Karlsruher Institut für Technologie

The World Karst Aquifer Mapping Project – WOKAM

Nico Goldscheider, Chen Zhao & the WOKAM Team

Institute of Applied Geosciences, Division of Hydrogeology

The WOKAM Project is Team Work

Members of the Scientific Advisory Board (SAB) during the 2nd Meeting in Karlsruhe, April 2014

SAB Meeting 2014:

- Augusto Auler
- Michel Bakalowicz
- David Drew
- Guanghui Jiang
- Nils Moosdorf
- Zoran Stevanovic
- Andrea Richts
- George Veni
- Nico Goldscheider
- Franziska Griger
- Chen Zhao

… and others…

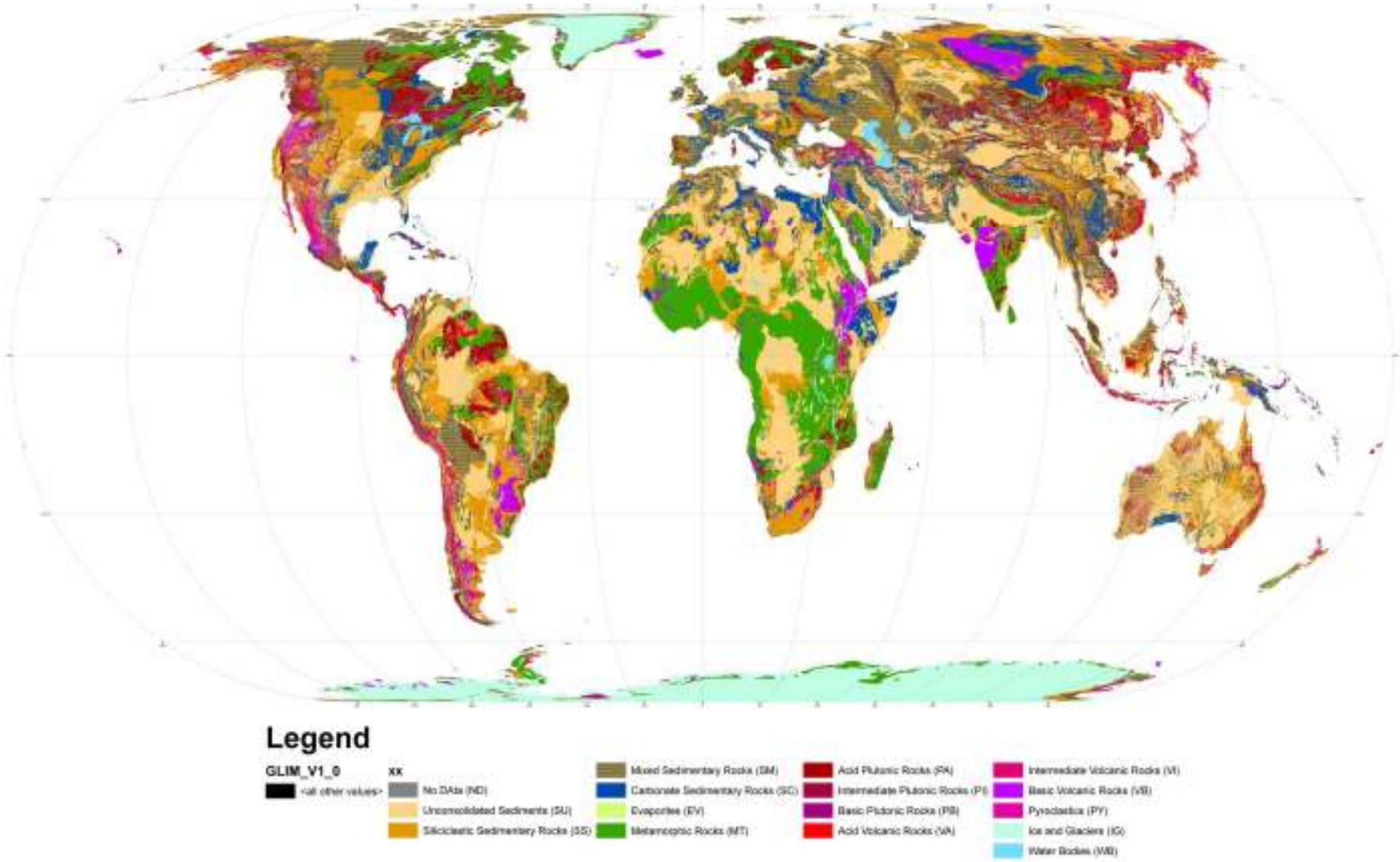
Concepts, goals and fundamental project structure

- WOKAM: Global map of **groundwater** resources in karst aquifers.
- Potential users: Policymakers and water resources managers, interested public and hydro-geo-environmental scientists.
- Products: GIS with several layers and connected database, printed karst map(s) on paper, karst layer for WHYMAP, publications.

Source de la Loue, France.

