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A New Approach for Harmonized Maps

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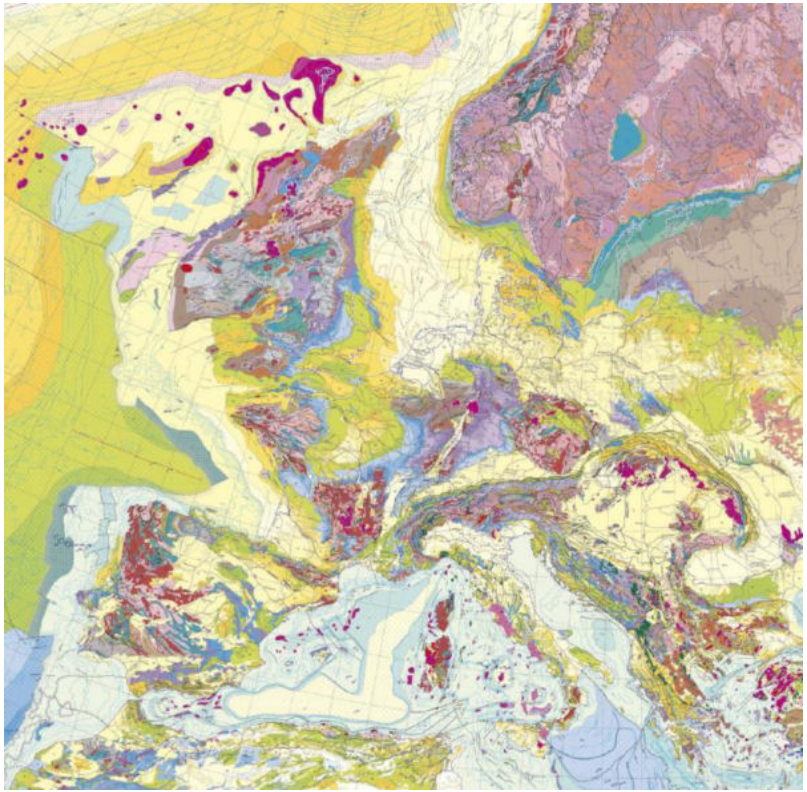
Challenge

Harmonizing geological maps from independent traditional heterogeneous sources



1. It is possible, of course!

2. The standard procedure typically comprises a joint working group, lots of discussions about matching the geological units, even more discussions about willingness for adaption, some GIS and so on - a time consuming work!

3. We are proud of the joint products (maps) achieved. But what about updating and improving them?

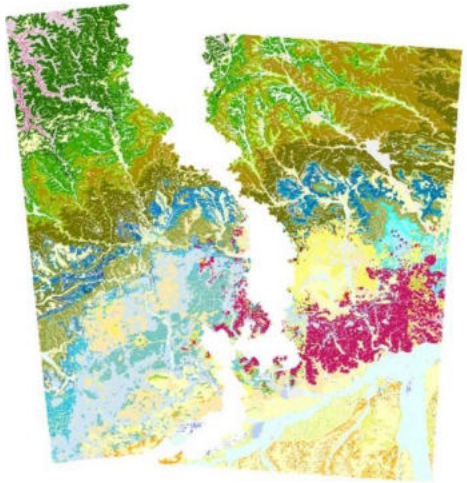
4. We face inside Germany a similar situation like in EGS – a bunch of independent players.

5. There is an urgent need for smarter solutions!

Kick off during a coffee break

The directors of BGR and the regional GSOs of BW and BY decided to step forward and start their joint ConSent (*Content Semantic*) project.

- **Starting point:** geological surveys follow integrated mapping concepts based on general legends of geological units.
- The maps series of the different surveys are **not compatible** with each other.
- **Main objective:** Provide interoperability of the integrated mapping concepts.



