Viewpoint geosites and their potential for geoeducation and geotourism

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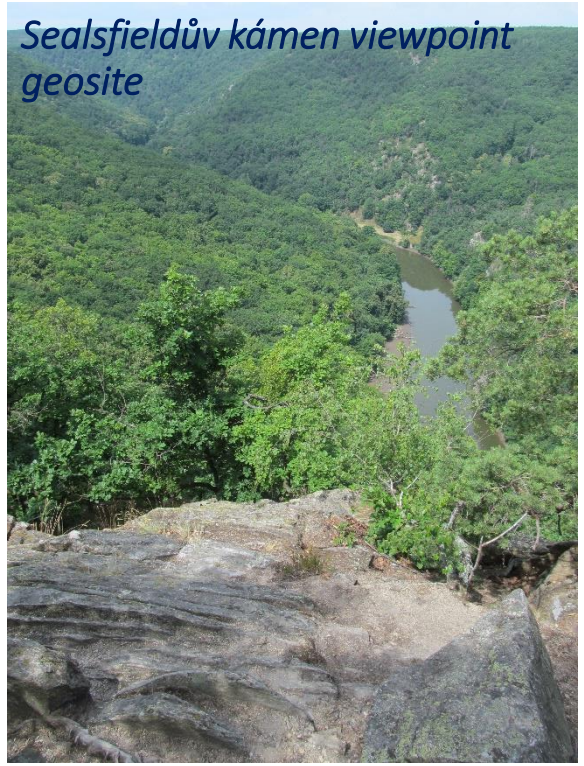
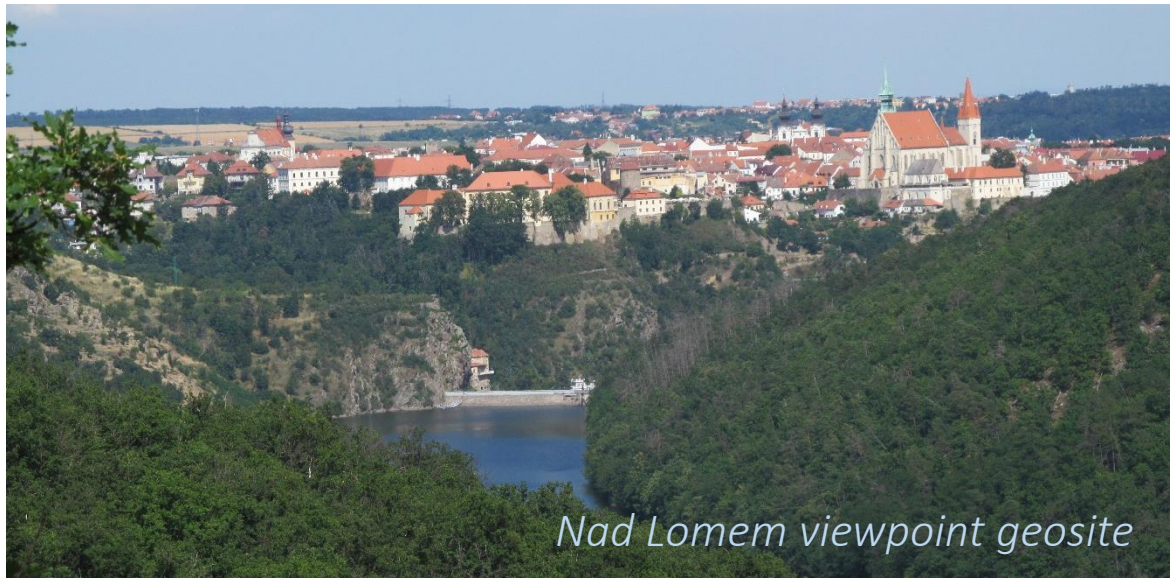
Geosites

- Defined as **portions of the geosphere that present a particular importance for the comprehension of Earth history**
- Geological objects or fragments of the geological environment exposed on the land surface that should be accessible for visits and studies
  - the importance of geosites not only for research, but also in the context of outreach activities – geotourism, environmental education
- Classification:
  - according to their **scientific interest**: structural, palaeontological, hydrogeological, geomorphological…
  - according to **spatial dimension**: point, line, large areas
    - → observable from **viewpoint geosites**


