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The Karst Information Portal (KIP): Developing a Network of Geographic and Geologic Karst Information

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Evolution of the Karst Aquifers of the Shenandoah Valley, Virginia and West Virginia

2:40 p.m. – 3:00 p.m.

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The Shenandoah Valley is underlain by several thousand feet of Cambro-Ordovician aged carbonate bedrock. The karst topography is complex, with sinkholes, caves, and springs more common near base level streams. Larger, calcium saturated springs commonly occur at elevations up to 50 meters above these streams, with spring runs commonly captured by vadose cave passages before emerging near modern base level. Transitional zones separate the perennial springs from current base level drainage network that divided the valley into smaller, hydrologically distinct blocks. Dye traces within block interiors yield long travel times, high dilutions, and divergent flow. Dye traces in transition zones show short travel times, little dilution, and convergent flow.

Patterns of genetic divergence between populations of the Madison Cave Isopod, *Antrolana lira*, suggest that populations, once in genetic contact via migration through a more extensive karst aquifer could have become isolated via stream incision. High levels of genetic divergence for mtDNA (COI) (9.5 – 11.2%) indicate that isolation occurred roughly 7 ± 3 ma, based on a mutation rate of 1.25% per my (Ketmaier, 2003). *Antrolana lira* shared a common ancestor with *Cirolanides texensis* approximately 20 ± 7 ma, suggesting colonization by *A. lira* occurred during the Miocene sea-level high stand.

These two lines of evidence are consistent with a history in which the Shenandoah Karst is the eroded remnant of a regionally extensive aquifer much like today's Edwards Aquifer or the Yucatan. Antrolana's marine lineage suggests that a saltwater-freshwater interface may have influenced aquifer development.

Ketmaier, V., R. Argano., A. Caccone (2003). "Phylogeography and molecular rates of subterranean aquatic Stenasellid Isopods with a peri-Tyrrhenian distribution." Molecular Ecology 12: 547-555.

The Karst Information Portal (KIP): Developing a Network of Geographic and Geologic Karst Information.

3:20 p.m. -3:40 p.m.

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Todd A. Chavez, University of South Florida
Alexander Klimchouk, Ukrainian Institute of Speleology and Karstology
Diana E. Northup, University of New Mexico
Len Vacher, University of South Florida
Penelope J. Boston, New Mexico Tech and National Cave and Karst Research Institute
George Veni, National Cave and Karst Research
Spencer Fleury, University of South Florida

The difficulty of sharing geologic and geographic karst information is well documented. While there is a significant body of internationally accessible literature, important works are largely unknown or inaccessible. Some of the more difficult documents to access include maps, databases, technical reports, graduate theses or dissertations, images, video, and government publications. Also, karst related documents published in less-accessible languages are hard to access or find—especially those published prior to the information age. In order to address this issue, the Karst Information Portal (KIP) was formed in 2005 and launched in 2007.

KIP is an evolving international community of scientists, information specialists, and other researchers seeking to promote information sharing and access to published and unpublished research in order to advance karst, cave, and aquifer research and stewardship. The portal is a searchable database of a variety of karst information that is accessible anywhere in the world. Like other well-known portals, such as Chronos, the KIP will continue to grow as users and developers bring more information within the network. We seek to expand KIP by developing partners in to populate the portal with pertinent databases, maps, gray literature, and other information of interest to the geoscience community. The KIP has the potential to transform geologic and geographic research in karst by creating new knowledge through the integration of international information in the discipline.

Late Holocene Paleoenvironmental Changes: Evidence from Cave Sediments in Florida

3:40 P.M. – 4:00 P.M.