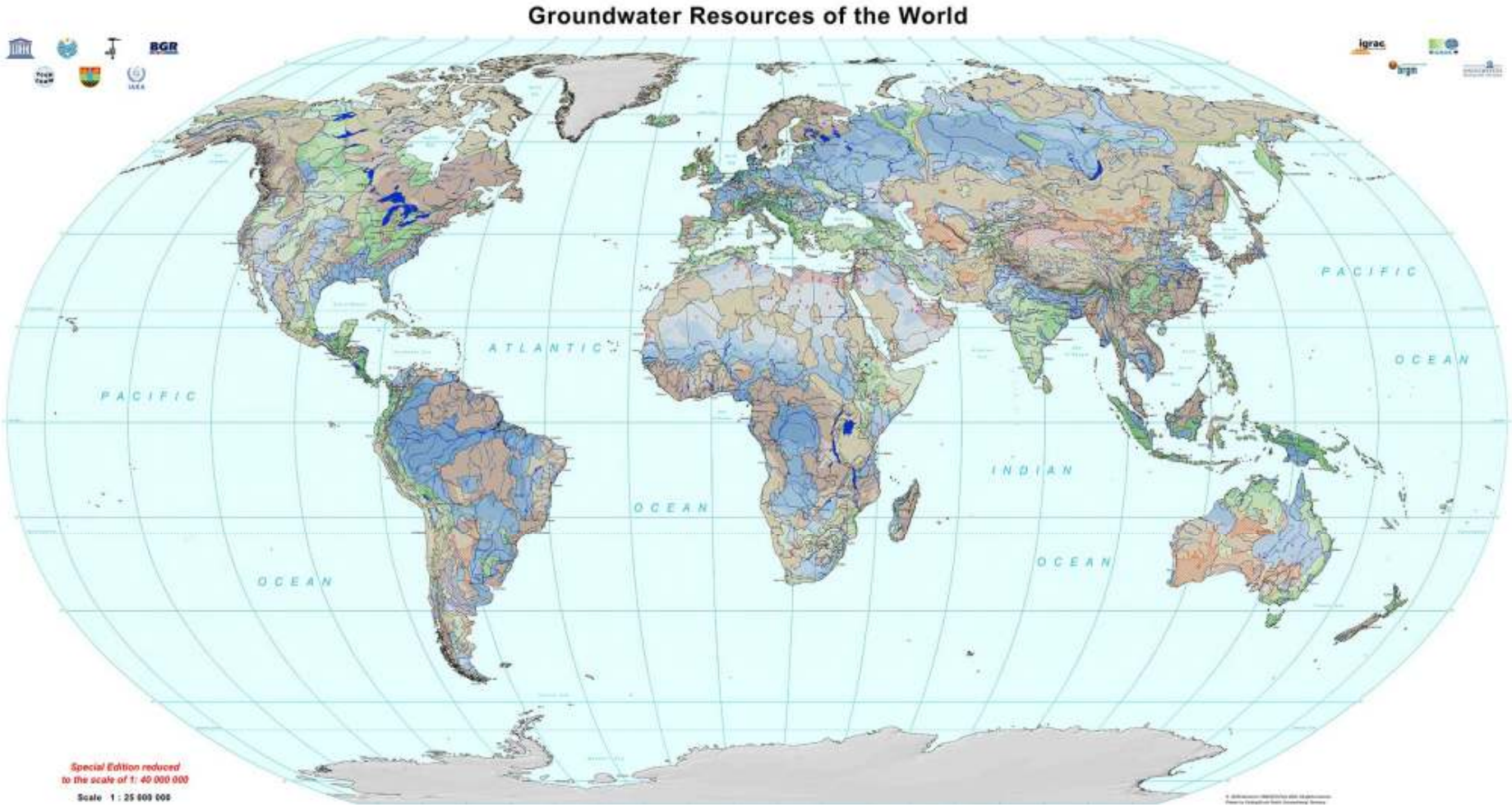
Karst springs will also be displayed on the World Karst Aquifer Map

Important mapping basis: Global Lithological Map (GLiM)