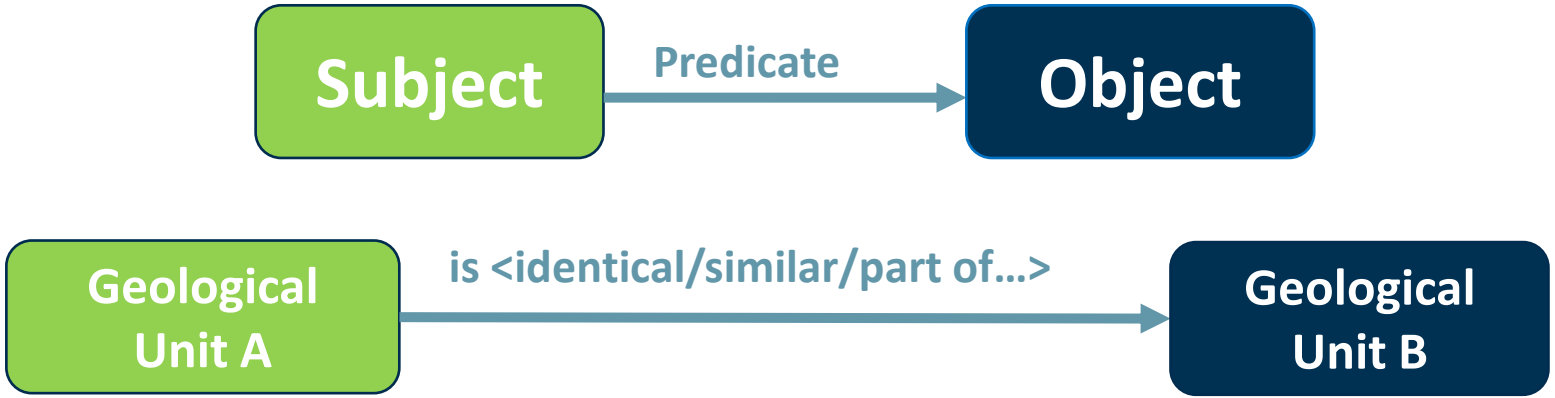
Goal: Linking of the geological general legends BW and BY by Semantic Web technology for the following applications:

- transborder **harmonisation of the large-scale geological maps** (scale 1:25,000) of the two regions
- **machinable downscaling** to maps 1:250,000, 1:500,000, 1:1,000,000 from large scale maps 1 : 25,000 of the regions
- Linking to further resources; here: LithoLex (**Litho**stratigraphic **Lex**icon Germany)

Linking of general legend units by SKOS

(Simple Knowledge Organization System)

- applying Web 3.0 concepts
- assignment of unique and persistent URIs (*Uniform Resource Identifier* in the internet) to general legend units
- relationships between units realised by a triple structure in RDF language (**R**esource **D**escription **F**ramework) respecting a stratigraphic hierarchy:



Workflow

Overarching hierarchical geological legend at different **downscaling** levels map scales 1:250,000 and smaller

Hierarchical relations

Overarching geological legend at formation level (hierarchical) map scale abt. 1:50,000 to 1:100,000

