmental integrity and human health have elicited global attention. Particularly vulnerable to microplastics are Danxia landforms, characterized by their unique topographical features and ecologically fragile milieu. Notwithstanding, empirical studies assessing the prevalence of microplastics in these unique landforms remain strikingly limited. The present investigation comprehensively examined the abundance of microplastics in surface water, sediment, and groundwater across six cities and six counties within the Danxia landforms. Comparative analysis revealed a moderate level of microplastic contamination in the urban rivers of the Danxia region relative to other freshwater rivers. Anthropogenic activities, notably urban wastewater treatment and tourism, emerged as principal contributors to microplastic pollution. Sedimentary microplastics exhibited an accumulative trend from upstream to downstream locations. The risk assessment revealed a high potential ecological risk in counties and a moderate risk in cities. Cluster analysis suggested that groundwater microplastics were a confluence of hydraulic interactions between surface and subsurface waters within the Danxia region. This investigation elucidates the microplastic contamination profile, origins, migratory patterns, and associated risks in Danxia's urban rivers, thereby furnishing scientific underpinning for health and ecological preservation strategies within urbanized Danxia landscapes.

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