➔ Jens Hartmann & Nils Moosdorf

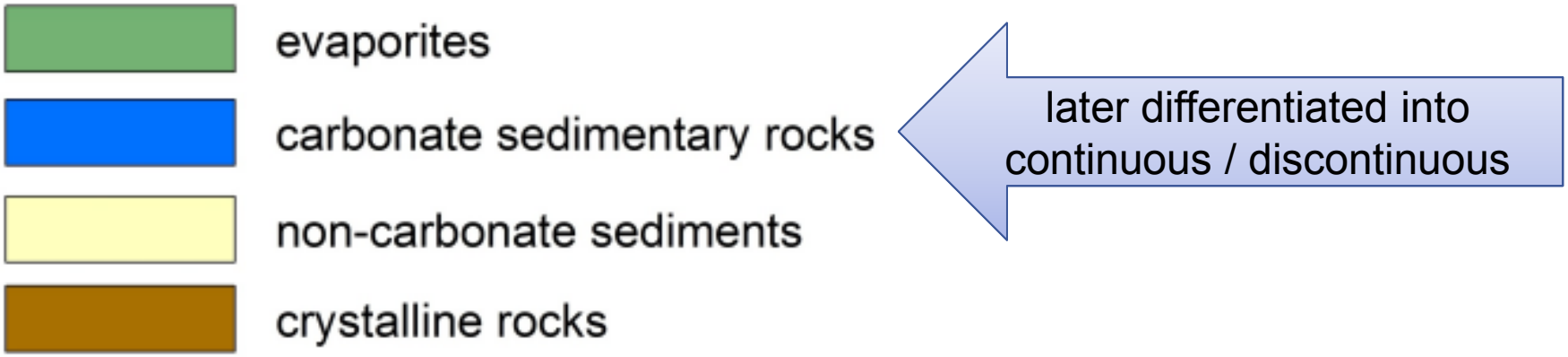
Important mapping basis: WHYMAP



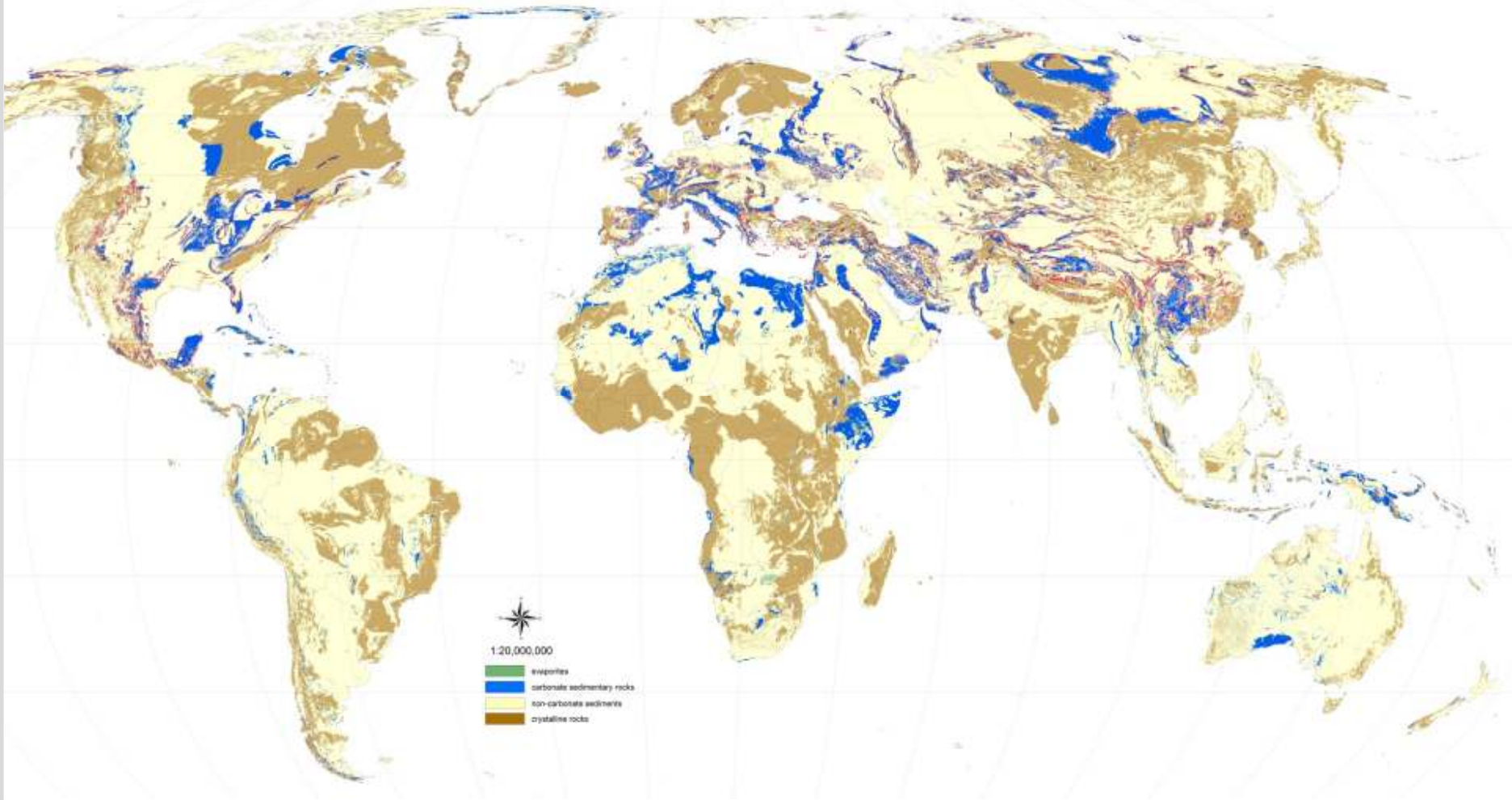
➔ Andrea Richts & Willi Struckmeier

Applied mapping procedure and legend

- Basis: global lithological map (GLiM) by Hartmann & Moosdorf.
- Great variety of rock types is grouped into 4 mapping units:



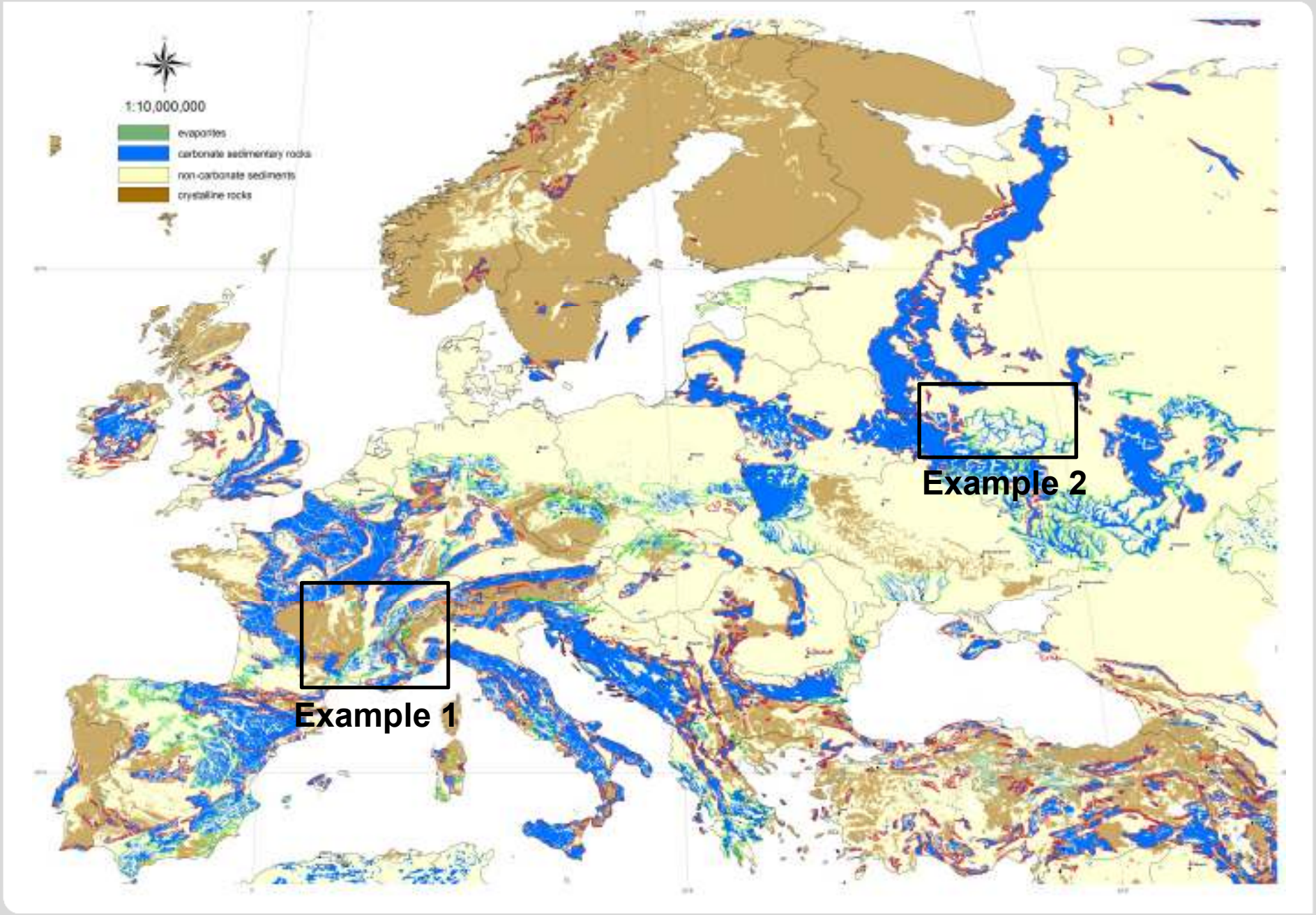
1st Draft of the „World Karst (Aquifer) Map“