SKOS relations

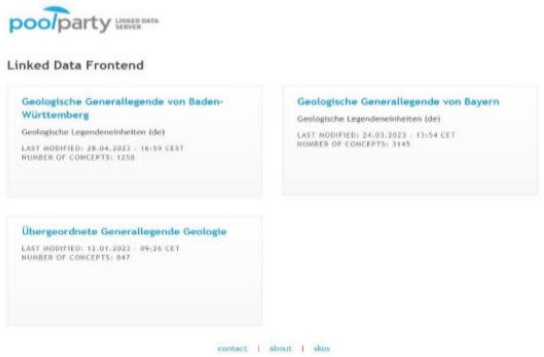
SKOS relations

Geological Legend of **BW** map scale 1:25,000

Geological Legend of **BY** Map scale 1:25,000

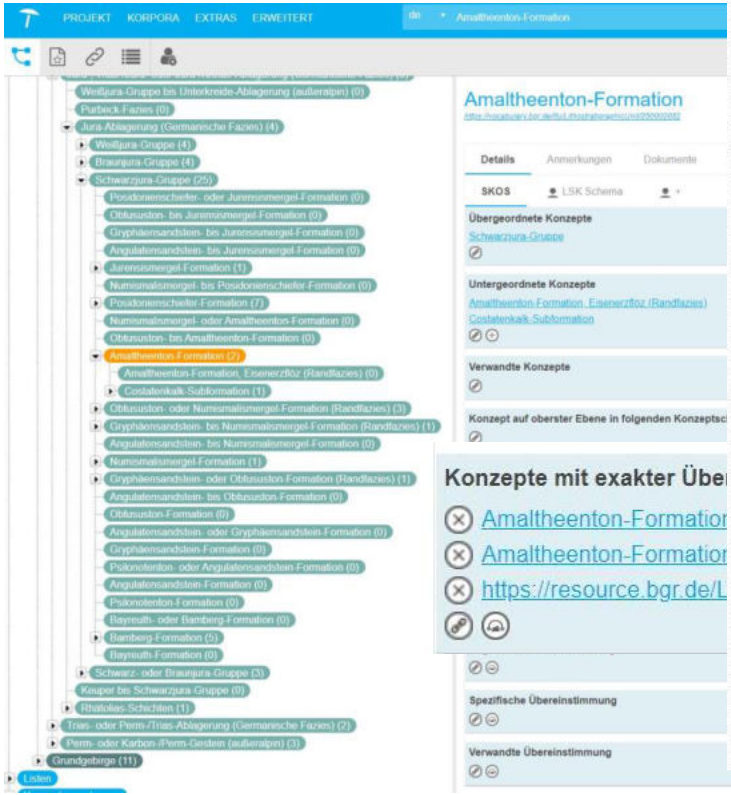
Implementation of geological legends in an editorial system (PoolParty)

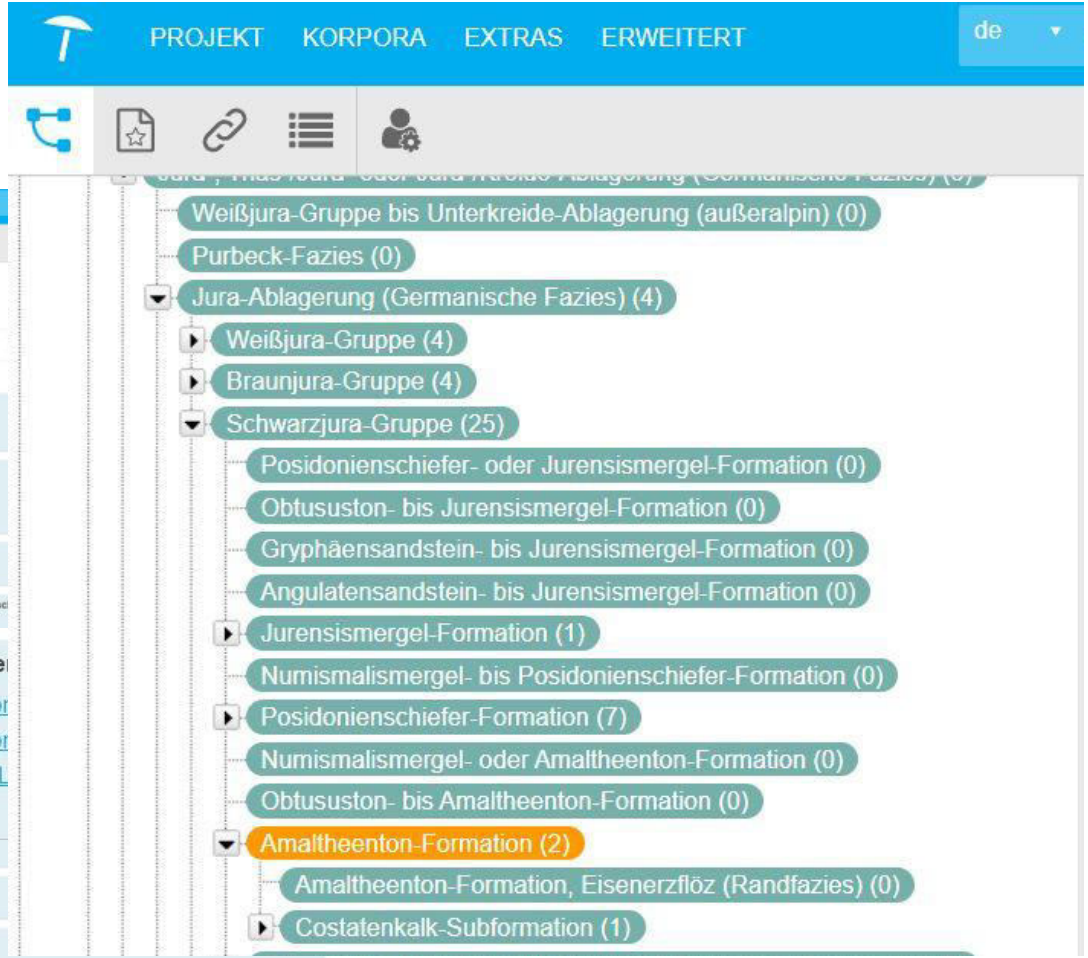
- internet-based thesauri
- URIs are assigned to units→ machine-readable
- relationships between the units are realised by the RDF language (triples)