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Cave sediments collected from Jennings Cave in Marion County, Florida show $\delta^{13}C$ variations in their organic acids, which indicate periods of vegetation change caused by climatic influences during the Late Holocene. The carbon isotope record ranges from -35‰ to -21‰, exhibiting variability of ~14‰, which is within the range of C_3 vegetation. This is to be expected in a humid, subtropical forested environment and likely indicates changes in C_3 plant abundance. The most negative $\delta^{13}C$ value of ~ -35 percent occurred around 1,870 cal yr BP, sharply becoming less negative to –21‰ around 1,800 cal yr BP. These changes in plant assemblages were in response to changes in available water resources, with increased temperatures and evapotranspiration leading to arid conditions and a shift toward less C_3 vegetation (increased C_4 vegetation) during the Medieval Warm Period. The cave sediment $\delta^{13}C$ record agrees well with $\delta^{13}C$ values from a speleothem collected nearby that covers the same time period. Prolonged migration of the Intertropical Convergence Zone and North Atlantic High affects precipitation in Florida and likely caused vegetation changes during these climatic shifts.

KARST INFORMATION PORTAL

THE KARST INFORMATION PORTAL (KIP): DEVELOPING A NETWORK OF GEOGRAPHIC AND GEOLOGIC KARST INFORMATION

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KARST INFORMATION PORTAL

www.karstportal.org

The growing footprint of humans worldwide has serious adverse effects on karst, an understudied natural environment that is crucial to the health and well-being of one out of every four people on Earth.

We simply do not know the full potential of karst for benefit or hazard to humanity and the global ecosystem.

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The Challenge

The karst research community and its knowledge base are fragmented, globally distributed, and highly interdisciplinary.

As karst issues move to the forefront of attempts to develop solutions to significant environmental degradation, information integration and linkages promoting collaboration is essential.

The Solution

The Karst Information Portal (KIP) is a growing international community seeking to create an open system for karst-related information..

The goal is a freely accessible web-based information network to inform research, to enhance collaboration, and to address policy decisions in karst environments.

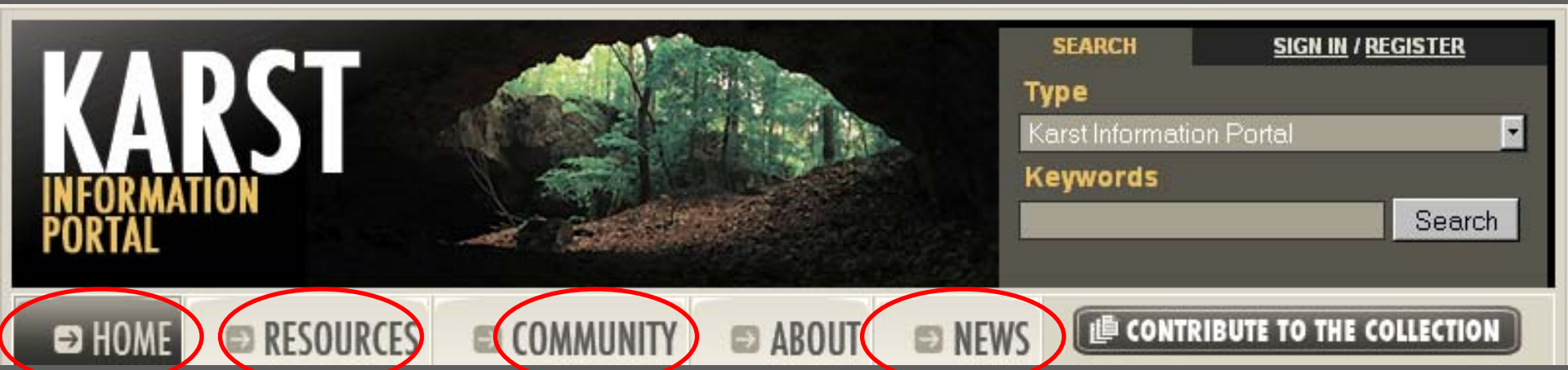
Register

Anyone may visit KIP but registered users ...

- Contribute data and information
- Communicate about important karst issues
- Stay current on events, new research and publications and more
- Join the community meeting this information challenge

KIP's success depends on contributions of data and information from the karst community from recreational cavers to professional scientists.

Contributors can upload content that will be shared globally and archived for the future. Contributors have input regarding access to their content.



Site Overview

The Karst Information Portal (KIP) includes four main content areas ...

Home

Quick access to …

- Current news & events
- Research updates
- Important announcements

Resources

The "information core"

- Topics
- Research tools
  - Publications
  - Reports
  - More …
- Links

Community

Connect with issues & people ...