Generated from GLiM – unedited

Continuous / Discontinuous Carbonate Rock

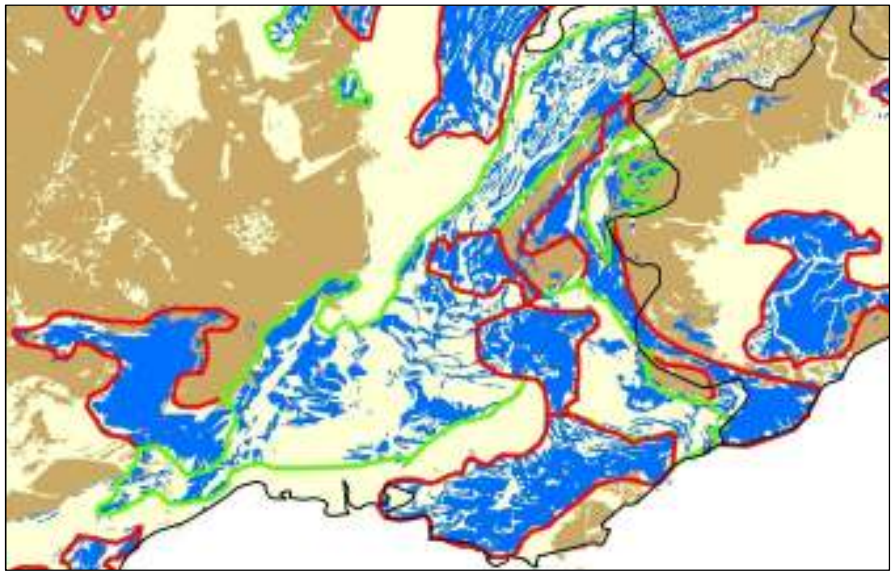
- Approximate differentiation at ~ 65 %.
- Cannot be done automatically, because the size, shape and distribution of carbonate rocks and their representation on maps differs strongly.
- Therefore, this work step is done manually, with geologic expertise.
- The delineation should always be done at the same working scale (1:10 Mio) and by the same person(s).
- This work step goes along with generalization.


1:10,000,000
evaporites
carbonate sedimentary rocks
non-carbonate sediments
crystalline rocks
Example 1
Example 2

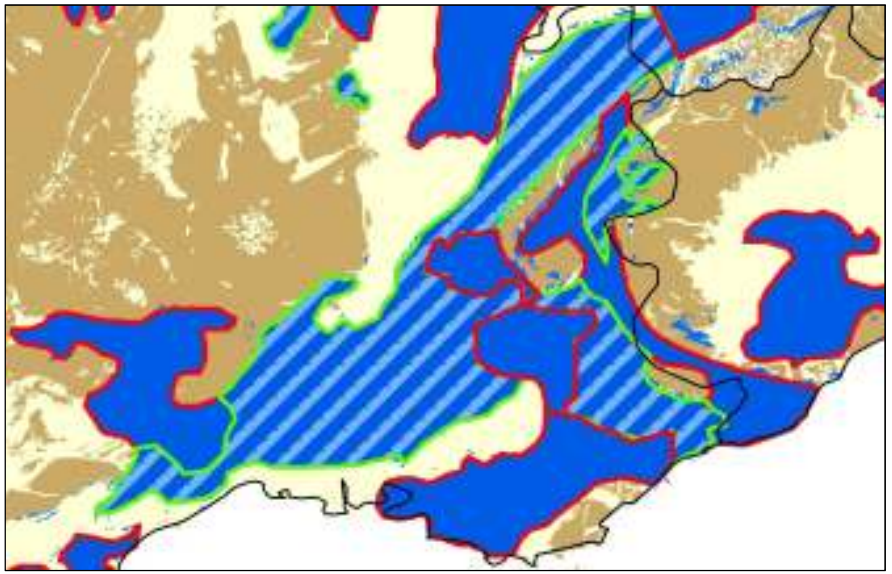
Differentiation continuous / discontinuous carbonates

