

Verband der deutschen Höhlen- und Karstforscher e.V.

German Speleological Federation

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Statement of the German Speleological Federation for the UN Water Conference 2023

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Photo: Alexandra Bengel

Karst covers about 20 % of Earth's land surface and supplies around 10 % of the world's population with water! ⁽¹⁾

Karst is a landscape formed from the dissolution of rocks such as limestone, dolomite, and gypsum. It is characterized by underground drainage through natural pipes (conduits) some of which are large enough for humans to explore (caves). Where karst is present on the land surface it is characterised by sinkholes, disappearing streams, and springs. However, some karst conduits travel long distances beneath landscapes developed on other rocks that display no evidence to suggest water is flowing through the limestone at depth.

Water flows rapidly through conduits (up to km/day) and there is little or no filtration, so karst aquifers are very vulnerable to contamination. Moreover, contaminants can spread over large distances harming people and subterranean species and ecosystems. Pollutants may also become trapped in karst aquifers and then be released over time at springs⁽²⁾. Karst groundwaters are particularly susceptible to transmission of bacteria, for example from poorly designed waste-water systems, and of pollutants, such as pesticides and herbicides from agricultural land, hydrocarbons from roads and fuel storage facilities and sediment from agriculture, extractive industry and development. There are also many examples of over-abstraction of groundwater from karst, which commonly leads to subsidence or catastrophic collapse on the surface⁽³⁾.

Caves and karst groundwater-dependent ecosystems harbour many species some of which are endemic to a single cave system. Even small impacts can result in detrimental, potentially irreversible, changes to subterranean habitats, including natural underground biofilms that consist of many specially adapted microorganisms⁽⁴⁾. Deforestation, intensive agriculture, and mining are major threats to cave fauna causing severe biodiversity losses. In contrast to their direct impacts on surface karst and its unique biodiversity, the underground impacts are largely indirect and relate primarily to changes to water quality and quantity⁽²⁾. Mining activities can change underground waterways in and beyond a karst area, commonly causing springs to dry up. during high precipitation events water can develop new underground passageways causing severe damage on the surface. 'Water mining', where extraction exceeds recharge, is a particular problem in karst because of the ease of water removal from caves and large conduits⁽²⁾.



An understanding of karst, its groundwater systems, and their complex interrelationships is important for

- sustainable use
- resource protection
- disaster risk reduction
- subterranean biodiversity.

VdHK calls on the UN Water Conference to recognize (a) that karst groundwater is a biodiversity hotspot and (b) that total catchment management is more vital for karst landscapes than many other lithologies. In particular:

- Countries should treat karst water as a fragile and finite resource, implementing laws to control and discipline water extraction, as well as allowing appropriate funding for quick reaction in case of contamination. In particular, recommendations regarding the proper design and implementation of septic tanks and the location of landfills should be put into practice.
- Managers should recognise that in karst catchments, surface actions result in direct or indirect impacts underground or further downstream.
- Agricultural activity has the potential to cause significant adverse impacts on karst geoecosystems. Land managers should (a) give particular attention to any proposed changes in land use and (b) provide guidance appropriate to the type of farming and the particular conditions on the ground in order to minimise impacts on water quantity and quality.
- Any proposal for a new mine or quarry in karst should be subject to a detailed environmental assessment that considers both features in and on the boundary of the area, as well as the potential for distant impacts via surface water and karst groundwater.
- Buffer zones should be established around karst water sources, such as springs, wells and caves.

(1) World Karst Aquifer Map

<https://numis.niedersachsen.de/trefferanzeige?docuuid=473d851c-4694-4050-a37f-ee421170eca8>

(2) IUCN/WCPA Guidelines for Cave and Karst Protection

<https://www.iucn.org/resources/jointly-published/guidelines-cave-and-karst-protection-second-edition>

(3) IUCN/WCPA Guidelines for Geoconservation in Protected and Conserved Areas

<https://portals.iucn.org/library/sites/library/files/documents/PAG-031-En.pdf>

(4) Cave Animal of the Year

<https://hoehlentier.de/en/>