

Development of an International Cave and Karst Research Institution Network (ICKRIN) to Advance Research in Global Cave and Karst Science

The initiative to create International Cave and Karst Research Institution Network (ICKRIN) is put forward jointly by several institutes dedicated to cave and karst research:

- Institute of Karst Research (IZRK, Slovenia),
- National Cave and Karst Research Institute (NCKRI, USA),
- Hoffman Environmental Research Institute, Western Kentucky University (USA),
- Ukrainian Institute of Speleology and Karstology (UISK, Ukraine),
- International Research and Application Center for Karst Water Resources (UKAM, Turkey).

All karst and cave research institutes and centers meeting the criteria indicated below, are invited to join this initiative.

The purpose of the ICKRIN initiative is **to promote cave and karst science by facilitating global collaboration and cooperation of specialized research institutions and centers.**

Background

International cooperation in karst and cave research

In view of rapidly growing importance of cave and karst science in both scientific and practical aspects, there is a strong demand for international cooperation in this subject area. In many aspects, the global karst/cave science community addressed this demand through several established international bodies, such as:

- 1) Union International of Speleology and its various Commissions
- 2) Karst Commission of the International Geographic Union
- 3) Karst Commission of the International Association of Hydrogeologists
- 4) IGCP-UNESCO karst projects (IGCP-299, 379, 448; currently -513; 1990-2009)
- 5) IUCN Working Group on Cave and Karst Protection

These organizations function as non-governmental associations or elected/appointed boards, mainly through voluntary involvement of active individual scientists and experts, or country representatives. They do very important work in reviewing the progress and status of karst and cave studies, promoting these studies and advising on various karst/cave issues, organizing congresses and symposia, preparing publications, etc. However, their capabilities to create necessary scientific resources and to promote ongoing research cooperation are somewhat limited by virtue of their nature and by the lack of institutional support and infrastructure.

Typically, these organizations:

- are poorly funded (mainly from membership dues or small allocations from parent bodies),
- do not possess premises, facilities and permanent staff,

- do not own or themselves maintain considerable research databases,
- do not pursue their own research.

Some documentation centers sponsored by these organizations are based on certain nationally funded research establishments, but such arrangements are weakly defined and structured. Initiatives on collaborative efforts and on establishing new research and essential information resources often remain unrealized or progress slowly due to the lack of staff- and resource-based support and organizational involvement of data-producing research institutions.

The ICKRIN initiative is not intended to substitute for any of the existing international organizations in their functions, or to compete with them in any sense. Instead, in addition to addressing the needs of member Institutions, ICKRIN is designed to serve as a solid organizational vehicle to support and implement those international initiatives that must be based on office and resource infrastructure and professional expertise.

The ICKRIN will work in close cooperation with the major international and national cave/karst science bodies and will seek affiliation with the Union International of Speleology (UIS) as a permanent Committee that promotes cooperation between research institutions.

National Cave and Karst research institutions and centers

Although cave exploration and cave/karst learned societies exist in many countries (some of them established back in 19th century), dedicated research institutes and centers were few until recently. The oldest such institutions are the Institute of Speleology in Romania (founded in 1920; currently the Institute of Speleology "Emil Racovita") and the Institute of Karst Research in Slovenia (founded in 1946). By 1990 there were only a few such institutes in other countries, although studies in the subject area were conducted by many outstanding scholars, mainly affiliated with universities.

The growth of recognition of the scientific and practical importance of cave and karst issues gave rise, during the last two decades, to creation of many dedicated karst/cave research institutes and centres in various countries (referred to as *Institutions* hereafter). They vary in size and scope (regional to national), belong variously to governmental agencies, private organizations and universities, and have varying research scope and agendas. Most (but not all) such Institutions are listed below, with indication of their affiliation and location:

Nation-wide institutes and centers:

- Institute of Karst Research, Academy of Science of Slovenia (Postojna, Slovenia);
- Institute of Karst Geology, Chinese Academy of Geological Sciences, Ministry of Land and Resources (Guilin, Guangxi, China)
- Institute of Speleology "Emil Racovita", Academy of Science of Romania (Bucharest-Cluj, Romania);
- Swiss Institute for Speleology and Karst Studies, Natl. Academy of Natural Sciences and Natl. Hydrological & Geological Survey (La Chaux-de-Fonds, Switzerland);
- National Cave and Karst Research Institute, National Park Service and New Mexico Tech (Carlsbad, New Mexico, USA);
- Korean Institute of Cave research (Seoul, S.Korea);