Example 1: Southern France

a) Representation on GLiM



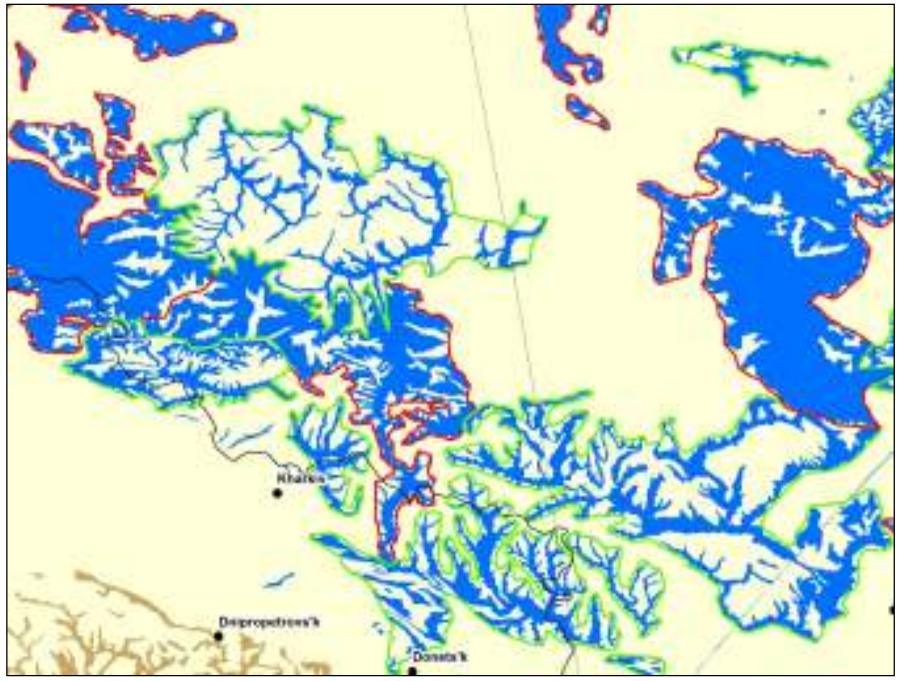
b) Generalization



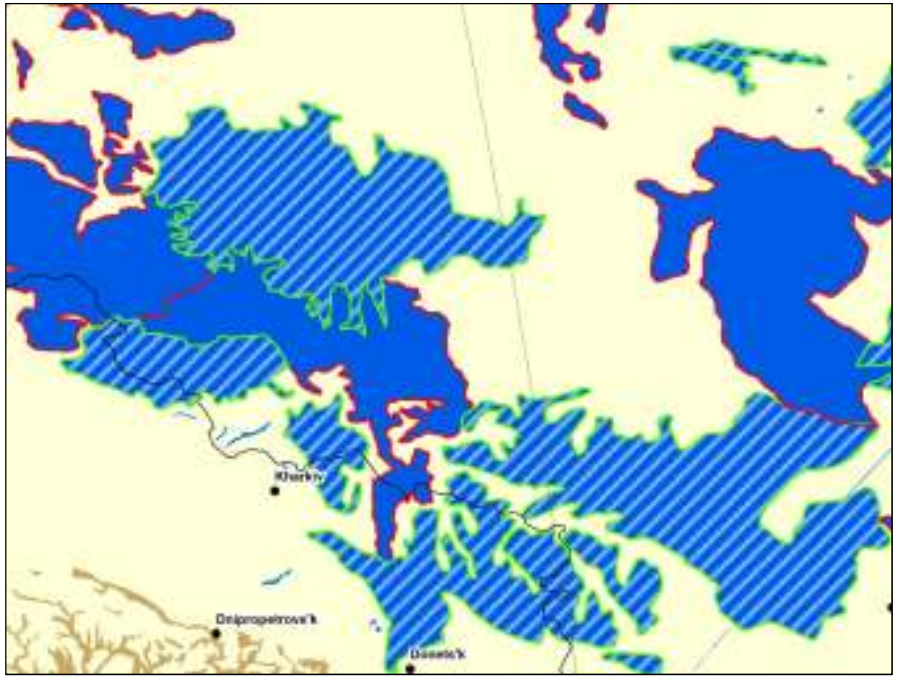
Differentiation continuous / discontinuous carbonates

Example 2: Eastern Europe

a) Representation on GLiM



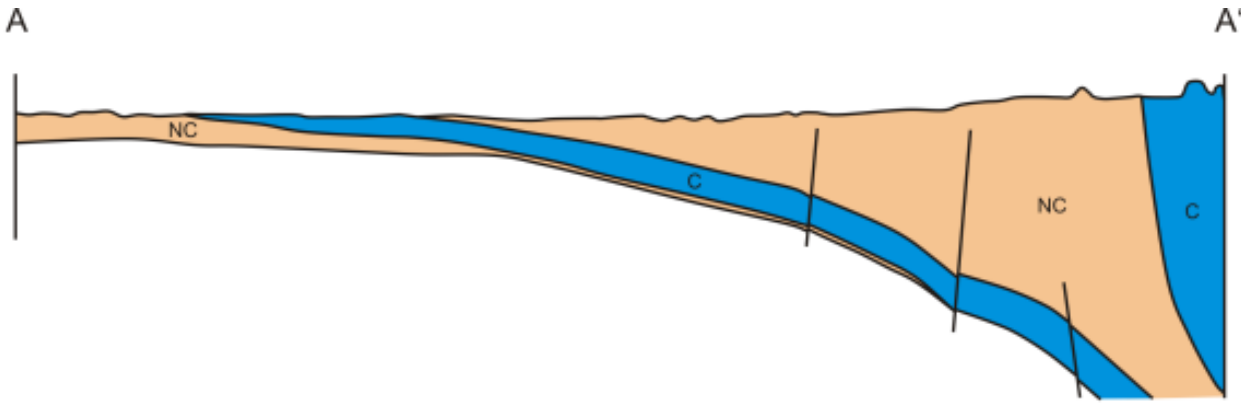
b) Generalization



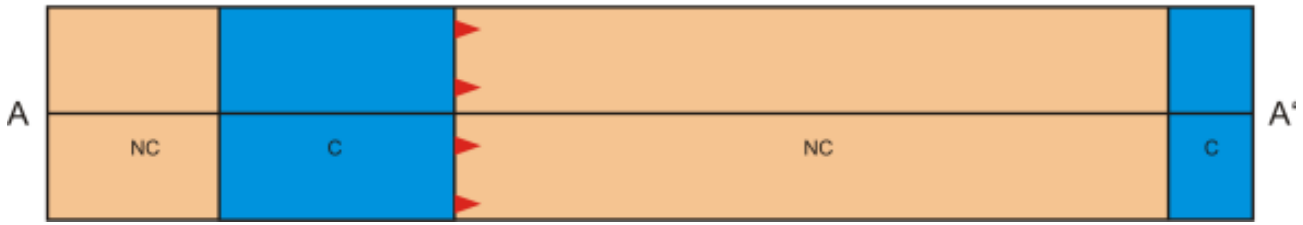
Exposed / non-exposed carbonate rock (karst) aquifers