Implementation in PoolParty

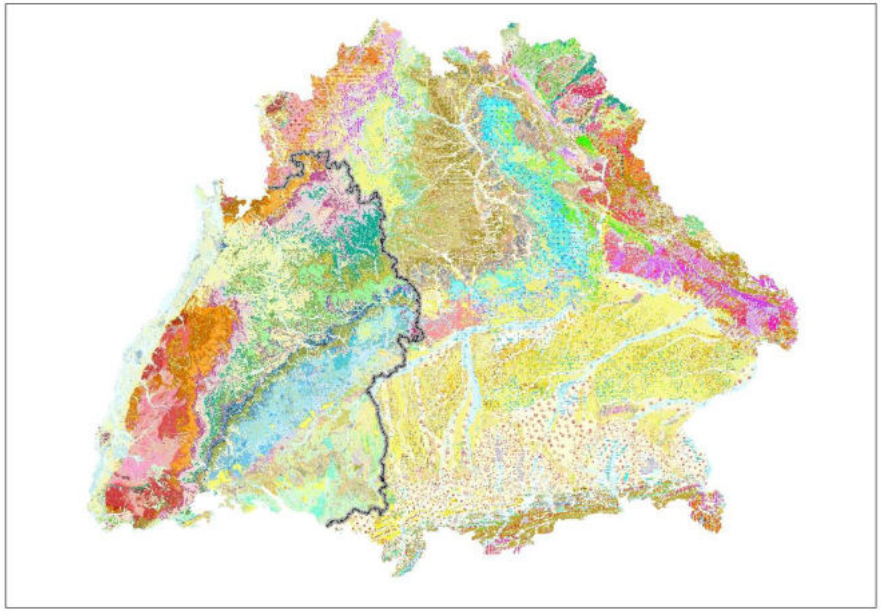
Example Amaltheenton-Formation (Jurassic)