- Ukrainian Institute of Speleology and Karstology, Ministry of Education and Science and Natl. Academy of Science (Simferopol, Crimea, Ukraine);
- Speleological Department, General Directorate of Mineral Research and Exploration (Ankara, Turkey)

Flagship Research institutes and centers based on universities:

- Centre of Karst Hydrogeology, University of Neuchâtel (Neuchâtel, Switzerland);
- Hoffman Environmental Research Institute, Western Kentucky University (Bowling Green, USA);
- Center for Cave and Karst Studies, Western Kentucky University (Bowling Green, USA);
- International Research and Application Center for Karst Water Resources, Hacettepe University (Ankara, Turkey);
- Institute of Karst and Rehabilitation of Rock Deserts, Southwest University of China (Beibei, Chongqing, China);
- Center of Karst Research, Université Montpellier (Montpellier, France);

Flagship Cave and Karst Research programs and groups based on universities:

- Limestone Research Group, University of Huddersfield (Huddersfield, UK);
- Cave and Karst Studies Program, New Mexico Tech (Socorro, New Mexico, USA);
- Karst Research Group, University of South Florida (Tampa, USA);
- Karst & Cave Research Group, Mississippi State University;
- Karst & Cave Research Group, Bergen University (Bergen, Norway);
- Karst & Cave Research Group, Silesian University (Katovice, Poland);

Institutes operated as learning societies:

- Karst Waters Institute (Charlestown, Virginia, USA);
- Italian Institute of Speleology, University of Bologna (Bologna, Italy);
- Institute of Karstology and Speleology, Perm University (Perm, Russia);

Other research establishments:

- Laboratorio di Biologia Sotterranea di Verona, Natural Museum (Verona, Italy);
- Kungur Speleological Station, Institute of Mining, Russian Academy of Science (Perm, Russia);
- Ozark Underground Laboratory, privately operated (Missouri, USA)

Private consulting companies specializing in karst and cave issues:

- Veni & Associates (San Antonio, USA);
- La Moreaux & Associates (Oak Ridge, Tennessee, USA);
- Worthington Groundwater (Dundas, Ontario, Canada)

This list is incomplete. A detailed inventory and survey of karst/cave research establishments will be performed as the first stage of implementation of this proposal.

The roles of Cave and Karst research institutions and centres

Cave and karst science research institutes/centers are major hubs for studies and advanced specialized education in the subject area. They have general and research facilities, equipment, staff with various areas of expertise, specialized libraries and archives, research databases, etc. They are involved in numerous funded research projects on local, national and international levels. Most of these institutions are based on outstanding karst regions or objects possessing particular (unique) or typological characteristics, which they study systematically. As such Institutions were commonly built around expertise and reputation of accomplished and internationally recognized experts in cave and karst science, they often play roles as of centers of excellence and of custodians of research traditions in cave and karst science.

Rationale

Institutions networking: benefits to global cave and karst science

Networking of cave and karst science research locations, and federation of the research resources they possess, would provide a new and unique platform for synergy and efficient collaboration in cave and karst science. There are many ways in which the creation of ICKRIN would promote global cave and karst science, - some of the most obvious are as follows:

- As its constituent institutions are staff- and facility-based, ICKRIN could provide a solid organizational and logistic support for efforts and initiatives of other international bodies of the “society” or “council” type.
- As its constituent institutions are major primary “stakeholders” for research data and information resources, ICKRIN could serve as a major vehicle for integration and networking of research collections and creation of global research information infrastructure. ICKRIN could serve as a supporting organizational structure for such global information initiatives as “Karst Information Portal”. ICKRIN would be the most appropriate structure to establish a world-wide network of specialized libraries and documentation centers on cave and karst science, through implementation of cataloging standards and establishment of access and exchange procedures.
- As its constituent institutions are major conceivers and executors of research projects, ICKRIN could serve as a tool to facilitate realization of ongoing projects through cooperation, avoid duplication of research efforts, and promote new collaborative international projects.
- Existence of the organized structure of research institutions and their information network, and federation of resources they possess and operate, will greatly enhance the ability of the cave/karst scientific community to set challenging scientific projects, as well as to develop solutions to critical environmental problems associated with caves and karst.
- ICKRIN will foster unprecedented cohesiveness within the cave/karst science community through federation of its major research hubs.

Institutions networking: benefits to participating institutions

Despite of the fact that cave/karst research institutions are growing in number, and despite the dramatically growing importance of cave/karst studies in both the scientific and practical aspects, the respective institutions are not abundantly funded and have rather limited research facilities. Tighter co-operation between these institutions would allow more efficient use of available resources and promote availability of additional funds through collaborative projects. International networking would also help to raise the visibility profile of member institutions on a national level.

