REPUBLIC OF SLOVENIA | MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING

Global Water Partnership Mediterranean

MIO-ECSDE

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Capacaty Building Workshop on
"Shared Groundwater Resources Management"

2 – 4 December 2008 / Postojna, Slovenia

Karst characteristics

Dinaric karst and Sava River Basin

Nataša Ravbar

Karst Research Institute SRC SASA

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SAVA RIVER BASIN COMMISSION

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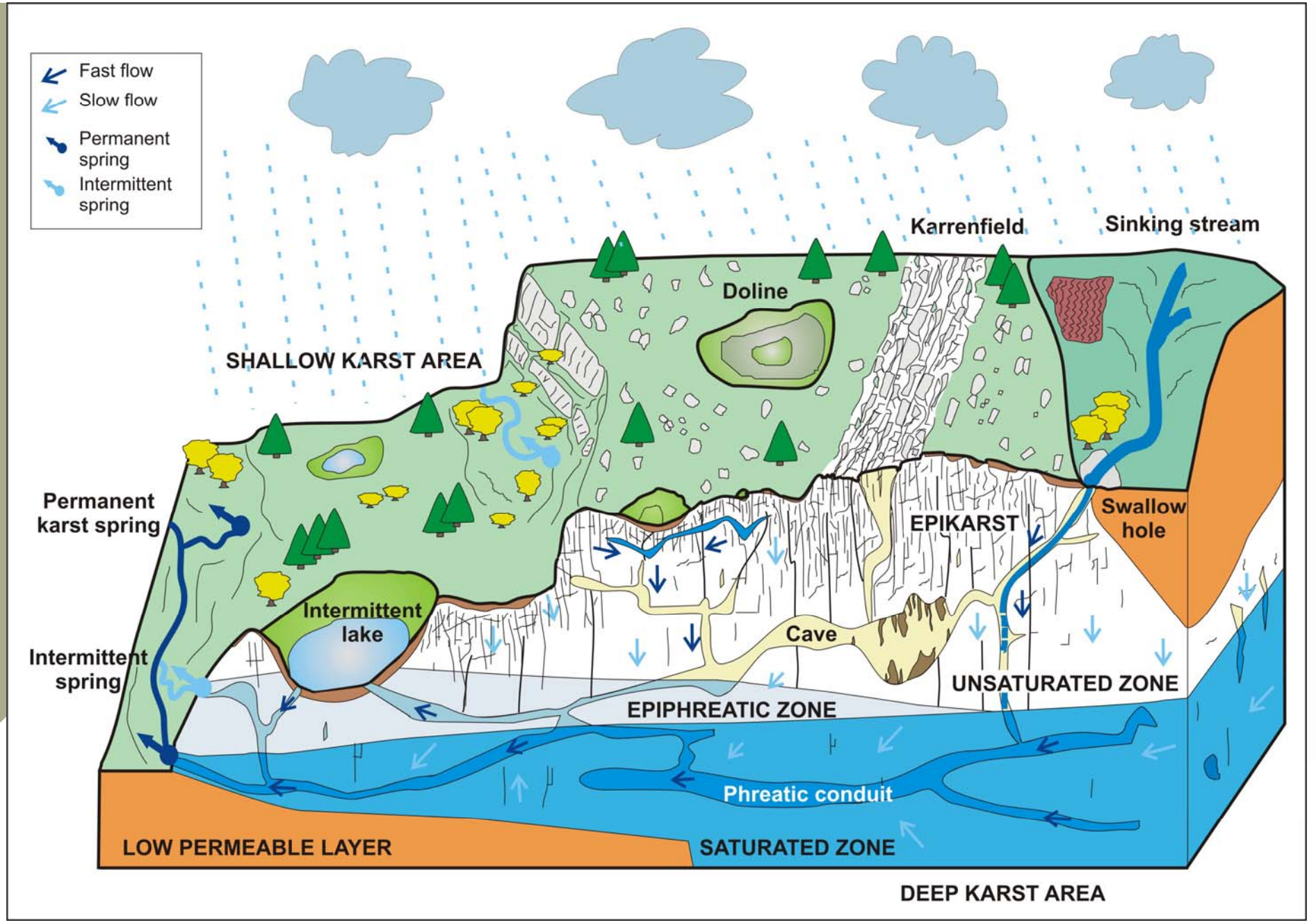
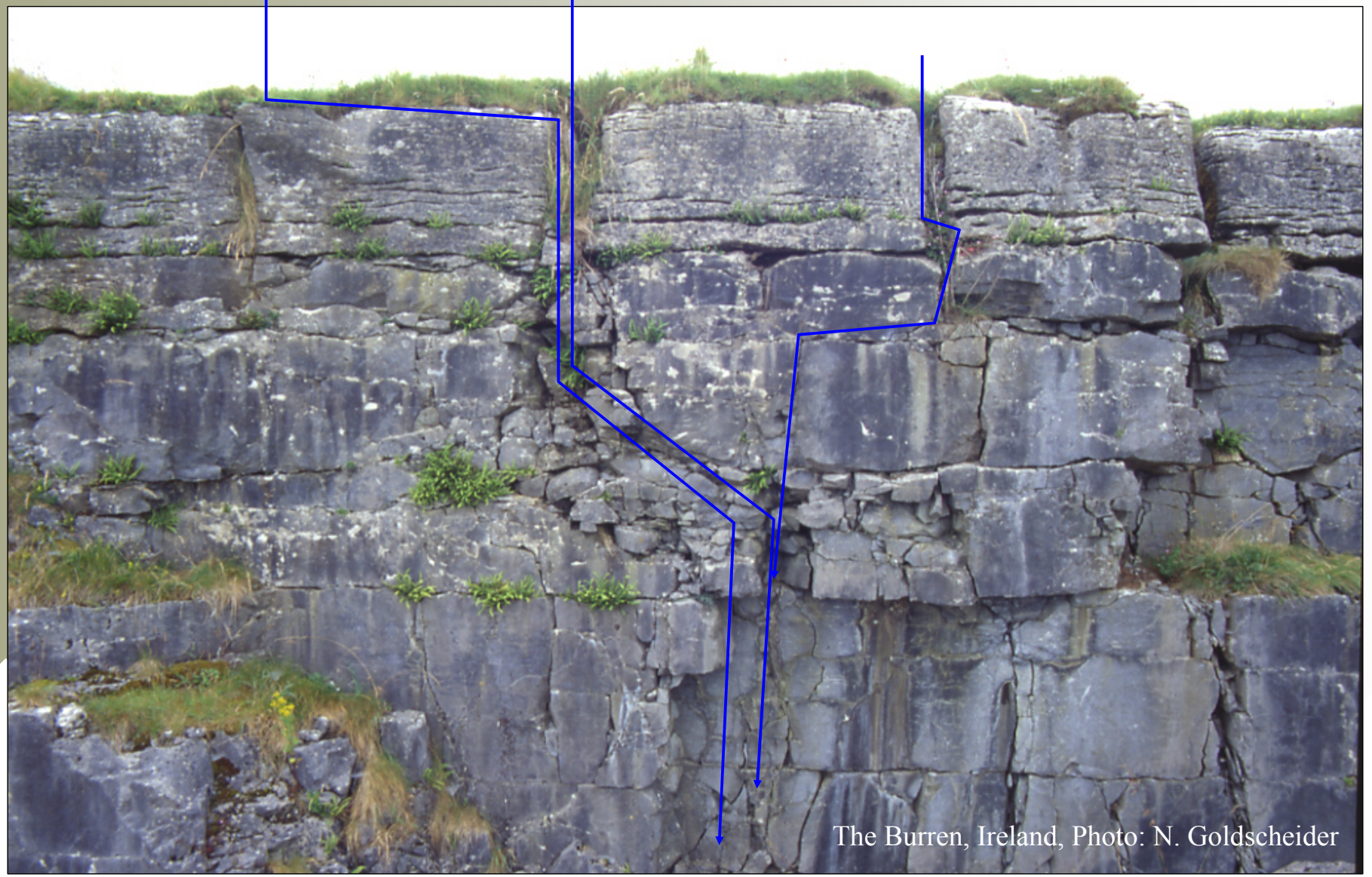
Conceptual model of karst aquifers