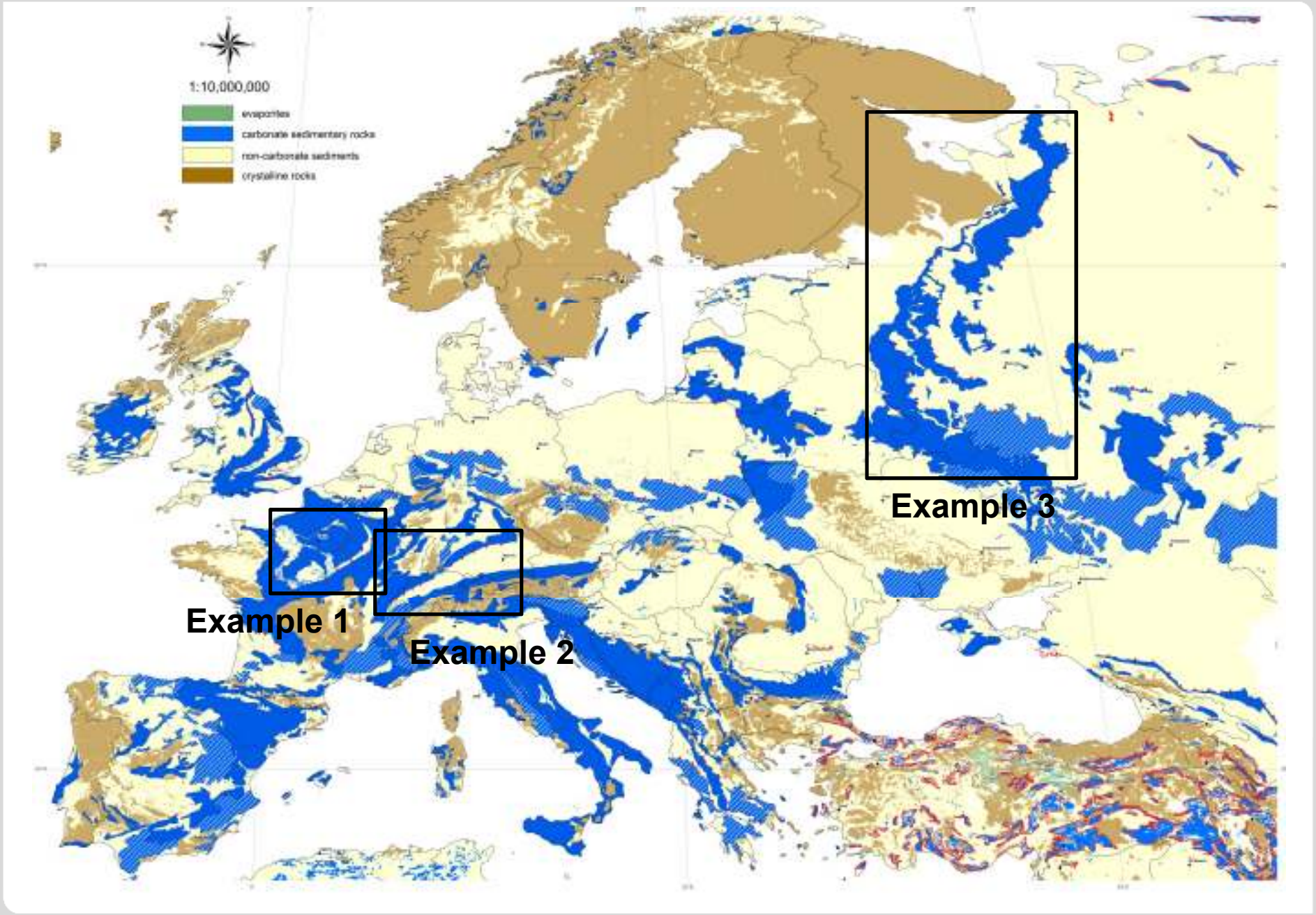
- Non-exposed = potential deep or confined karst water resources.
- Non-exposed karst aquifers cannot be delineated precisely without detailed 3D geological information that is usually not available.
- We show non-exposed karst using a “thrust fault symbol”; the teeth point in the dipping direction, toward the deep aquifer.

Profile:



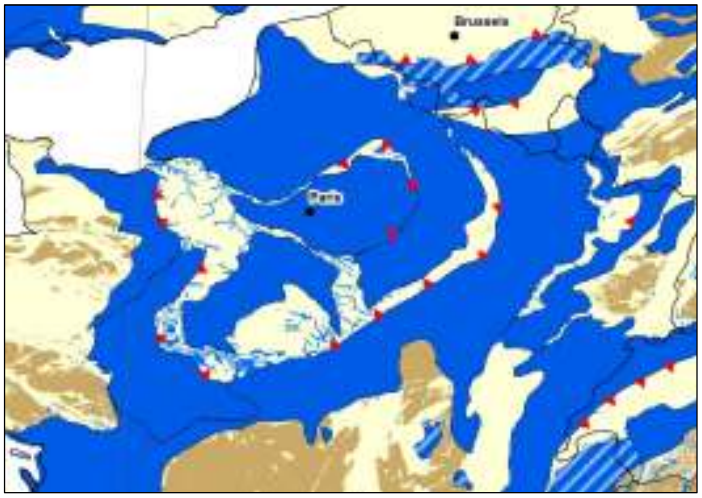
Map:

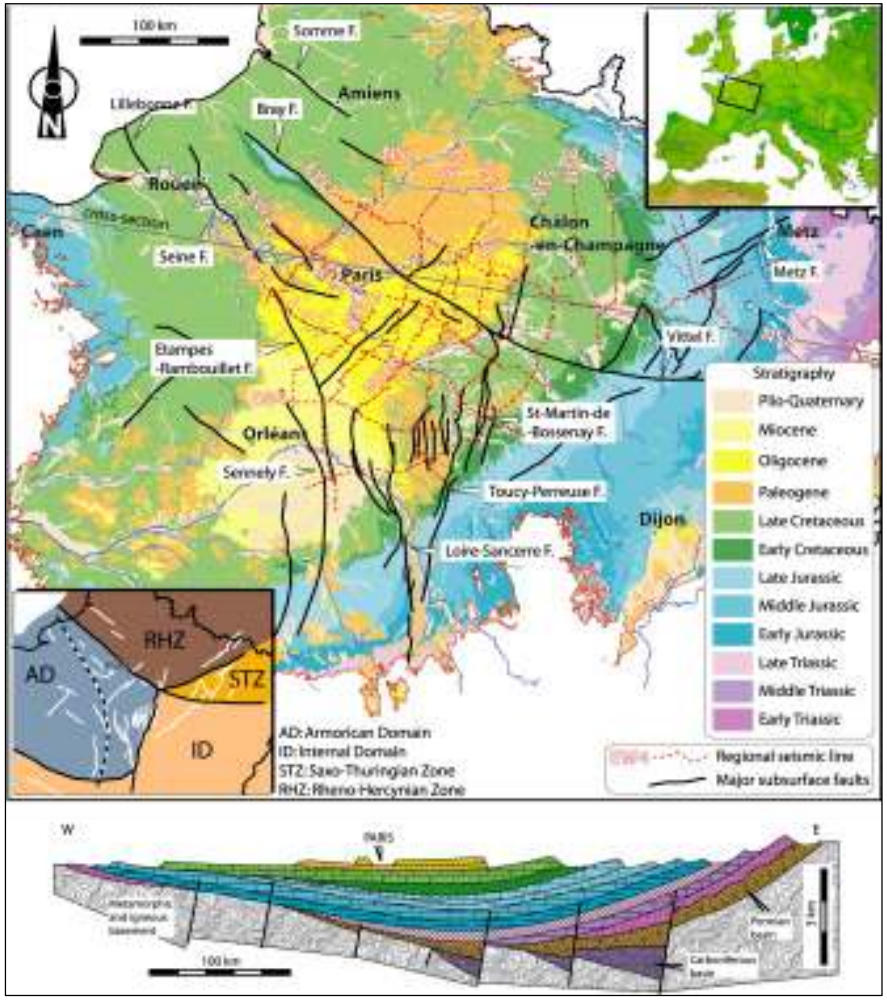



1:10,000,000
evaporites
carbonate sedimentary rocks
non-carbonate sediments
crystalline rocks
Example 1
Example 2
Example 3