One of the major functions of ICKRIN will be to serve the interests of its constituent institutions in conducting their own research by providing an infrastructure for more efficient co-operation and partnership between them and for sharing and combination of research resources, results, experience and opportunities. The ICKRIN activities and infrastructure will be designed to:

- Facilitate mutual access to research data, collections and archives through establishing procedures and rules and creating open-access or members-only-access integrated resources;
- Facilitate mutual access to laboratory facilities, scientific equipment, tools and services; facilitate equipment exchange, sharing, combination and loan;
- Facilitate exchange and internship for graduate students and young researchers, and support sabbatical leave for researchers;
- Organize specialized short-term professional training courses based on the specific expertise of particular member institutions and their staff, on specific facilities or field objects and stations studied or operated by member institutions;
- Facilitate and support access of researchers from other institutions to unique or specific field areas and objects, studied by member institutions;
- Facilitate involvement of member institutions in large nationally and internationally funded research projects, facilitate organization and preparation of collaborative grant proposals;
- Create paths and protocols for professional requests for information and support;
- Facilitate the use of external research and intellectual resources for solving particular challenging issues.

ICKRIN purpose and objectives

The purpose of ICKRIN is *to establish new collaboration in the area of cave and karst science and to facilitate bi-lateral and multi-lateral co-operation and partnership between karst and cave science research institutes/centers, sharing their research resources, experience and opportunities.*

ICKRIN objectives include:

- 1) Provide staff-and-facility-based support to science-oriented collaborative activities and initiatives of other major international cave/karst related organizations;
- 2) Gather information on research resources possessed or operated by member institutions;

- 3) Develop real-time expanding databases, for use by member institutions and for open use when appropriate, of research projects, scientific collections of many sorts, scientific facilities and equipment operated by member institutions;
- 4) Create a communication infrastructure and procedures for coordination of research programs and submission of calls for collaborative project proposals and professional services;
- 5) Provide a path for combined use of lab and equipment resources, and for sharing research methods and techniques;
- 5) Facilitate involvement of member institutions in nationally and internationally funded research projects;
- 6) Establish a global network of cave/karst science documentation centers and libraries, based on selected ICKRIN member institutions, and develop and implement global procedures for submitting published hard-copy items for repository in such centers.
- 7) Establish procedure and practice to facilitate exchange and internship for PhD students, young researchers and researchers on sabbatical leave between member institutions;
- 8) Sponsor specialized professional training courses, as well as field symposia and seminars in the regions of expertise of member institutions;
- 9) Raise and manage funds (primarily from collaboration and networking programs) to support and further develop specific ICKRIN infrastructure;
- 10) Facilitate the growth and development of member institutions by any feasible and appropriate means.

ICKRIN organisation

Basic principles

- 1) No membership fees;
- 2) Equal representation of member institutions in ICKRIN managing bodies;
- 3) No governance of member institutions' internal activities;
- 4) Decisions based on consensus; no obligations *ab invito*;
- 5) No obligation for member Institutions to join every ICKRIN activity or program.
However when joined, an activity or program should be firmly supported in agreed upon ways;
- 6) Mutual support of member institutions in solving scientific, methodological and organizational problems;
- 7) Professionalism, coherence, and open science principles.

Affiliation, legal status

ICKRIN will seek to affiliate with the Union International of Speleology in the status of a permanent Committee that promotes cooperation between research institutions. When this happens, the Advisory Committee of ICKRIN will act as a corresponding UIS Committee. During Phases 1 and 2 of implementation (see below) ICKRIN will examine and decide upon the need and conditions to constitute itself as a legal entity.

Requirements for member institutions

ICKRIN is open to be joined by academic, governmental or private research institutes, centers, groups and programs (Institutions) actively engaged in cave or karst studies, which meet the requirements specified below.

To join ICKRIN, an institution must have a formally established status as an organization (e.g. program or project) with a primary goal of the advancement of cave and karst studies (in general or a particular topic), have a definite list of members possessing academic qualifications (research staff or faculty) and meet at least one of the following criteria:

- conduct its own in-house research projects;
- participate in research projects funded by external agencies or parent institutions;
- conduct licensed professional consultancy in cave/karst related areas;
- possess and operate general facilities (buildings, offices, vehicles, etc.);
- possess and operate research facilities (labs, equipment, field stations, etc.);
- possess and operate research collections in physical (libraries, archives, sample repositories, etc.) and/or in digital (databases, catalogues, documents, images, GIS systems, etc.) forms;
- be engaged in graduate level student training.