General properties of karst aquifers

infiltration of rainwater

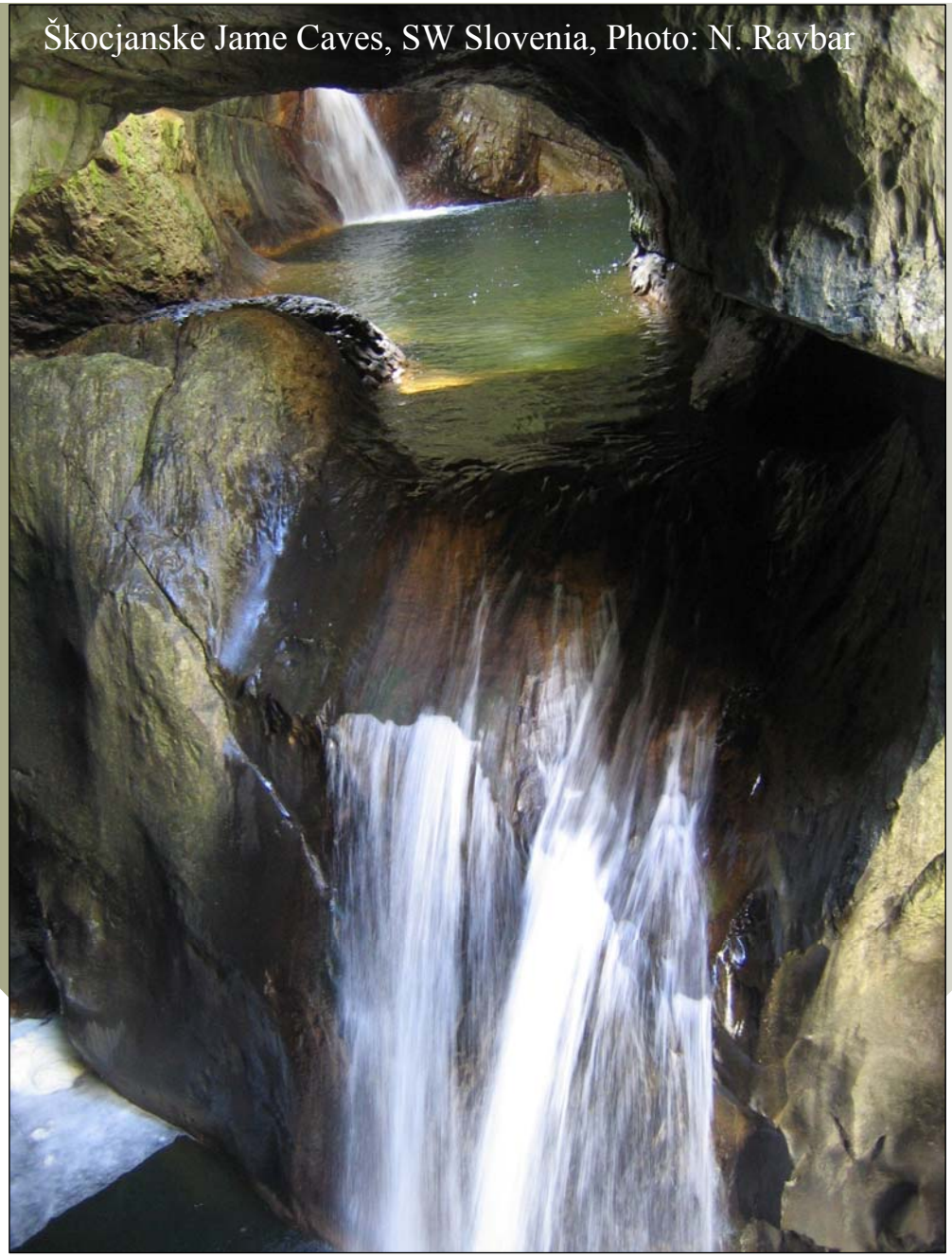


General properties of karst aquifers

Tržiščica sinking stream, Central Slovenia, Photo: N. Ravbar

allogenic point recharge
via swallow holes

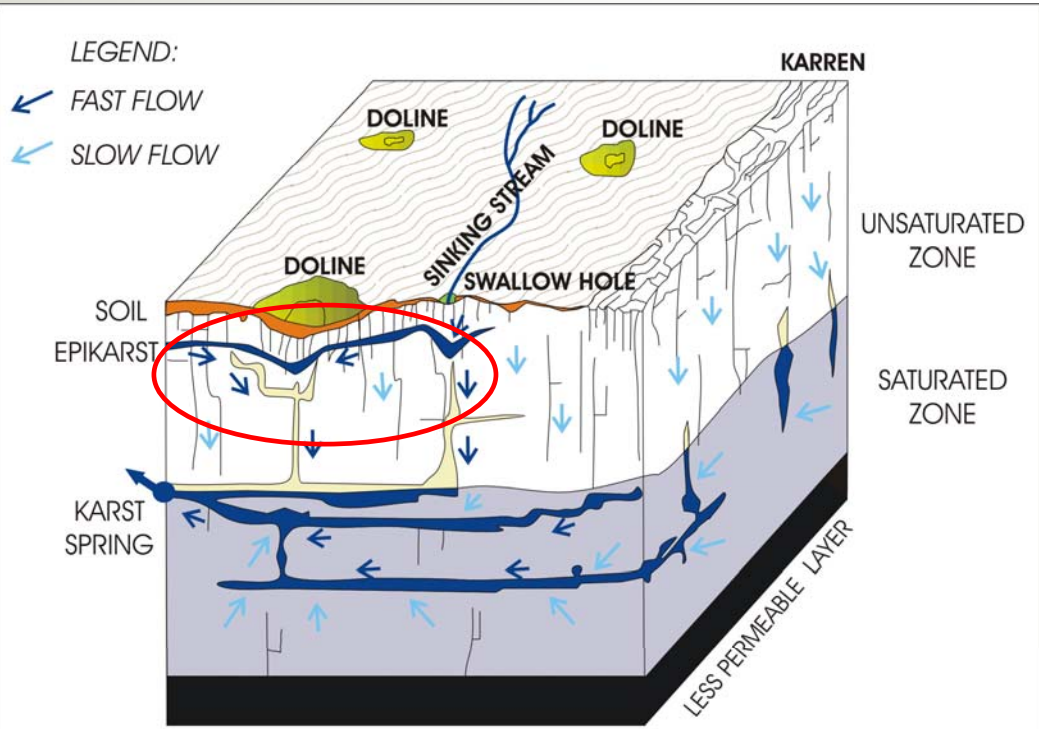
General properties of karst aquifers


Škocjanske Jame Caves, SW Slovenia, Photo: N. Ravbar

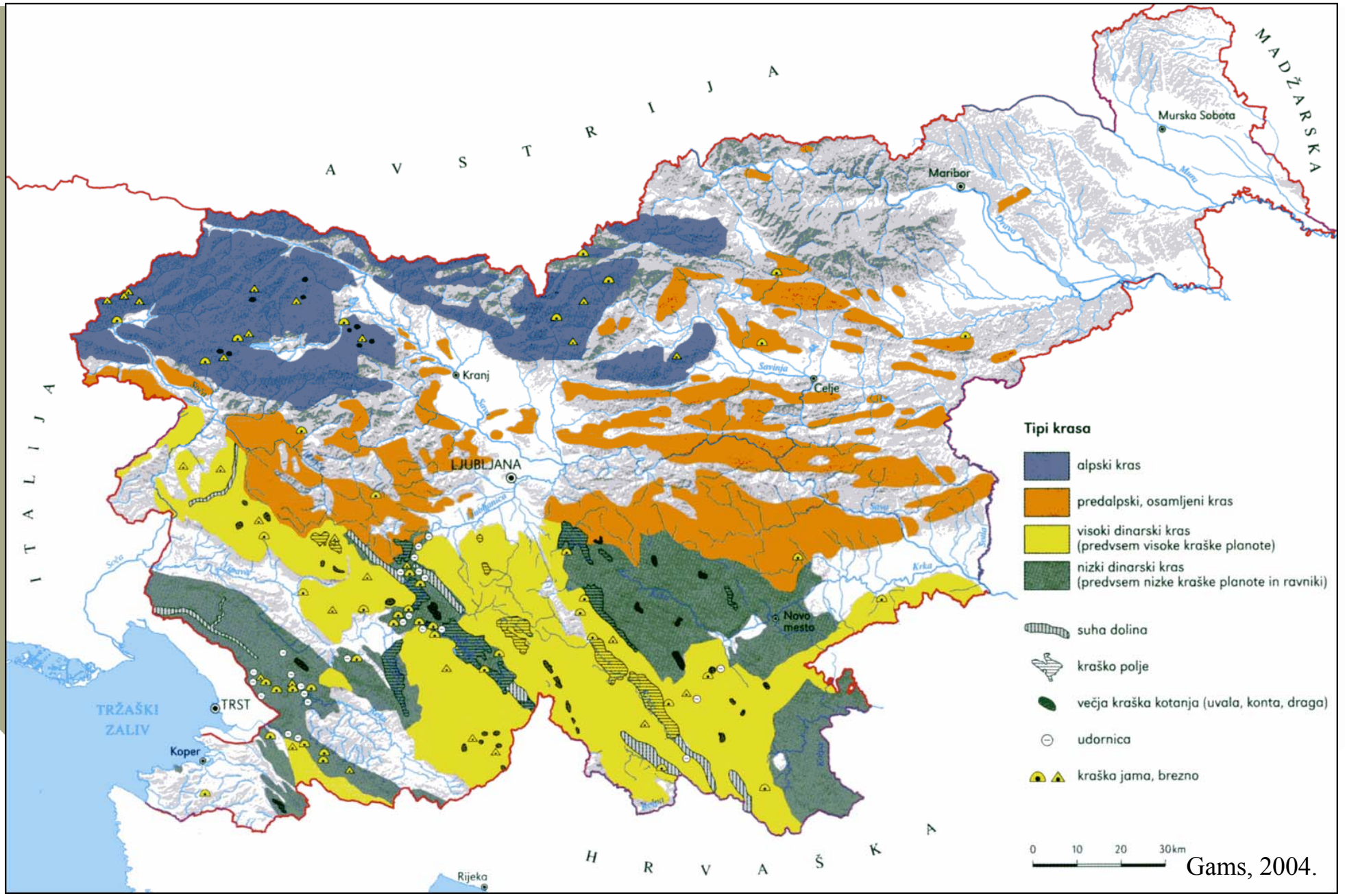
groundwater flow in conduits and caves


Planinska jama, SW Slovenia, Photo: P. Jakopin

Conceptual model of karst aquifers

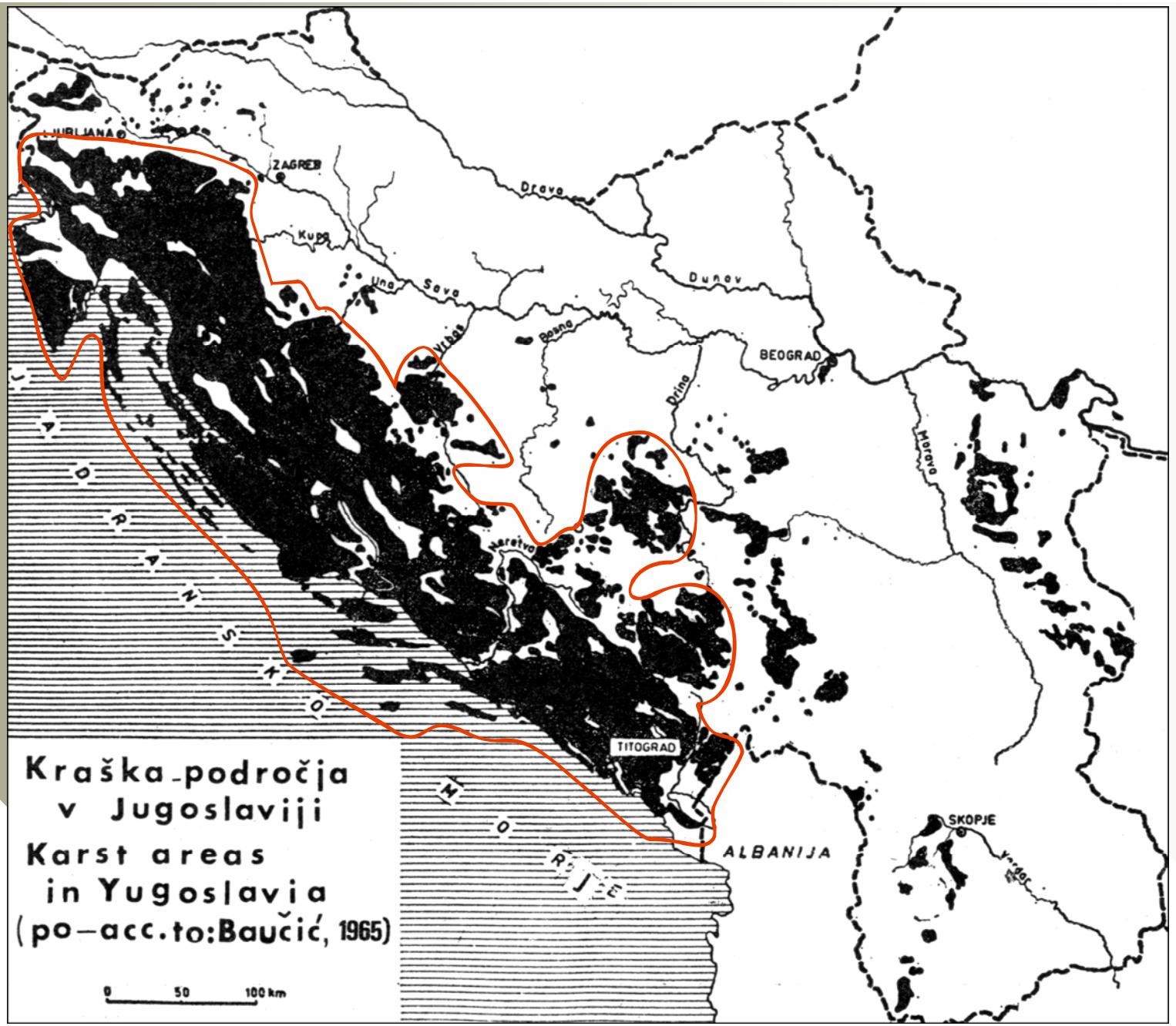


Karst in Slovenia



Gams, 2004.