Differentiation exposed / non-exposed carbonate rocks

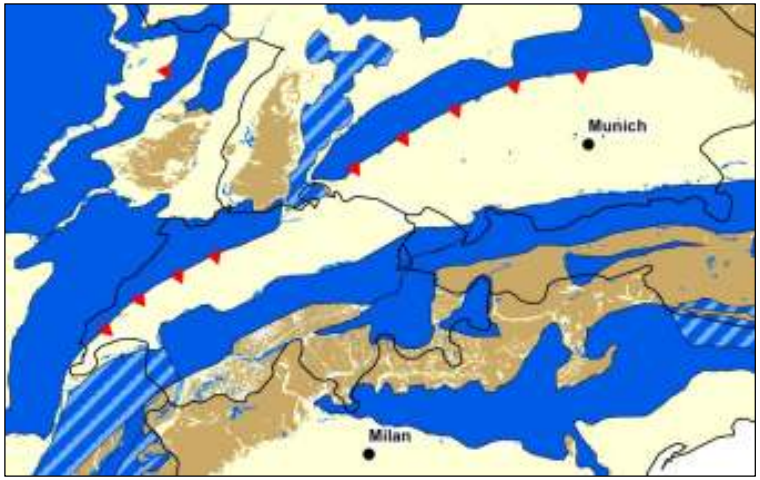
Example 1: Paris Basin





Differentiation exposed / non-exposed carbonate rocks

Example 2: Molasse Basin / Northern Alpine Foreland



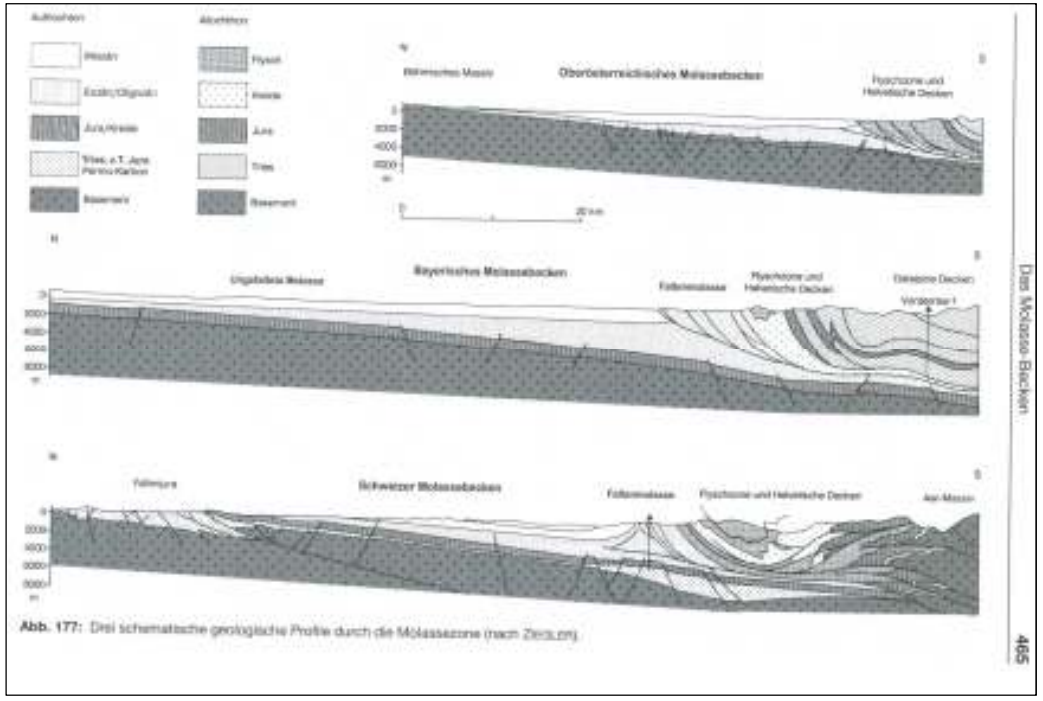
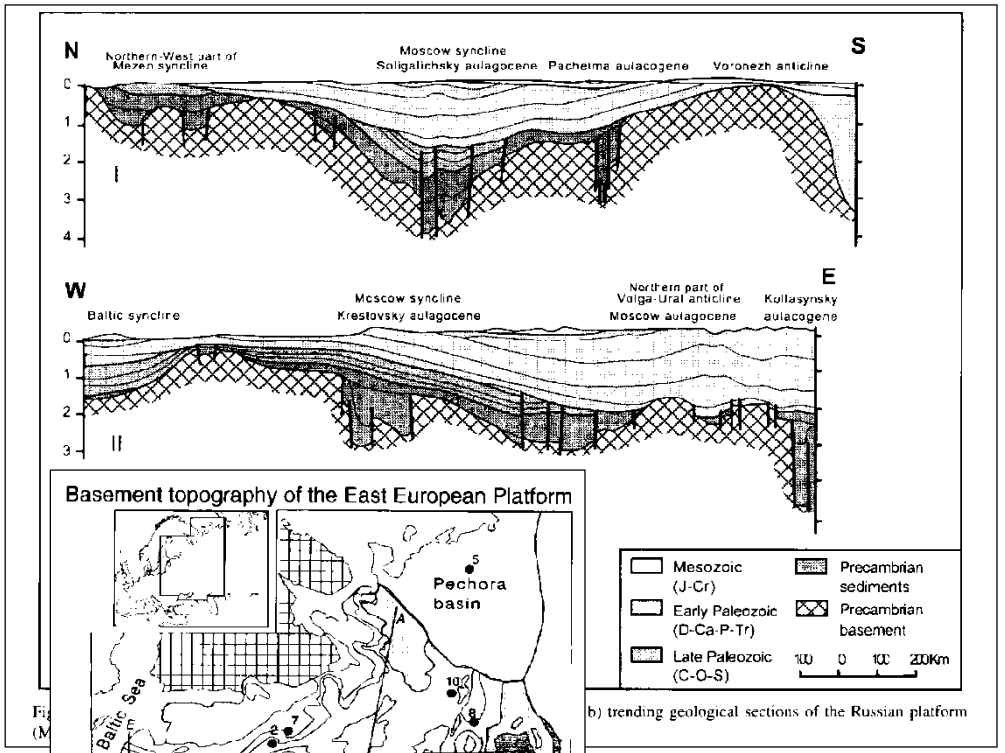
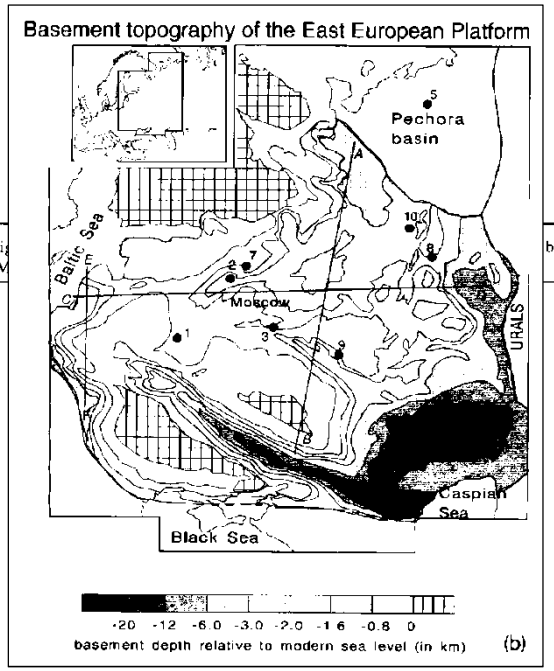


Abb. 177: Drei schematische geologische Profile durch die Molassezone (nach Ziegler)

Differentiation exposed / non-exposed carbonate rocks

Example 3: Eastern Europe





GLiM is invaluable, but there are problematic zones…

SAB member George Veni helps to fix problems on the draft karst map for North America (Karlsruhe 2014)

Springs, wells, caves, etc.

- Compilation of a karst spring database (many colleagues are involved).
- Main criterion: Discharge during low-flow conditions, because this is important for water supply (and available for most relevant springs).
- We will show “selected karst spring” with Q(low flow) > 2000 L/s and also selected smaller karst springs.
- We also collect data on karst water wells, etc.
- The map will show a small number of selected caves.

  … etc. …

➔ **Work in progress**: We need your contributions, organized and evaluated by the SAB members.


Acknowledgements: all members of the SAB…
… and all other collagues who contributed.