

Project MIKAS (Most Important Karst Aquifers' Springs)

John Gunn, School of Geography, Earth and Environmental Science, University of Birmingham, United Kingdom

Zoran Stevanović, Centre for Karst Hydrogeology, University of Belgrade-Faculty of Mining & Geology, Serbia

Augusto Auler, Instituto do Carste / Carste Ciência e Meio Ambiente, Belo Horizonte, MG, Brazil

Avihu Burg, Geological Survey of Israel, Jerusalem, Israel

Seifu Kebede, School of Agricultural Earth and Environmental Sciences, University of KwaZulu-Natal, South Africa

Neven Kresic, Independent Consultant and Director, Karst Waters Institute, Warrenton, VA, USA

Peter Malik, Geological Survey of Slovakia, Bratislava, Slovakia

Junbing Pu, School of Geography and Tourism, Chongqing Normal University, P.R.China

Benjamin Tobin, Kentucky Geological Survey, University of Kentucky, Lexington, KY, USA

Introduction

Globally, the majority of large springs discharge from karst groundwater systems and karst springs provide the base flow to many rivers and form important sources of potable supply, including to some large cities. Springs with lower discharges may also be important because of their aesthetic, cultural, ecological, economic, historic or scientific values. Some lists have been published showing the largest springs but there is no consensus on which springs are the most important. Hence, the aim of the MIKAS (Most Important Karst Aquifer's Springs) project is to identify, and to provide a list of, the most important karst springs at the global, but also at the national level. The project was launched in June 2022 at the annual meeting of the International Association of Hydrogeologists (IAH) Karst Commission (KC). The MIKAS project team leader is Zoran Stevanović and the Project Advisory Board consists of the team leader, one representative from each continent, and the three rotating chairs of the KC. The UNESCO-IHP provides project monitoring and will sponsor some of the activities.

During preliminary discussions the Advisory Board (AB) decided that the project would best be accomplished by appointing national experts who would be responsible for identifying the most important karst springs in the countries for which they were responsible. It was also decided that national experts should have the option of producing a list of Nationally Important Karst Springs (NIKAS) although only the MIKAS are reviewed by the AB. A set of Guidelines has been agreed that include selection criteria MIKAS and NIKAS together with a template for the Spring Survey Form.

The selection criteria are the cultural, ecological, economic, historic or scientific values although it was recognised that the five criteria are not present at all springs. Hence, MIKAS and NIKAS lists should be created based on these common criteria, but should also be adapted to local conditions, recognising the specific circumstances of each country. Something that is important in one country does not have to be important in others.

As of February 2024, the MIKAS project involves 105 national experts each of whom has agreed to work voluntarily on the project. Their expertise has so far helped evaluate more than 120 springs in 28 countries, and by the end of the process these experts will have identified MIKAS in more than 100 countries from all the continents (except Antarctica). To date there are still some countries, most notably in Central Asia and the Caribbean where it has not been possible to identify a national expert, but the AB are actively trying to recruit experts to cover these gaps.

The Survey Form

Initially it was planned to have as much information about the proposed springs as possible. However, the AB recognised that the amount of information available varies widely from country to country and decided to simplify the Survey form to facilitate the work of national experts. The form requests mandatory basic information for each of the proposed springs together with other optional information. The template, which is shown below, can be downloaded from the project website [<https://mikasproject.org/>] which also has more information about the project, including the Guidelines, instructions for completion of the Survey Form and the list of engaged experts.



Spring Survey
Instructions for filling

1) Spring Location and Hydrogeological Information

Spring name		Dominated aquifer's lithology and stratigraphy	
Country / Region			
Nearest settlement		Important or unique karst features in the catchment	
River/Hydrogeological basin		Type of Spring	
Coordinates		Regime of spring discharge (Q in l/s, min/av/max)	
Z(altitude)m asl		Specific characteristics	
Intake structure*			
Amount of used water* and ecological flow*			
Water physical and chemical characteristics			
Groundwater protection			
Remarks (web pages)			

*/ in case of spring tapped

2) Spring Importance / Criteria

Criterion	Justification / Facts	Criteria order
Historic, H Aesthetic, A Economic, E Scientific, S Ecological, Ec		
Current status of spring		
Final proposal for list MIKAS or NIKAS		

3) References and source

References, which validate spring importance	
Data collected by:	
Assisted by (collaborators):	
Remarks	

4) Optional data

Grading criteria for proposing the spring	
Surface of catchment area (km ²)	
Water distribution system*	
Purpose of water used*	
Sort and number of beneficiaries*	
Groundwater chemistry	
Water treatment*	
Threats to spring water quality	

Collection of MIKAS and NIKAS information for the Asian region is being coordinated by Junbing Pu and the volunteer National Experts are listed below:

ASIA	
Regional Coordinator: Junbing Pu	National Expert(s)
Eastern Asia	
China, Hong Kong SAR, Macao SAR	Junbing Pu, Xubo Gao, Chengcheng Li
Republic of Korea	Heejung Kim
South-Central Asia	
Central Asia	
Kazakhstan	Oleg Podolny
Kyrgyzstan	Alexei Dudashwili.
Southern Asia	
Afghanistan	Sayed Sharif Shobair *
Bhutan	Zoran Stevanović
India	Jerome Perrin
Iran (Islamic Republic of)	Zargham Mohammadi
Nepal	Jerome Perrin
Pakistan	Gulfam Hussain
Sri Lanka	Jerome Perrin
South-Eastern Asia	
Cambodia	Men Ratana
Indonesia	Eko Haryono
Lao People's Democratic Republic	Vongphachanh Sinxay
Malaysia	Othman Bin Kangsar
Myanmar	Thida Oo
Philippines	Ross Dominic Darang Agot
Thailand	Chaiporn Siripornpibul
Viet Nam	Nguyen Xuan Nam
Western Asia	
Iraq	Zoran Stevanović
Israel	Avihu Burg; Joseph Guttman
Jordan	Joanna Doummar
Lebanon	Joanna Doummar
State of Palestine	Amer Marei
Syrian Arab Republic	Joanna Doummar
Turkey	Mehmet Ekmekci
United Arab Emirates	Abdel Khareem Ghata *