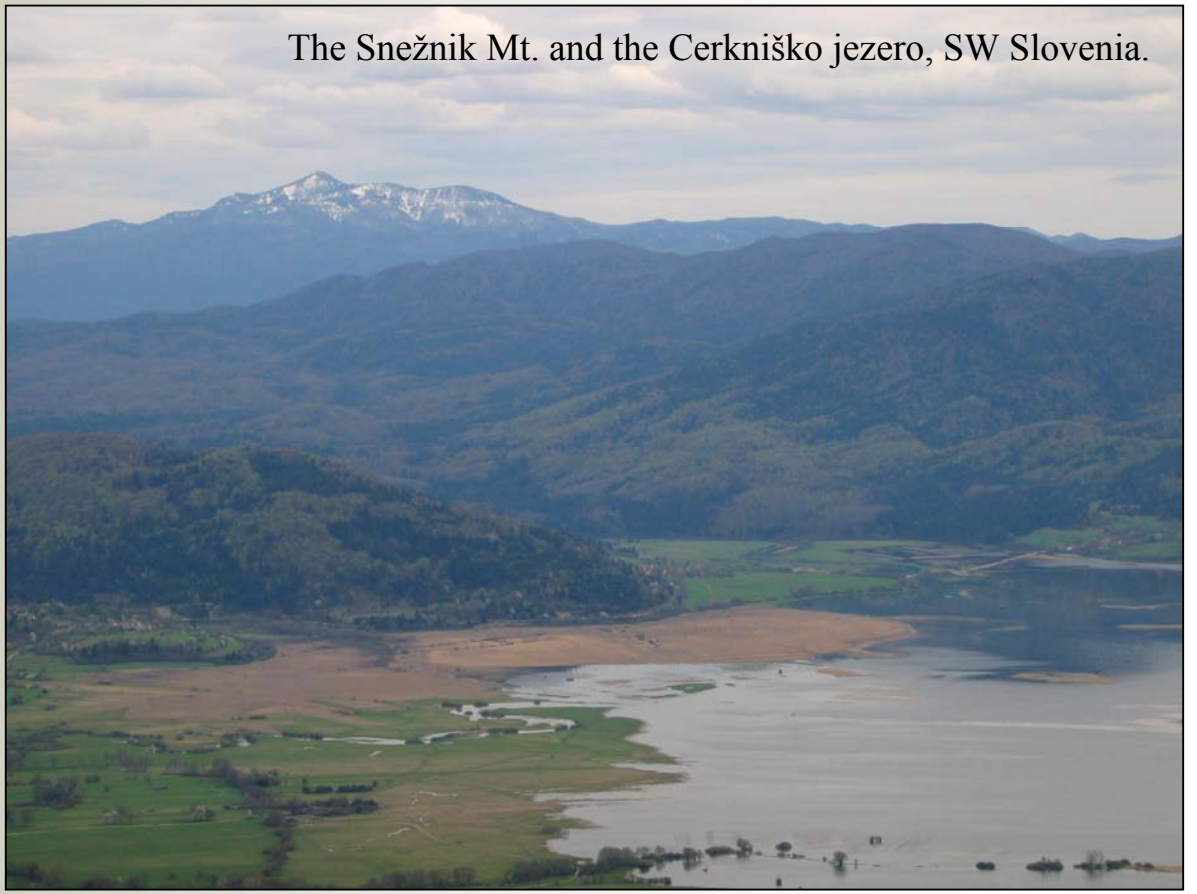
Dinaric karst



Gams, 1974.

Karst in Slovenia

- large karst massifs and karst plateaus,
- intersected by shallow karst areas, karst poljes and valleys,
- thick carbonate rock sequences,

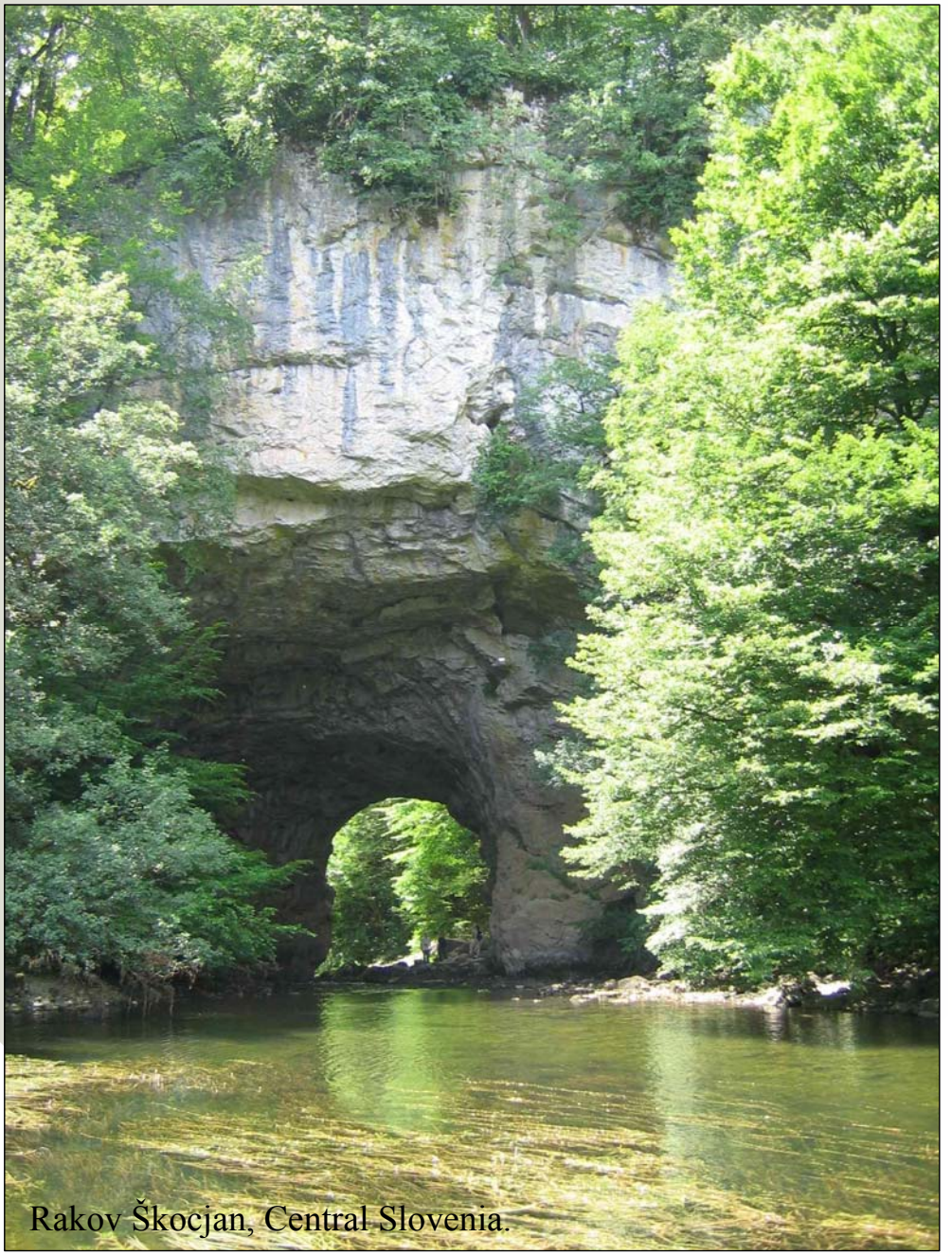


The Snežnik Mt. and the Cerkniško jezero, SW Slovenia.

Karst in Slovenia

- springs
- sinking rivers
- intermittent lakes – Cerkniško jezero (25 km^2, 28 million m^3)

The Cerkniško jezero, Central Slovenia, Photos: N. Ravbar.



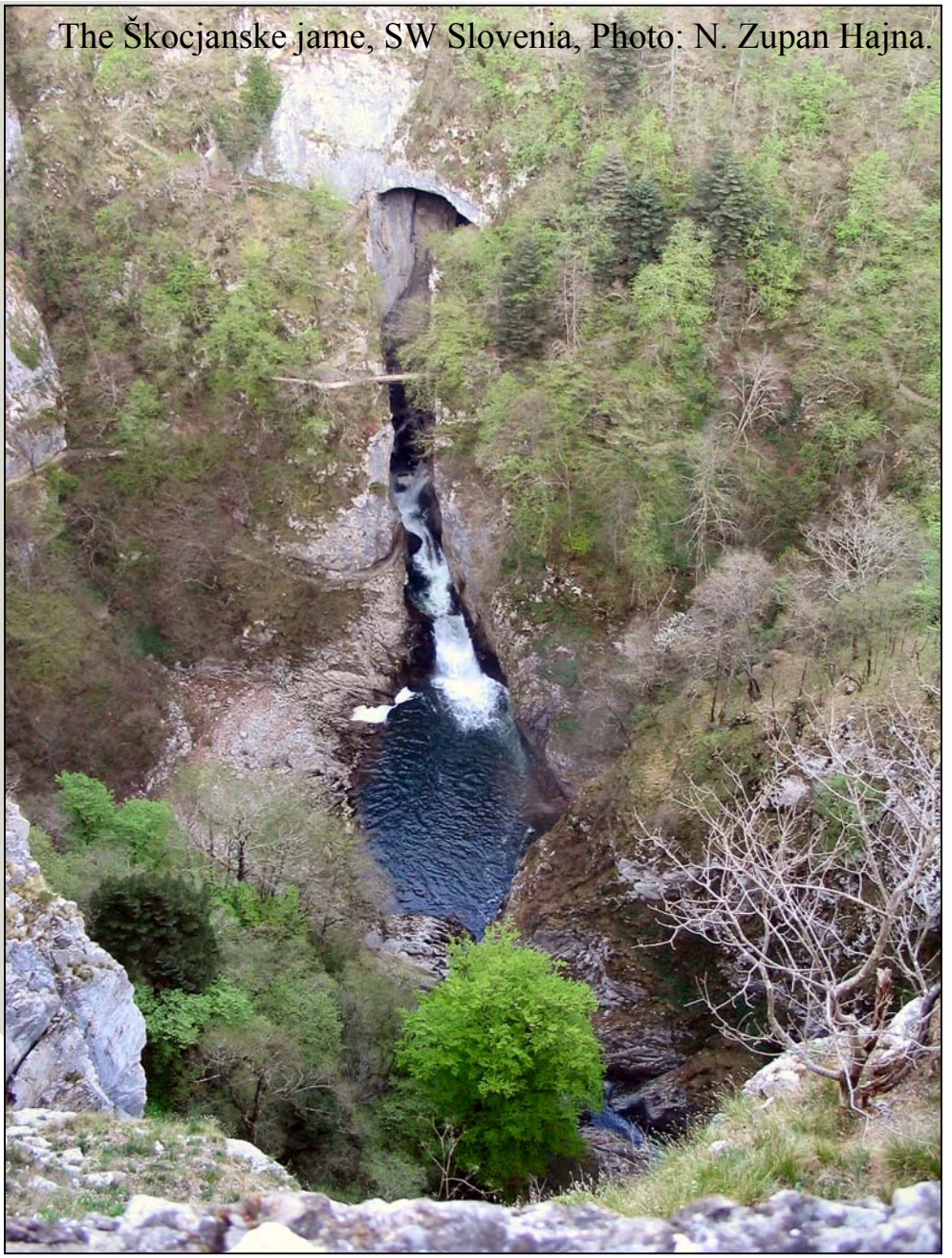
Rakov Škocjan, Central Slovenia.