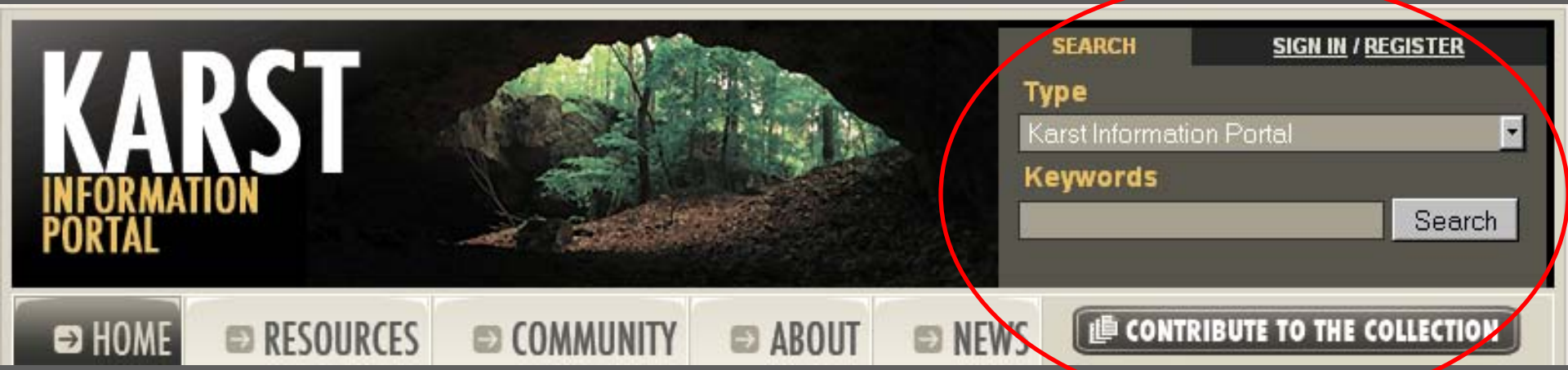
- Organizations
- Contacts (directory)
- Discussion forums

News

Stay current on karst developments …

- Announcements
- Events
- New publications
- Research updates

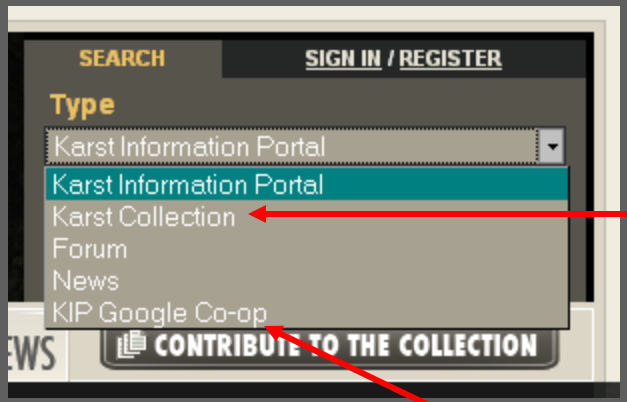
Content expands with contributions by registered users



Search

Five options tailor search targets …

- Karst Information Portal (comprehensive)
- Karst Collection
- Forums
  - Posts/comments
- News
  - Announcements
  - Events
  - New publications
  - Research updates
- KIP Google Co-op



Nearly 4,000 bibliographic references for karst-related data and information sources forms the core of the collection.

Queries a Google-powered customized search engine leveraging participant expertise with Google's search technologies.

KARST INFORMATION PORTAL

How can KIP be useful to geographers and geologists?