Managing bodies and management

ICKRIN is a collaborative arrangement amongst research institutions that are working together to build a networking infrastructure that will facilitate co-operation and partnership between them, sharing research resources, results, experience and opportunities. Its activities are led by an Executive Director and a Board of Directors, advised by an Advisory Committee and various continuing and *ad hoc* working groups.

Advisory Board provides general guidance and advice to ICKRIN. It reviews the progress and status of ICKRIN, recommends future directions to the Executive Director and the Board of Directors, promotes ICKRIN within its respective institutions, and advises on how to address the needs of member institutions and the general cave/karst research community. The Advisory Committee selects its own chair and appoints members of the Board of Directors.

Composition: The Advisory Committee consists of directors or chief scientists of all member institutions (one delegate from each member), representatives of major international cave/karst science bodies and representatives of funding agencies, if any.

Term: The members serve until the incumbent resigns or until they are substituted by respective member institutions or funding agencies. Member institutions can substitute their delegates at their discretion but not more often than once a year.

Board of Directors establishes strategic direction and scope of ICKRIN. It elects the Executive Director and advises him or her; identifies and determines outreach and potential funding opportunities; designs and establishes ICKRIN services for member institutions, reviews the development of ICKRIN infrastructure, participates in quarterly e-mail/web forum conferences for progress report and yearly meetings.

Composition: The Board of Directors consists of seven members, one of whom is elected by votes of the Board members for the position of the Executive Director.

Term: The Board of Directors serves for three years, with the possibility of renewal at the discretion of the Advisory Committee.

Executive Director is responsible for all aspects of the administration of ICKRIN, oversees the development and performance of its infrastructure and activities of working groups, maintains contacts with member institutions, supervises ICKRIN staff and manages funds.

Term: The Executive Director serves for three years.

Working groups are created by the Advisory Committee to identify solutions to particular issues of ICKRIN development, develop concepts, tools and mechanisms for implementation of various ICKRIN infrastructure components or perform particular functions within the ICKRIN. The working groups advise the Board of Directors.

Composition: Working Groups are composed of experts from member institutions or volunteers from the scientific community selected by the Executive Director and the Advisory Committee.

Term: Continuing Working Groups are created for an undefined term as necessary and can be terminated at the discretion of the Advisory Committee. *Ad hoc* working groups are created for various terms (commonly 1 to 3 years) for particular tasks and dissolve as the task is completed.

Management and meetings: Regular communication of the Advisory Board and Board of Directors, and their decisions on particular issues, will be conducted mainly through e-mail and web-forum conferences and voting. Special password-access sections will be created on the Speleogenesis Forum to conduct ICKRIN businesses. Yearly meetings of the Advisory Board and the Board of Directors will be conducted only in conjunction with major cave/karst science conferences or symposia.

Internet facilities: During Phases 1 and 2 of its implementation, ICKRIN will use web sites www.speleogenesis.info (and the Forum therein) and www.institute.speleoukraine.net for its various organizational needs. During Phases 2 and 3 ICKRIN will examine its needs for Internet-based infrastructure, outline its major components of and determine how they are related to the existing www.speleogenesis.info services and to the emerging “Karst Information Portal” (KIP) initiative. Then decisions will be made on whether ICKRIN establishes its own Internet domain name and web-site or develops its internet infrastructure within Speleogenesis and KIP frames.

ICKRIN implementation

Phase 1: June-August 2006

- Circulating an initial draft proposal through representatives of cave/karst research institutions. Collecting feedback and comments, and incorporating them into a final rationale and strategic and management plan.
- Distributing a preliminary survey form to create a basic inventory of cave/karst research institutions worldwide and their research resources.
- Consulting other international organizations regarding cooperation in areas of common interest.
- Motion to the UIS Bureau to establish a UIS ICKRIN Committee.

Phase 2: September-October 2006

- Official joining of institutions by submitting an ICKRIN affiliation form.
- Forming ICKRIN managing bodies.
- Exploring funding opportunities (mainly from collaborative and networking programs of EU, NATO, NSF and private foundations; in cooperation with other international cave/karst organizations).
- Developing a conceptual framework for the ICKRIN infrastructure, forming Working Groups.

Phase 3: October 2006 – August 2007

- Active development of the ICKRIN information and research data infrastructure, internal procedures and rules.
- Establishing ICKRIN documentation centers.
- Reviewing progress and refining the ICKRIN strategic plan and management plan – at the first ICKRIN annual meeting in conjunction with the International Conference on Karst Hydrogeology and Ecosystems, August 13-19, 2007 at Western Kentucky University, USA (a collaborative IGCP523-IGU-IAH-UIS meeting).

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