Karst in Slovenia

- ponors

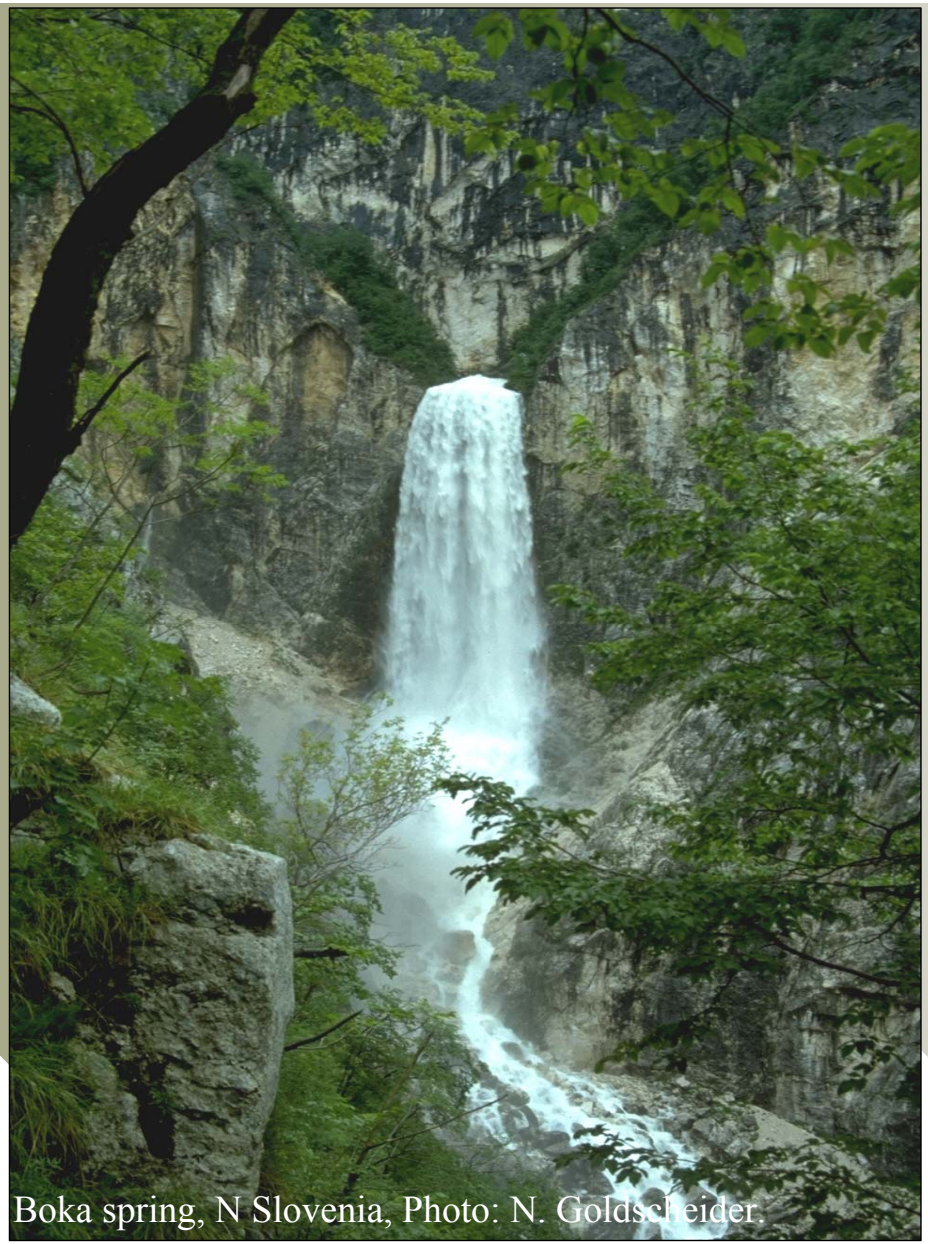
  (Škocjanske jame - UNESCO World Natural Heritage list , Postojnske jame – 20 km of passages)

Pivka ponor, Central Slovenia, Photo: S. Spetič.



The Škocjanske jame, SW Slovenia, Photo: N. Zupan Hajna.

Karst in Slovenia

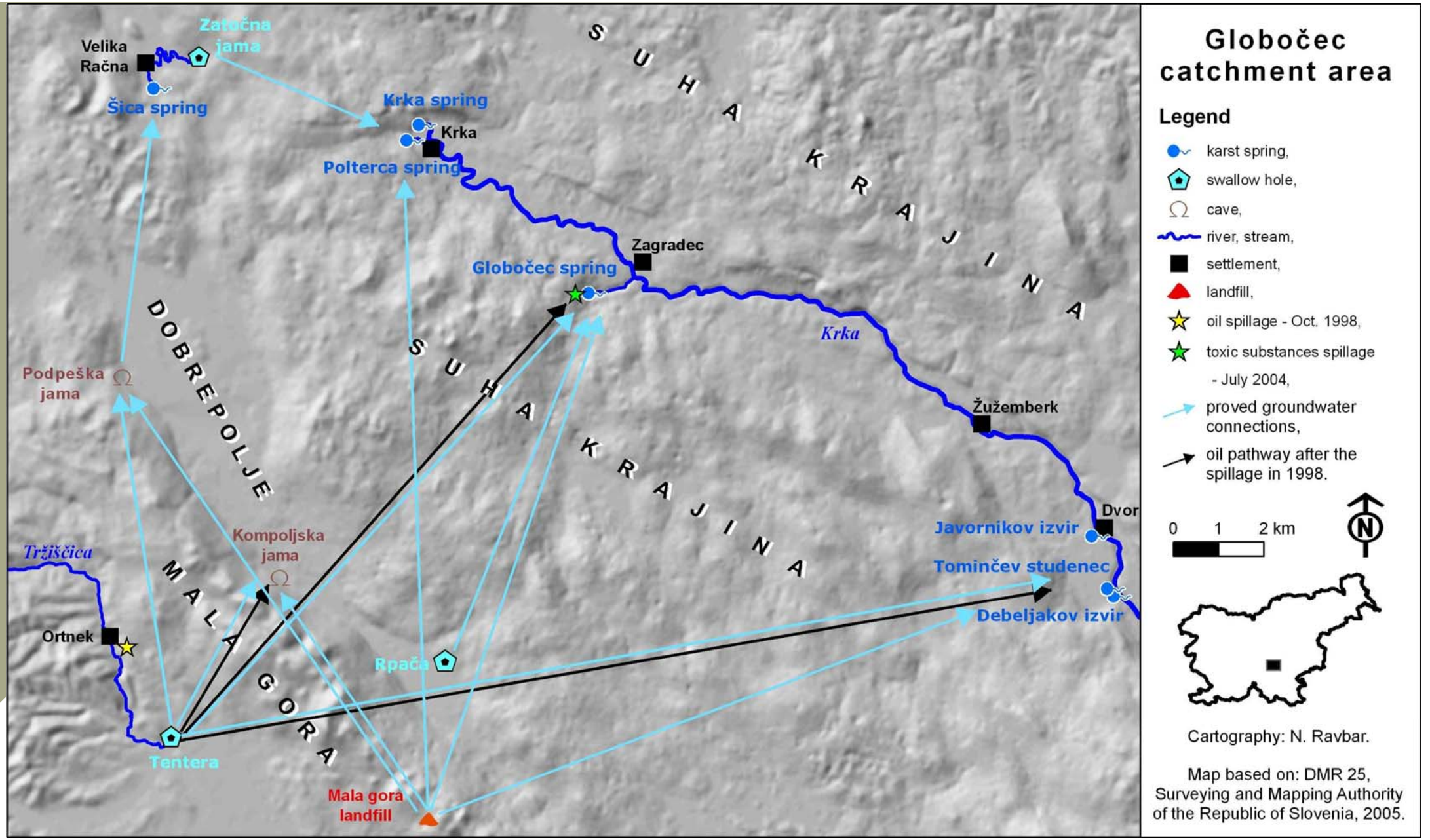


Boka spring, N Slovenia, Photo: N. Goldscheider.

- efficacious karst springs emerge at the aquifers margins

Hubelj spring, W Slovenia, Photo: M. Petrič.

Recharge areas in karst?

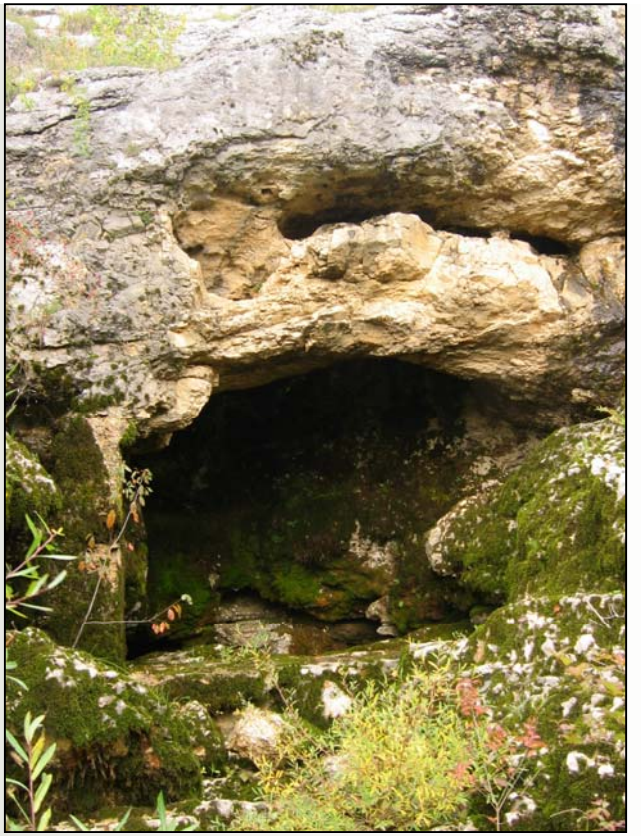


Recharge areas in karst?

- large catchment areas (extending over several tens or even hundreds km^2),
- watersheds difficult to determine - bifurcations
- groundwater level variations (several tens metres),

Recharge areas in karst?

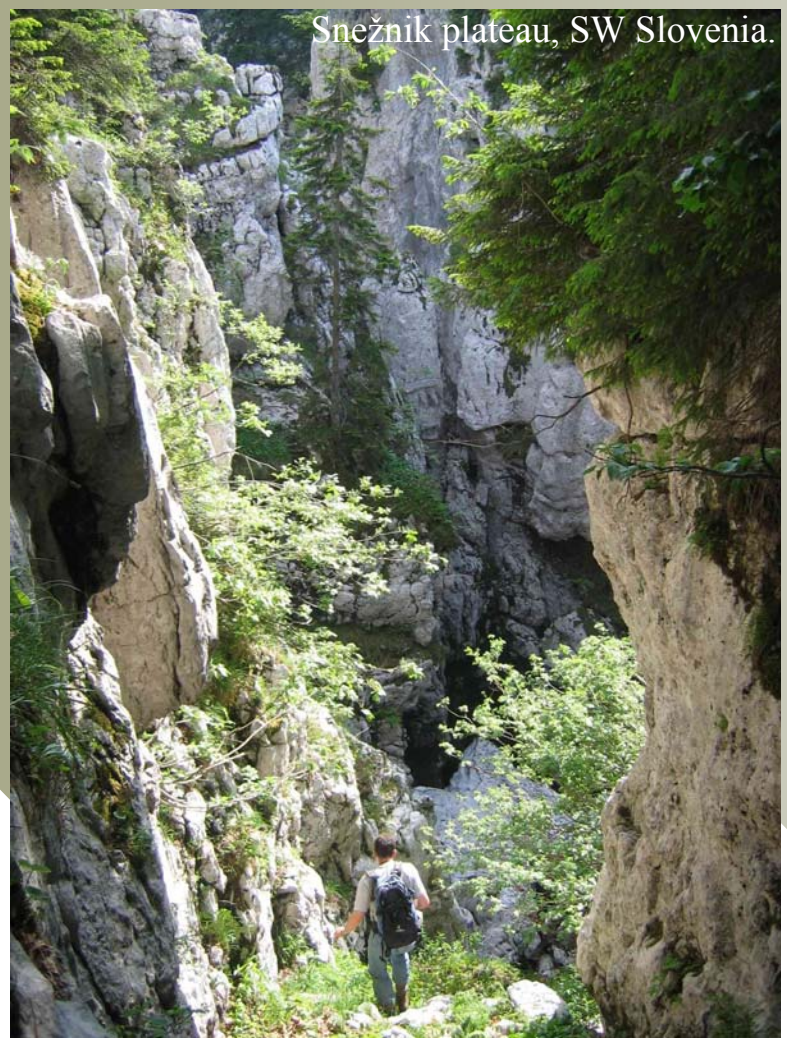
- variations of flow velocities and changing flow directions,
- variable catchment boundaries,
- surface – underground flow interaction.