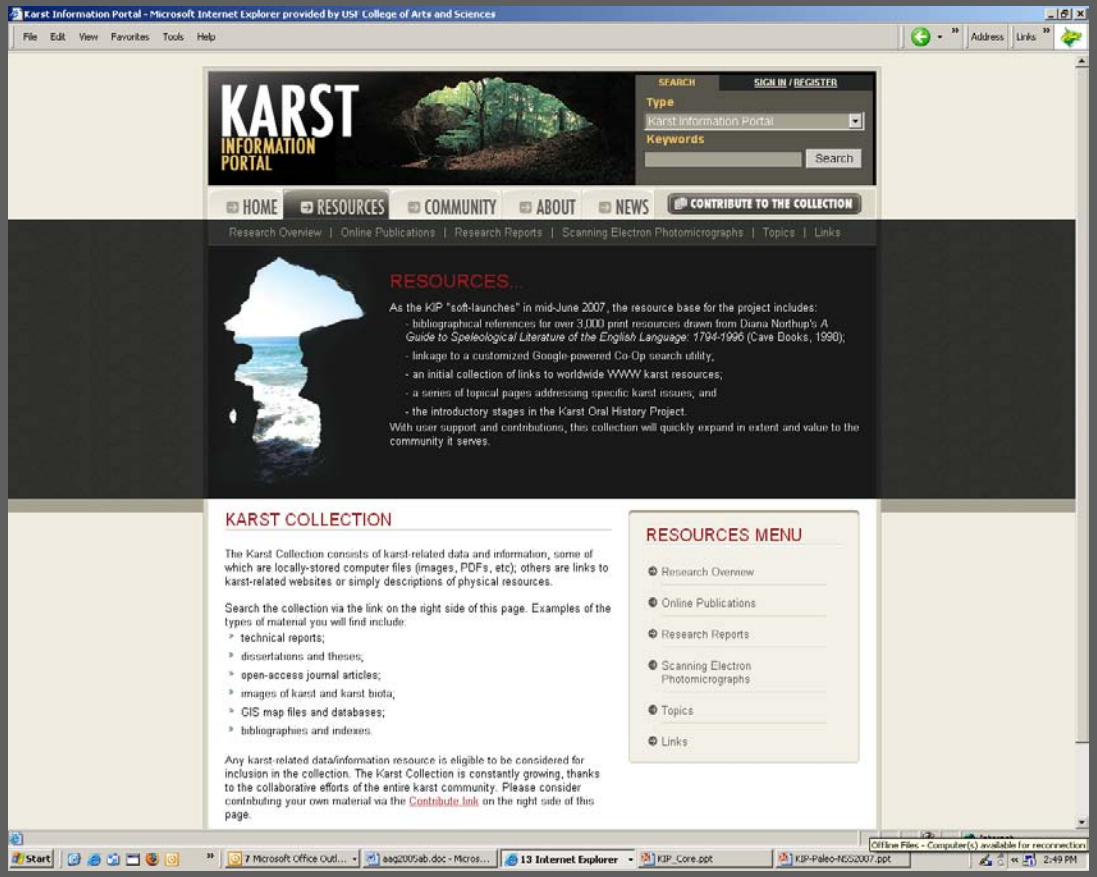
GIS Databases, Shape Files

Collections

Search Engines

