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Original
A research to study the unstoppable subterranean journey of microplastics / Balestra, V., Fiorucci, A., Marini, P., Bellopede, R.. - ELETTRONICO. - (2024), pp. 733-733. (SGI-SIMP Congress "Geology for a sustainable management of our Planet", Bari 2-5 September 2024).

Availability:
This version is available at: 11583/2992295 since: 2024-09-08T00:32:45Z

Publisher:
Società Geologica Italiana

Published
DOI:

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15 October 2026

https://doi.org/10.3301/ABSGI.2024.02

Bari, 2-5 September 2024

ABSTRACT BOOK

a cura della Società Geologica Italiana

BARI 2024

Geology for a sustainable management of our Planet

A research to study the unstoppable subterranean journey of microplastics

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Keywords: microplastics, caves, pollution.

Microplastics (MPs) are a global problem, contaminating remote areas too. However, different environments are poorly studied, such as subterranean ones and karst areas, despite the global drinking water sources and the environmental heritages. MPs can endanger the fragile subterranean ecosystems, be consumed or assimilated by animals, damage speleothems, and pollute karst aquifers.

The aim of this multidisciplinary research is to investigate MP pollution in waters and sediments in karst surface and subterranean environments from a geological, biological and environmental point of view, in order to monitor the state of ecosystems.

Samples from different European karst areas were collected and investigated, from show caves to unexplored caves, from surface watercourses to groundwaters. The sediments of three Italian show caves (Bossea, Borgio Verezzi and Toirano caves, Piedmont and Liguria. Italy) were analyzed, highlighting the presence of high amount of MPs along tourist paths and in speleological areas. Surface and subterranean waters of Bossea karst system showed MP pollution in all examined samples, underlining the importance of the entire aquifer karst systems monitoring, even susceptible to contamination by surface pollutants. Different protected aquatic surface (spring) and subterranean (caves) environments of the Classical Karst were analyzed in order to verify micropollution in habitats hosting particularly protected species such as the olm *Proteus anguinus*. All samples highlighted high values of MPs and anthropogenic microfibers. Sediment samples in not jet explored caves of Abruzzo region, Italy, were collected to verify MPs pollution even in underground environments not directly affected by human presence, showing still little threatened habitats by MP pollution. Samples from different caves in Herzegovina and Slovenia, and from Italian springs with different karst characterizations will be analyzed too, in order to understand MP transport in active karst systems and deposition in vadose zones. Other micropollutants linked to MPs will be analyzed too. Alongside, specialized hypogean crustaceans from Bossea karst system were analyzed in order to understand micropollutants ingestion even in subterranean habitats (Sforzi et al., 2024).

Karst areas and caves are one of the most important and well-known geological features in the world, fragile and unique ecosystems with an exceptional scientific, cultural and environmental value, as well as an important economic resource. Monitoring of these environments is fundamental for their conservation and to propose new strategies for the protection and conservation of karst habitats.

Sforzi L. et al. (2021) - (Micro-)Plastics in Saturated and Unsaturated Groundwater Bodies: First Evidence of Presence in Groundwater Fauna and Habitats. Sustainability, 2024, 16(6), 2532, https://doi.org/10.3390/su16062532.