The Matijeva jama, SW Slovenia, Photos: N. Ravbar.

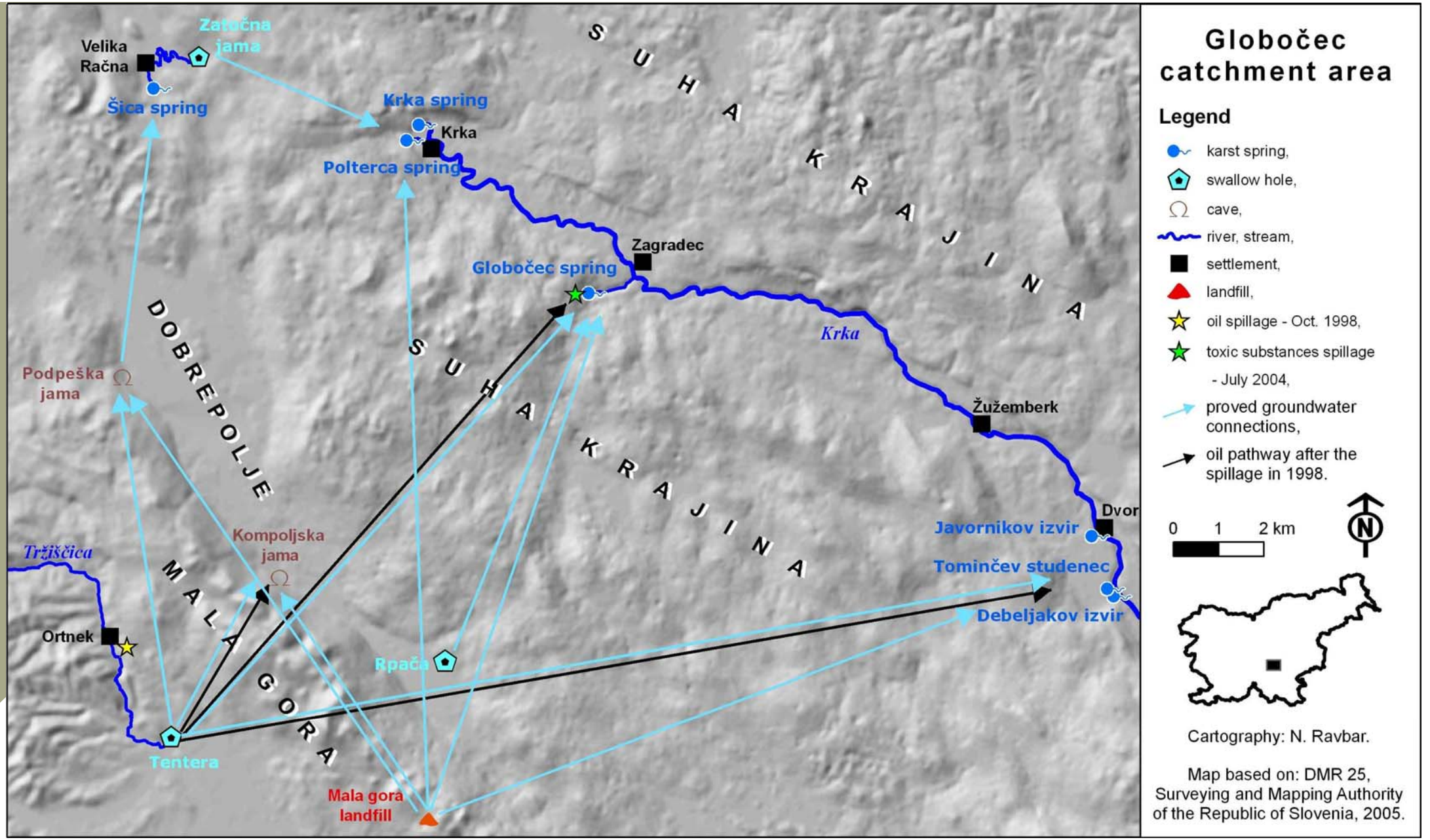
Contamination problems

- very thin protective soil cover and
- common absence of other protective overlaying layers.


Snežnik plateau, SW Slovenia.

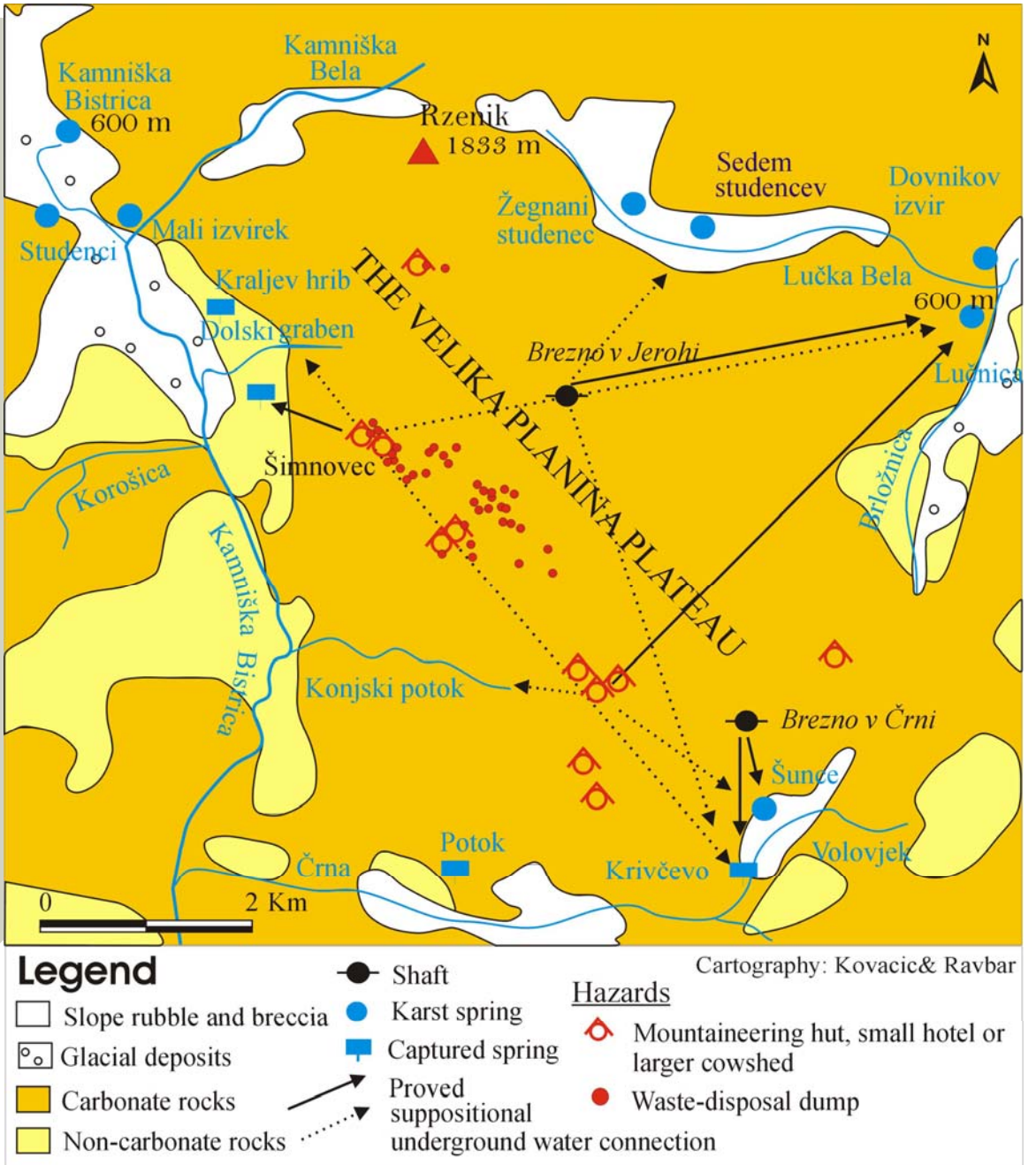

The Kras plateau, SW Slovenia, Photos: N. Ravbar.