Research Reports

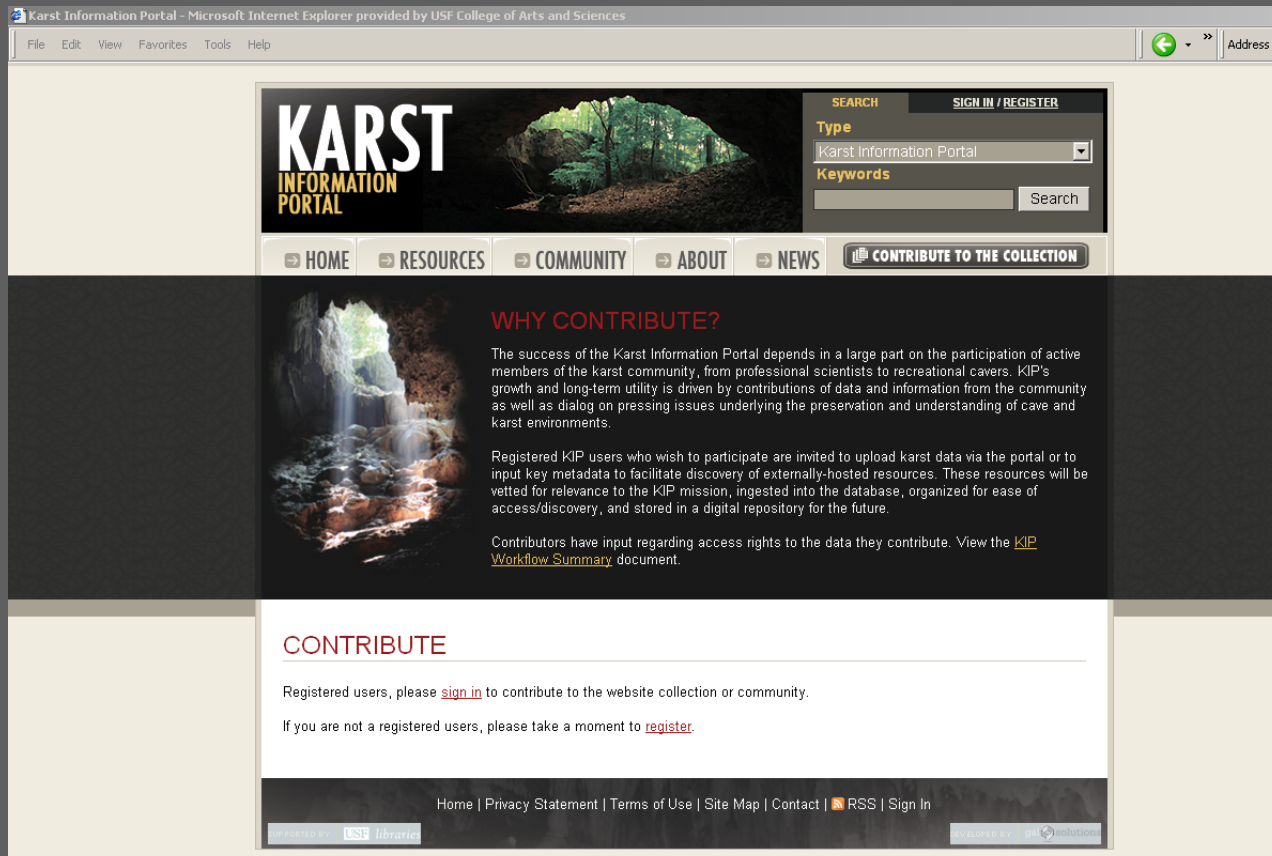
Grey Literature

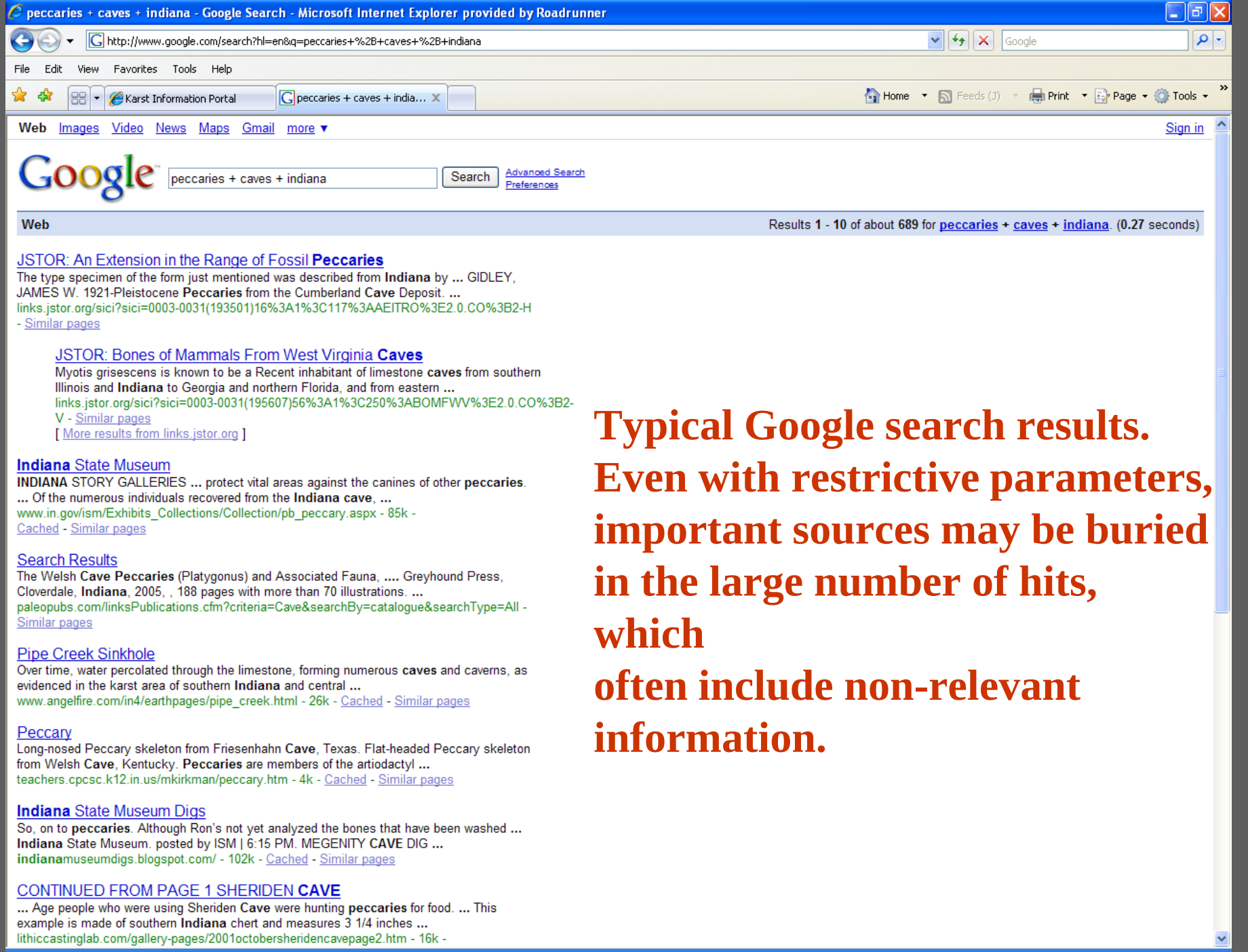


KARST INFORMATION PORTAL

Contributing to the collection:

Adding your data, reports, maps, etc.