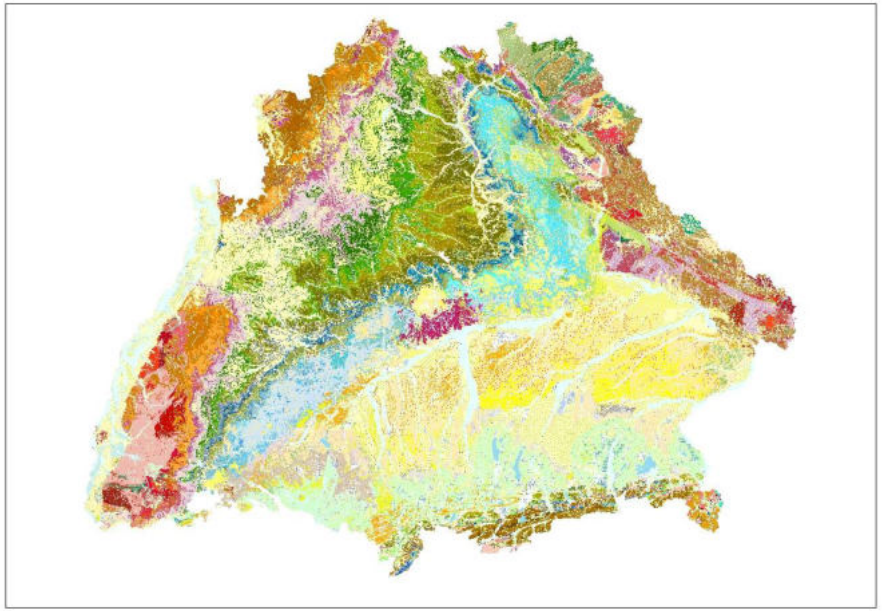


Visualization of geological maps 1:25,000

Original geological maps of BW and BY 1:25,000

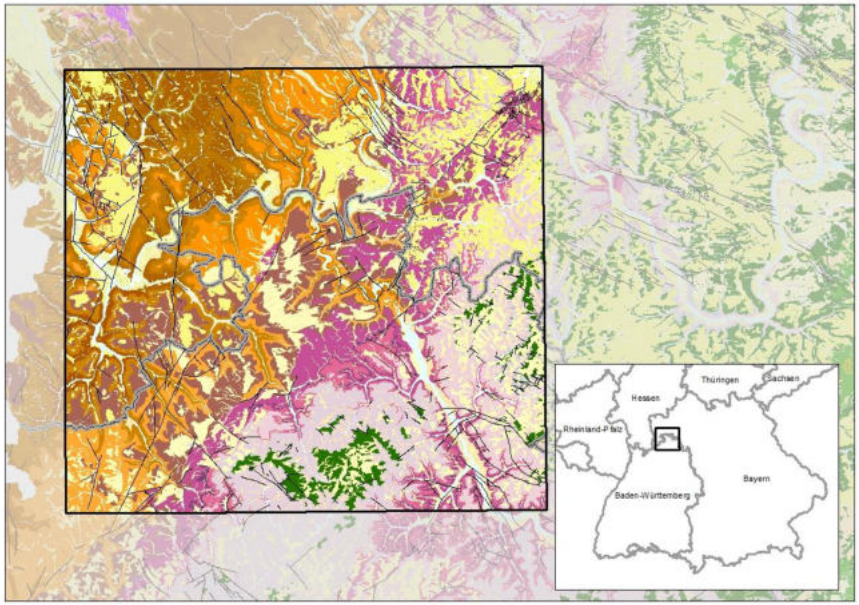


Harmonised map with the overarching geological legend

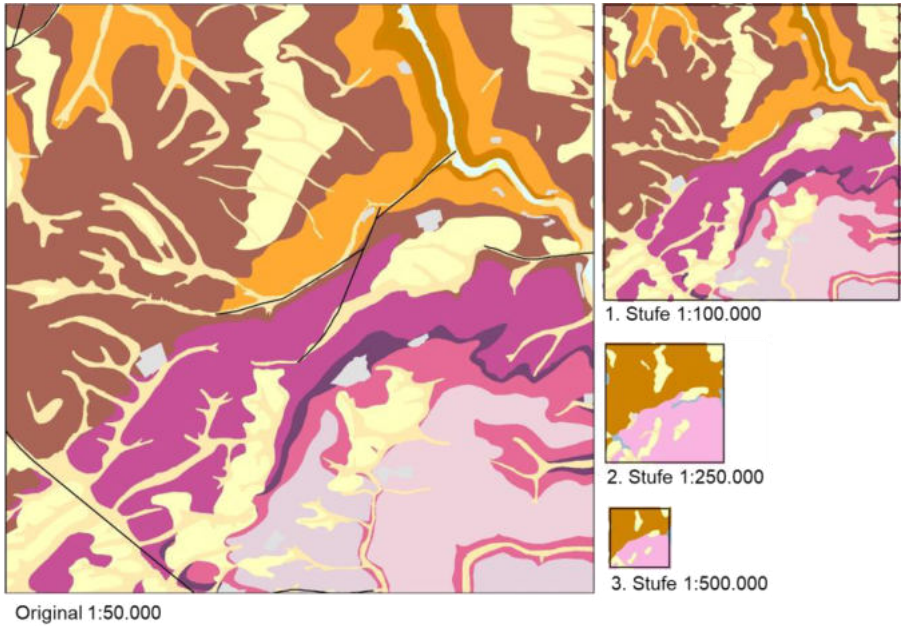


Next step: legend units of overarching geological units are connected to the German stratigraphic lithological lexicon (LithoLex).

Downscaling of maps using the *AutoGen* tool



Location of the pilot area



Machinable downscaling staring at 1:25,000

Conclusion

- Harmonisation of the geological map series could be achieved with little loss of detail using the overarching geological legend (OGL).
- Based on the OGL, a transnational harmonisation of further geological objects (boreholes, 3D models, thematic maps) will also be possible.
- Automated generalisation of geological maps with *AutoGen* shows promising results.
- The directors of all German GSOs decided to extend the ConSent project over entire Germany.

Thank you for your attention!

https://concent.bgr.de
https://www.bgr.bund.de/DE/Themen/Geodatenmanagement/Projekte/laufend/