Contamination problems

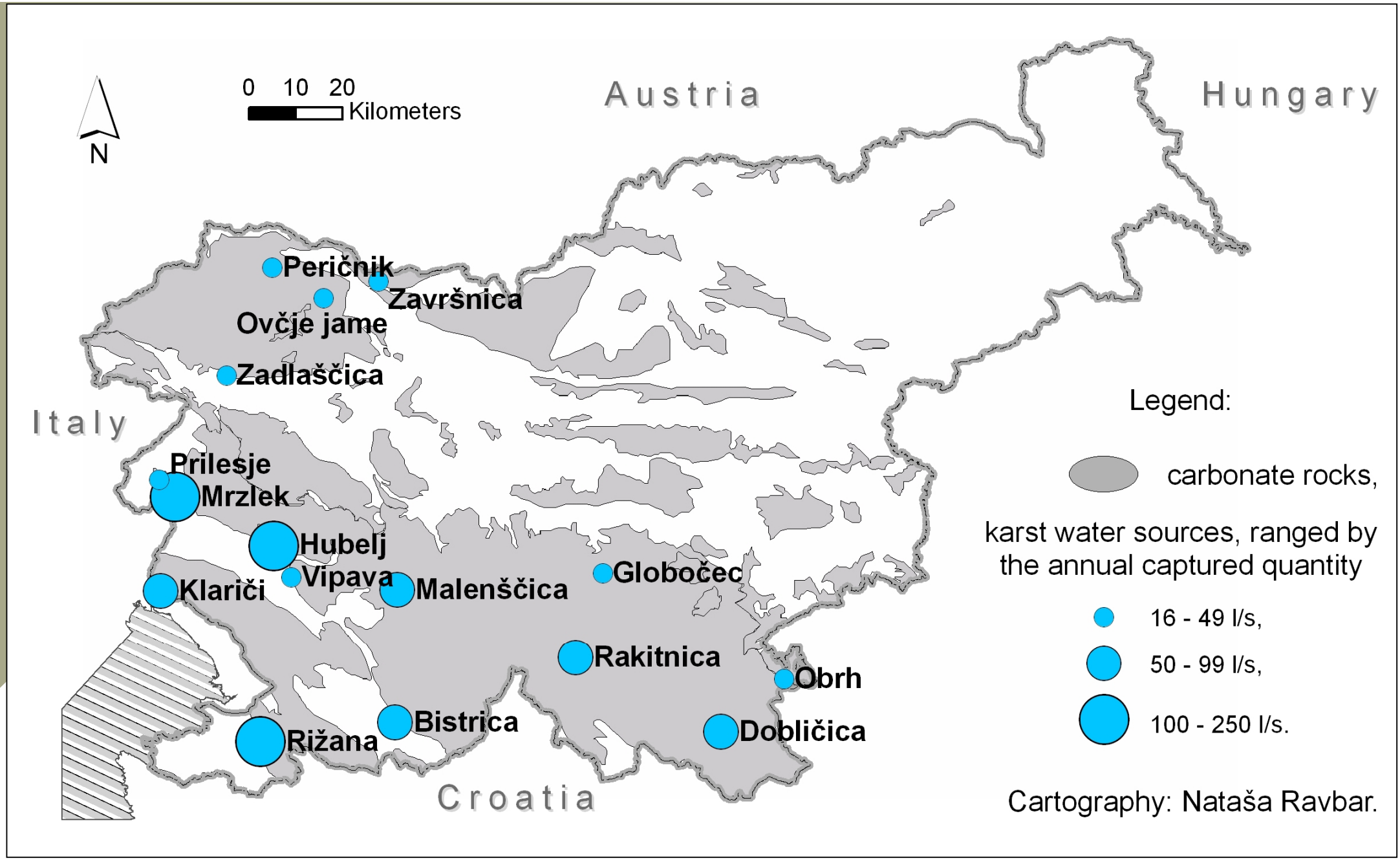


Contamination problems

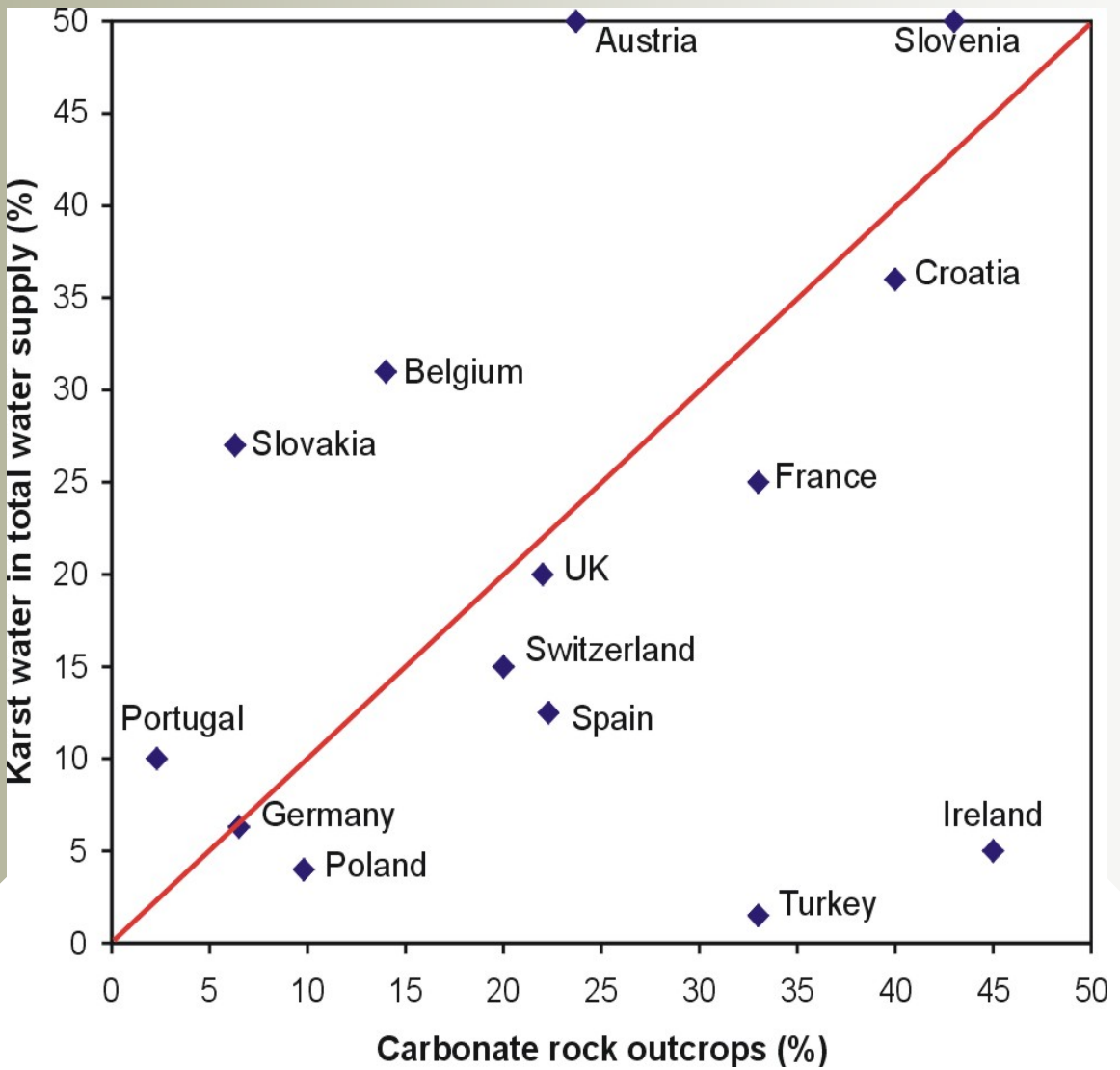
The Velika planina plateau, N Slovenia, Photo: N. Ravbar.



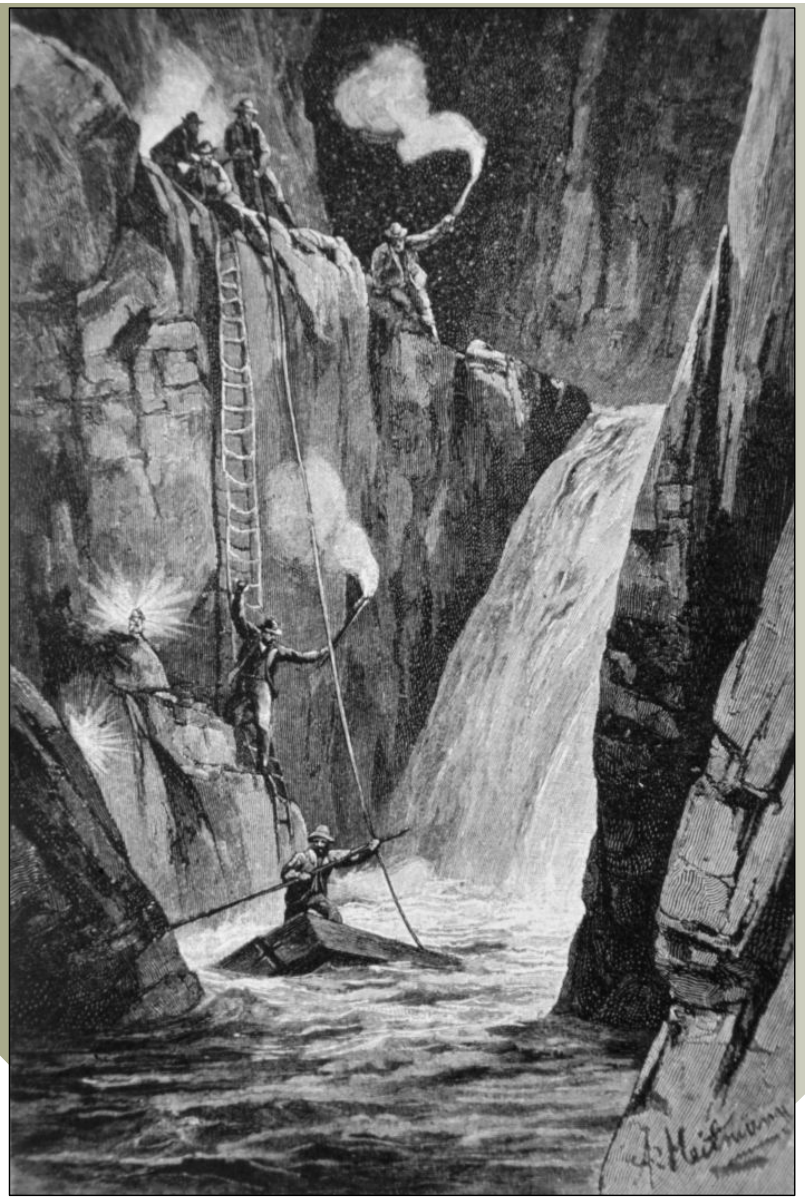
Carbonate rocks and the most important karst water sources



Carbonate rock outcrops and contribution of karst water to the total water supply in Europe



Kras and Karst



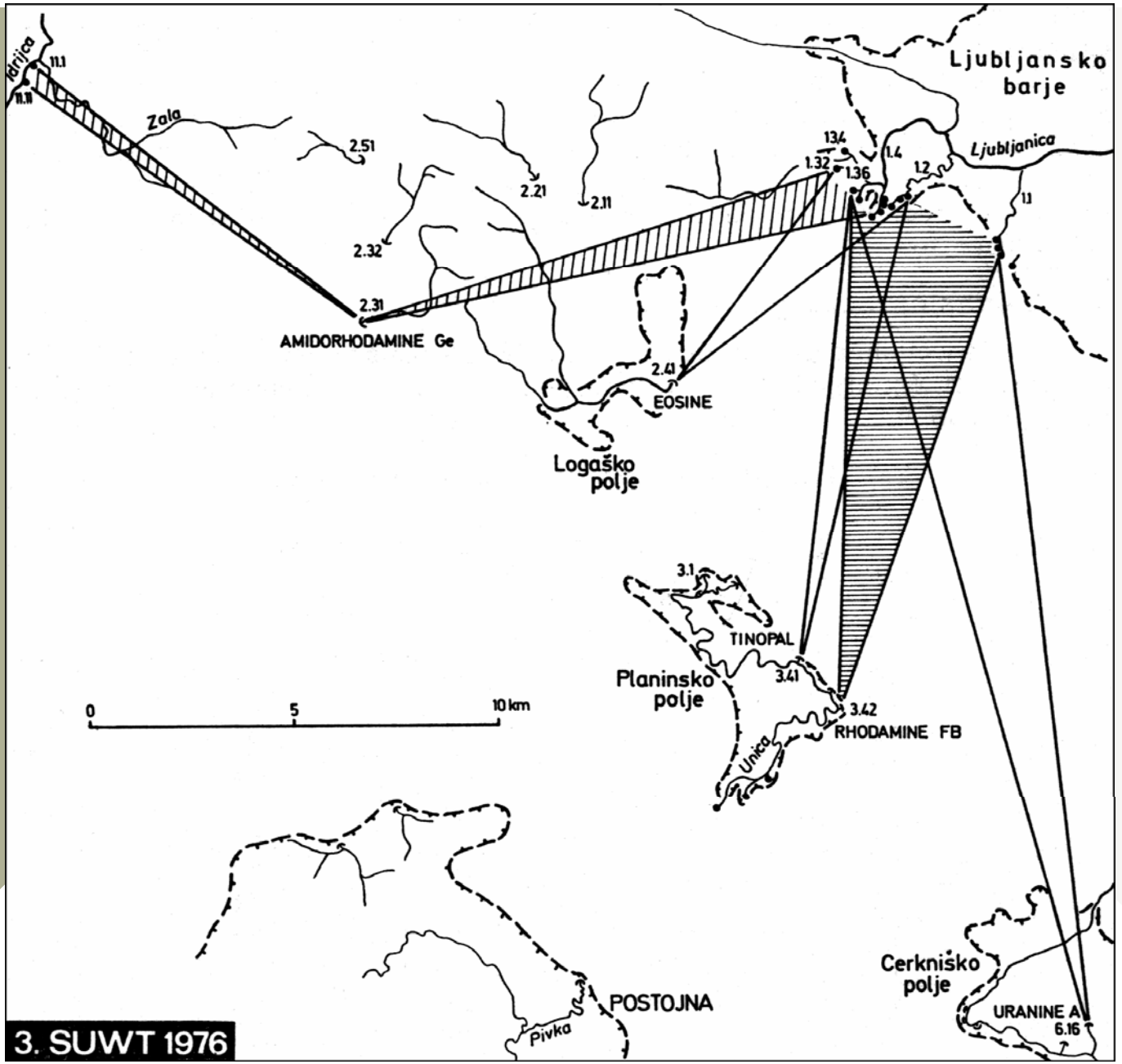
Karst Research Institute

80 years ago

Archives of the Karst Research Institute

Karst Research Institute (http://www.zrc-sazu.si/izrk/)