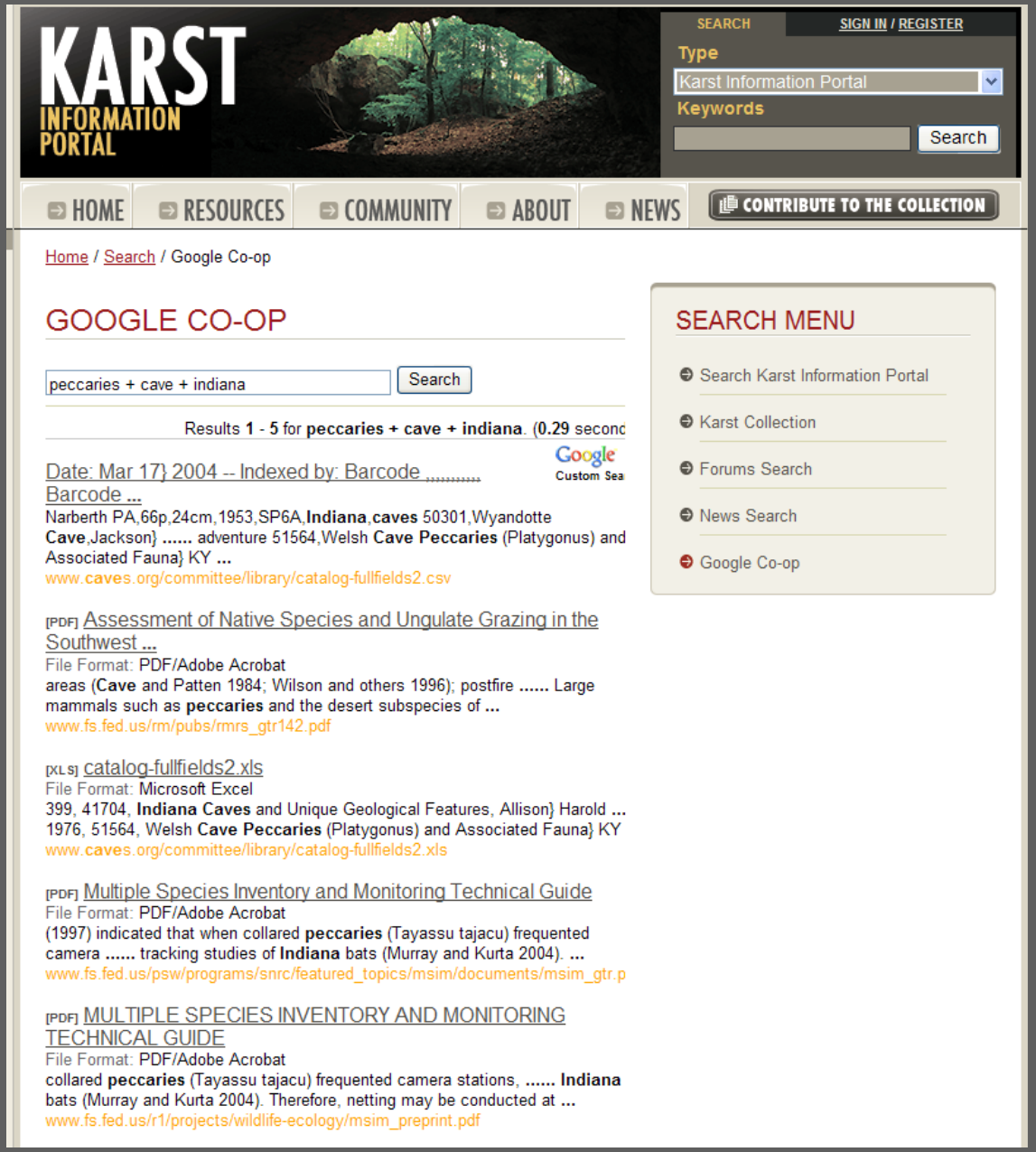




Typical Google search results. Even with restrictive parameters, important sources may be buried in the large number of hits, which often include non-relevant information.

- **KIP Google Co-op results:**

- **Fewer but more relevant hits**
- **from search of (currently) 45**
- **karst research websites**



KARST
INFORMATION
PORTAL

- Tools already in place (collaborative workspaces).
- Possible new tools: Dye Tracing Database, GIS Database, Cave Map Database and Tools, etc.

KARST
INFORMATION
PORTAL

- An example of a tool that is in process of development:
  - The Great Karst Trail

KARST INFORMATION PORTAL

- Great Karst Trail
- Modeled after The Appalachian Trail and the Ice Age Trail.
- Difference: global reach.
- Technical capability to make the trail virtual and connected to research, images, etc.

Great Karst Trail—A Model Trail for the Future

- Internationally Collaborative
- Utilizing Technology of Wiki space, the KIP, and GPS.
- Building Linkages of Existing Trails with Interpretation

Great Karst Trail Project

Potential for engaged scholarship.

Potential for engaging cave clubs and forest/park personnel.

Potential for developing on-line trail maps and interpretation in blog/wiki formats.

In early stages of developing this initiative.

Demonstrates the types of connections that can be made using on-line portals.

KARST
INFORMATION
PORTAL

- Summary
  - Available now at www.karstportal.org
  - Many resources on line including a specialized karst search engine
  - Seeking contributions of information by members
  - Many possibilities for enhancing information that exists by developing new tools, databases, or other sources of information.

KARST INFORMATION PORTAL

www.karstportal.org

The KIP Project Partners Thank You

NATIONAL CAVE & KARST RESEARCH INSTITUTE
http://www2.nature.nps.gov/nckri/

UNIVERSITY OF SOUTH FLORIDA LIBRARIES
http://www.lib.usf.edu/

UNIVERSITY LIBRARIES, UNIVERSITY OF NEW MEXICO
http://elibrary.unm.edu/

UNION INTERNATIONALE de SPÉLÉOLOGIE (UIS)
Commission on Karst Hydrogeology and Speleogenesis
http://uis-karst.kiev.ua/uis_karst/index.html/