Karst Research Institute



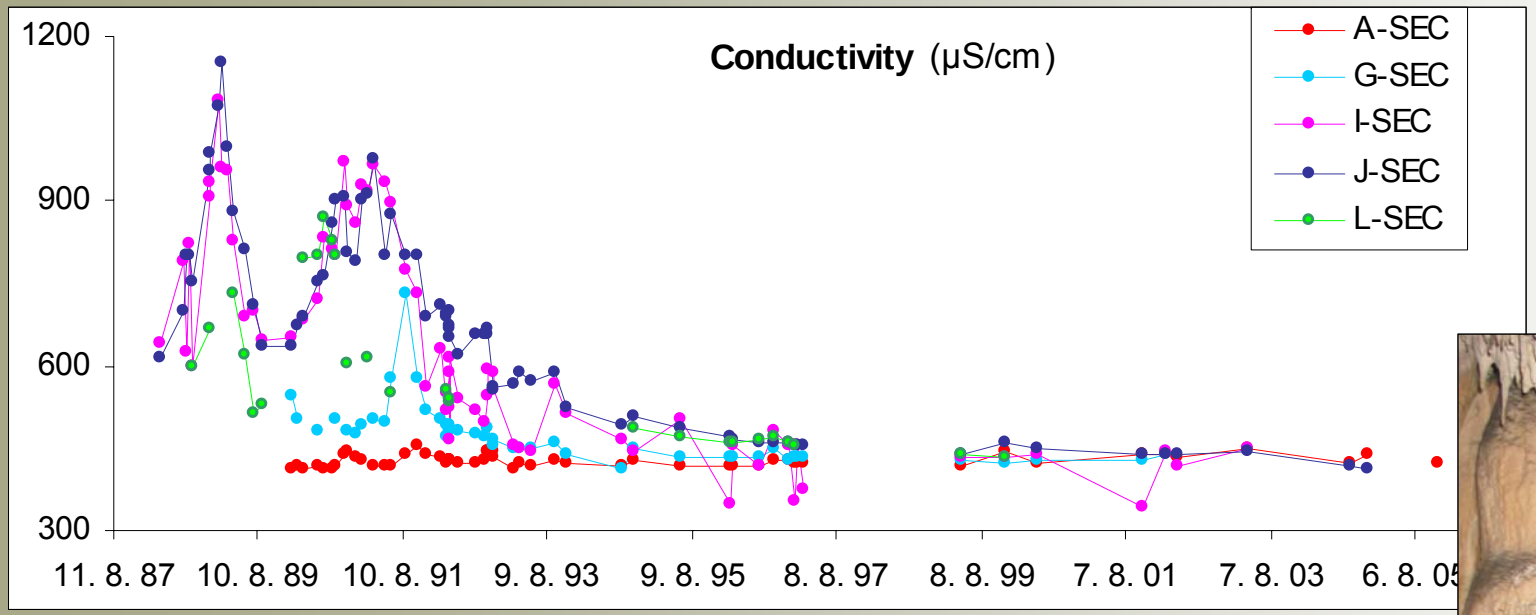
Gospodarič & Habič, 1976.

Karst Research Institute

artificial tracer tests

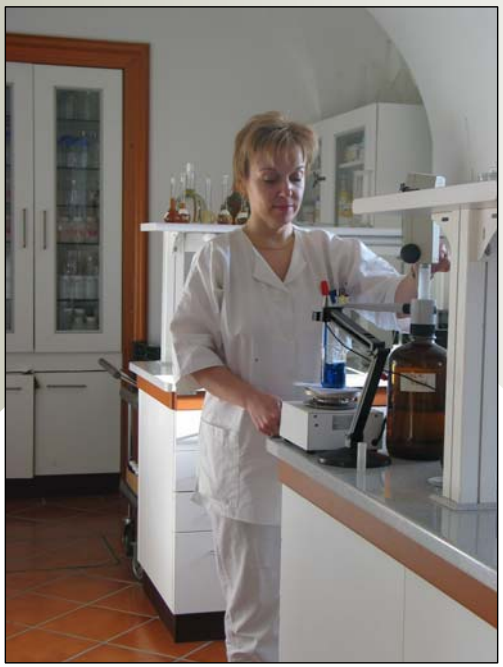
Photos: J. Kogovšek, N. Ravbar.

Karst Research Institute



after Kogovšek.

monitoring of
natural tracers



Postojnska jama, Photos: J. Kogovšek.

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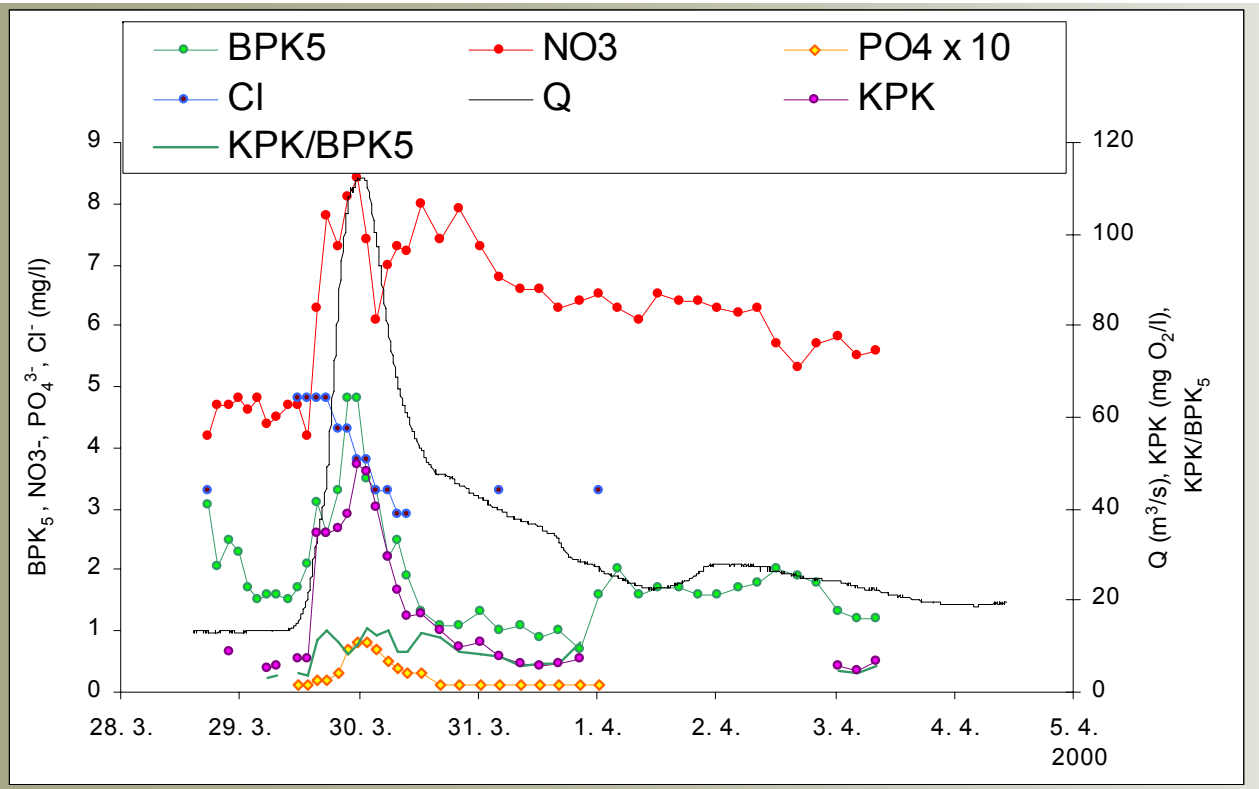

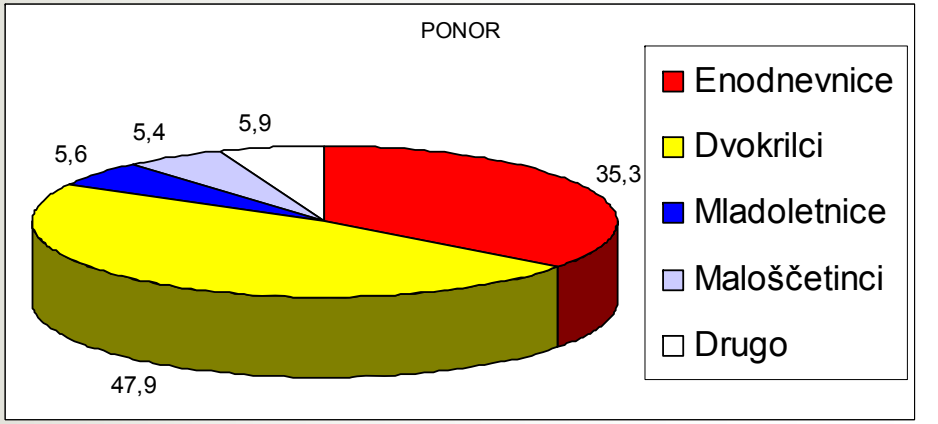

Kogovšek, 2002; Pipan, 1999.

monitoring of physical, chemical and biological parameters

Karst Research Institute

studying the impact of different hazards in karst

Photos: F. Drole, N. Ravbar.

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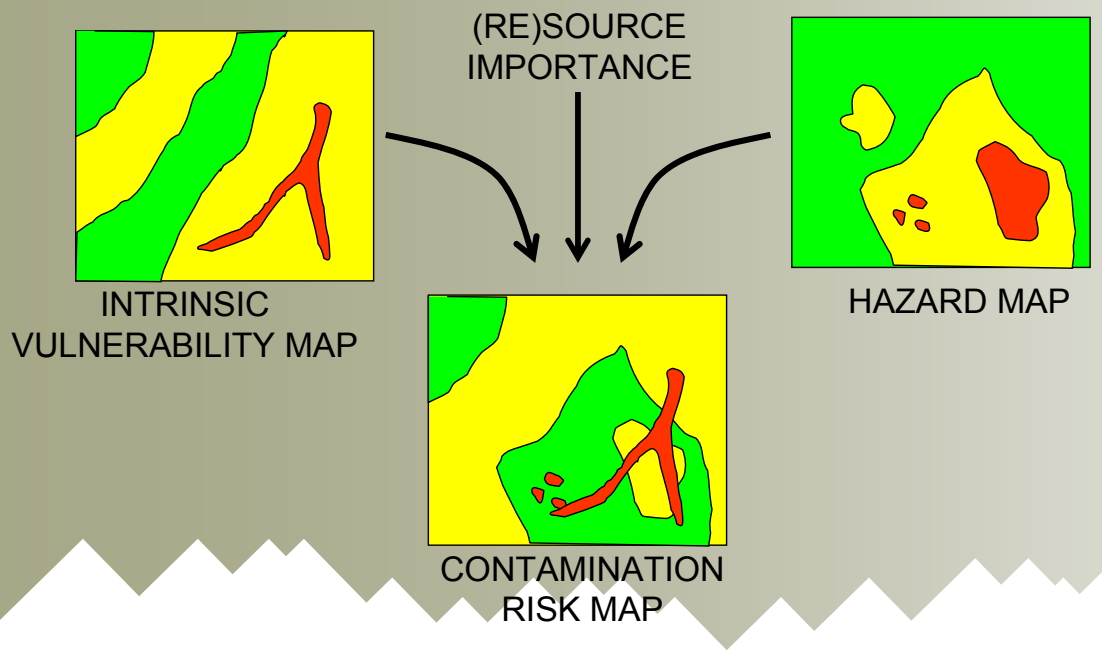
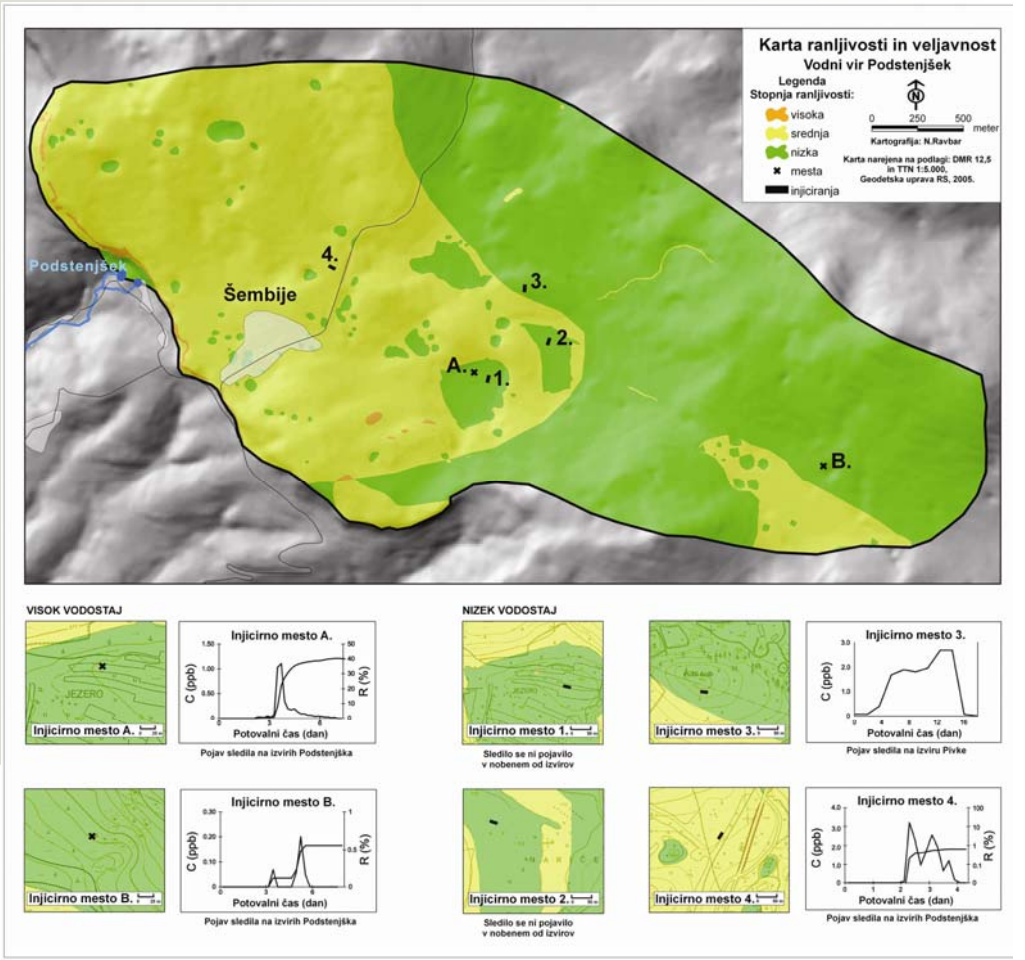
SLOVENE APPROACH

TO GROUNDWATER VULNERABILITY AND CONTAMINATION RISK MAPPING

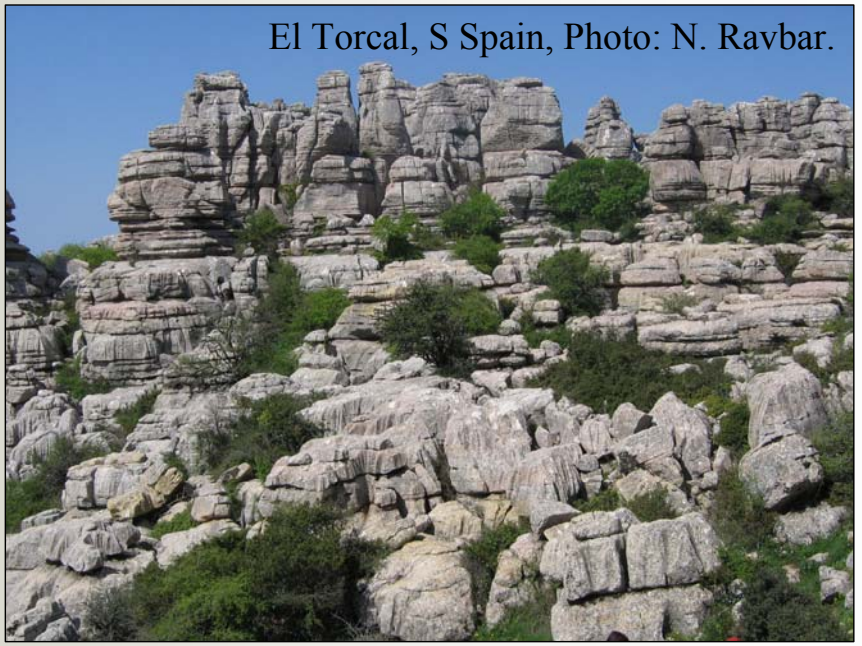




Ravbar, 2007.

Karst Research Institute


Guilin, S China, Photo: N. Ravbar.


El Torcal, S Spain, Photo: N. Ravbar.

- Europe
- China,
- Vietnam,
- Iran, ...


Iran, Photo: M. Knez.

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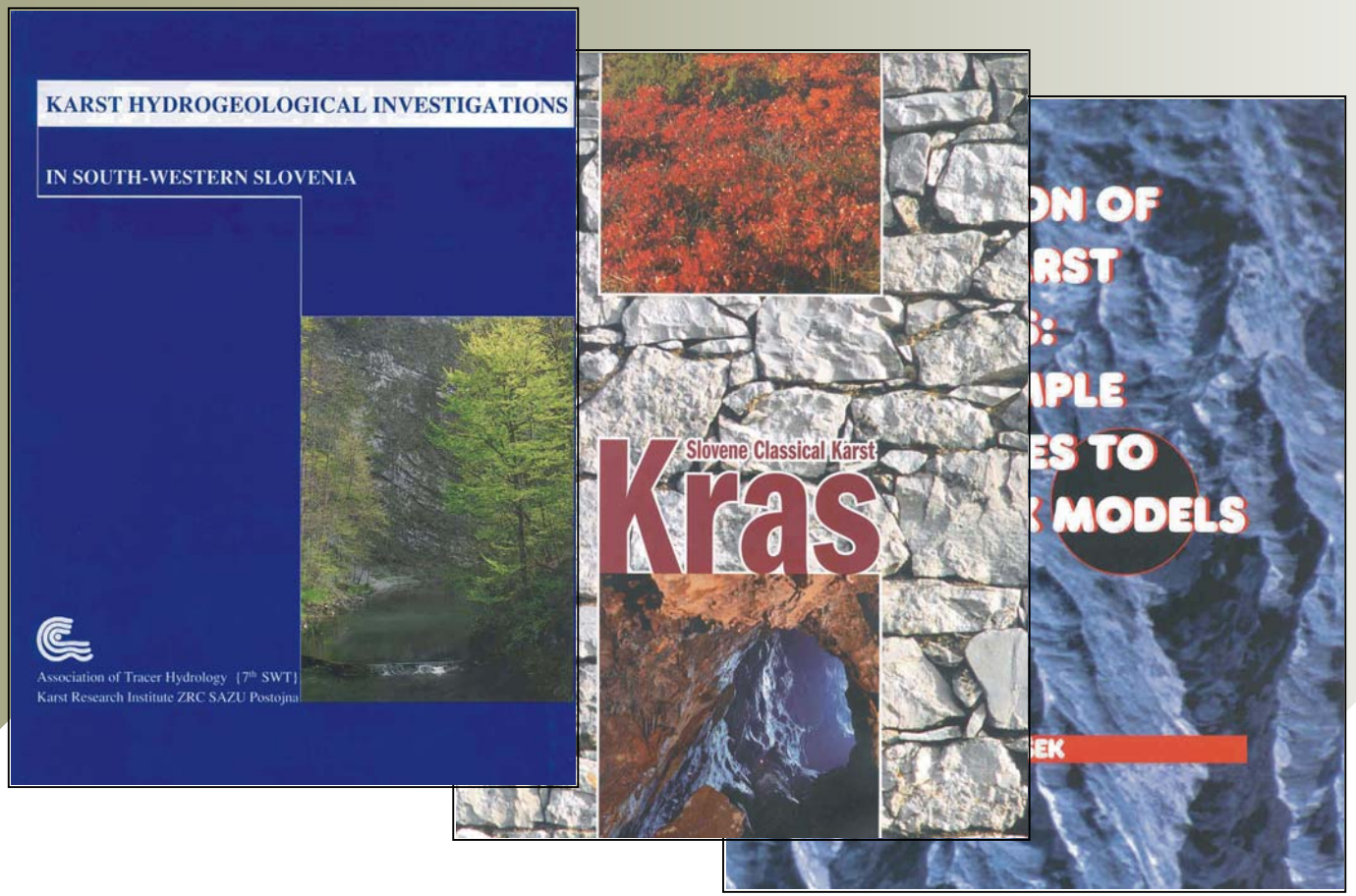
Acta Carsologica
Journal

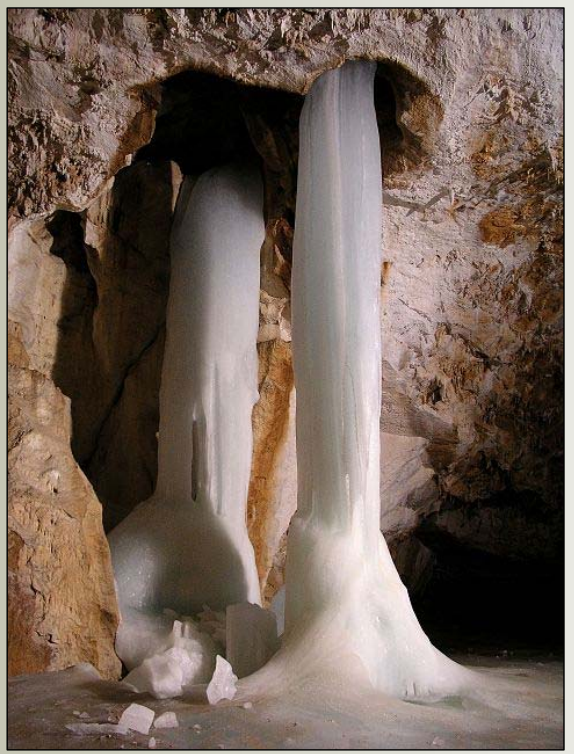


Different publications

International Karstological Schools

17th International Karstological School

Cave climate



15th – 20th June 2009

Karst Research Institute SRC SASA, Postojna

Karst Research Institute

- International Karstological School
- Cadastre of Caves in Slovenia
- Seat of International Speleological Union
- Seat of International Long-Term Ecological Research
- Postgraduate Study of Karstology