Hamerské vrásy geosite

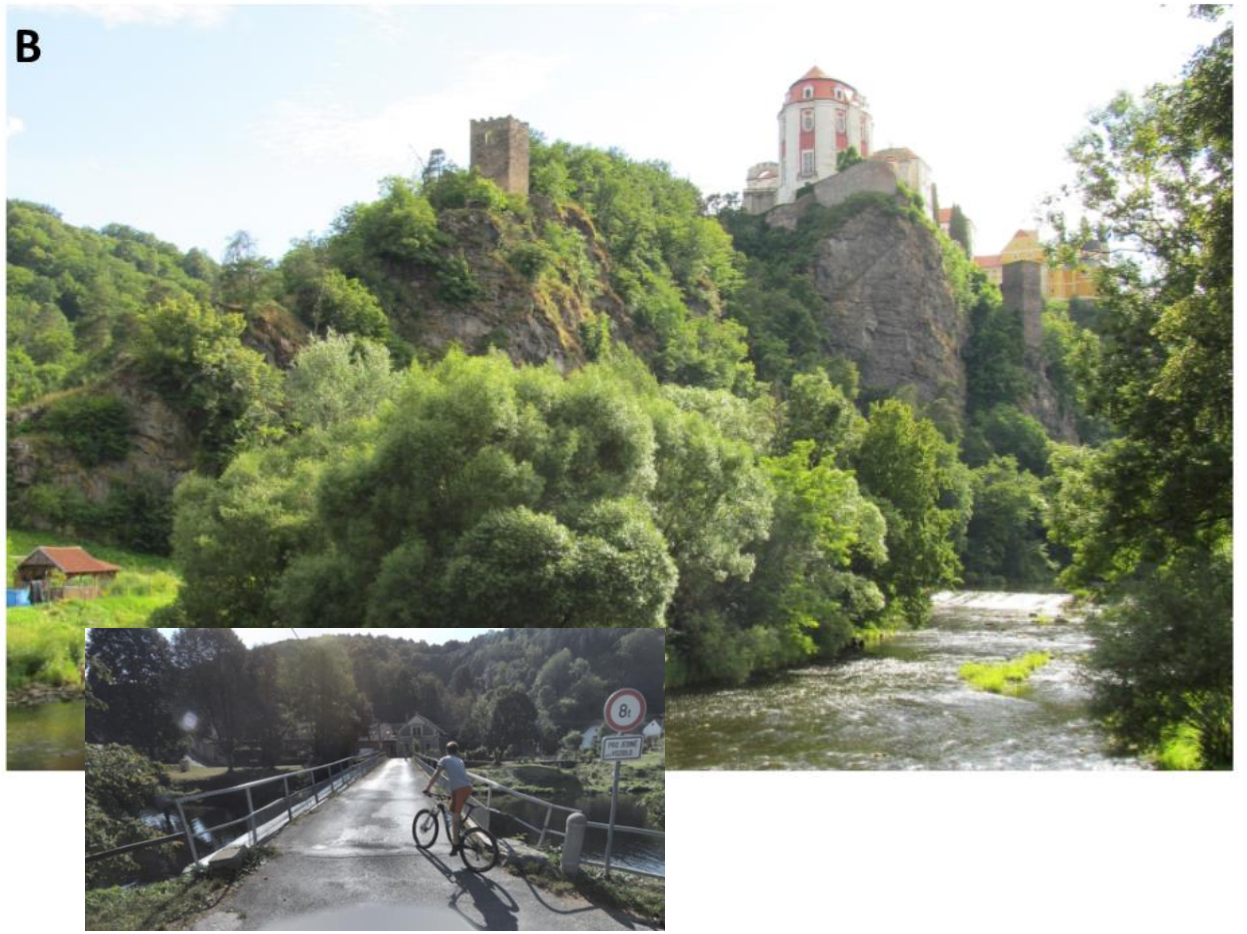

Sealsfieldův kámen viewpoint geosite


Nad Lomem viewpoint geosite

Viewpoint geosites

- Localities which offer a wider look at the surrounding landscape and hence, better understanding of its history, spatial relationships between rock types and landforms, and ongoing environmental change
- Classification:
  - **Sites with an intrinsic or scientific value:** usually natural viewpoints, attractive from Earth-science point of view, e.g. hill, rock outcrop, mountain, rim. They are often included in *geosite inventories* and assessed by methods used for classical geosites
  - **Sites without any intrinsic or scientific value (or a very low intrinsic value)**: sites where different geodiversity and landscape elements can be observed, but the sites themselves are not attractive from Earth-science point of view, e.g. bridge, the roof of a building or any other construction
- Within the geodiversity and geoheritage studies: less attention, but very important potential for geotourism and geoeducation
  - → **a need to recognize and assess their potential regarding geotourism development and geoeducation activities**

A – Viewpoint **geosite with high intrinsic value**: Králův stolec (a rocky outcrop above the Dyje River showing the specific forms of granite weathering); B – Bridge in Vranov as an example of **viewpoint geosite with no intrinsic value**, but offering a representative view on Bíteš ortogneiss promontory with visible plastic deformations (folds, faults etc.) and with important geo-cultural aspect (a suitable landform for building a fortress and castle)

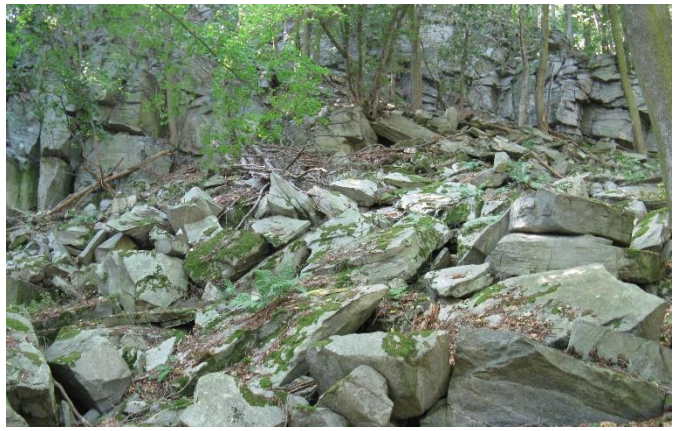


Methods

- Inventorying, mapping and describing the viewpoint geosites in a study area
- A method for assessing their potential that could reflect both viewpoint geosites with and without intrinsic value
  - Panoramic view (max. 4 points)
  - Diversity or number of Earth-science elements visible from viewpoint (max. 15 points)
  - Geo-cultural features: anthropogenic landforms incorporated in landscape, buildings from local material, small sacral objects (max. 3 points)
  - Overall landscape aesthetic (contrasts and structuration) (max. 5 points)
  - Disturbing elements (max. 4 points)
  - Tourist and educational characteristics (max. 10 points)
  - Current status (max. 5 points)
- Semi-quantitative approach applied in Podyjí National Park

Study area: Podyjí National Park

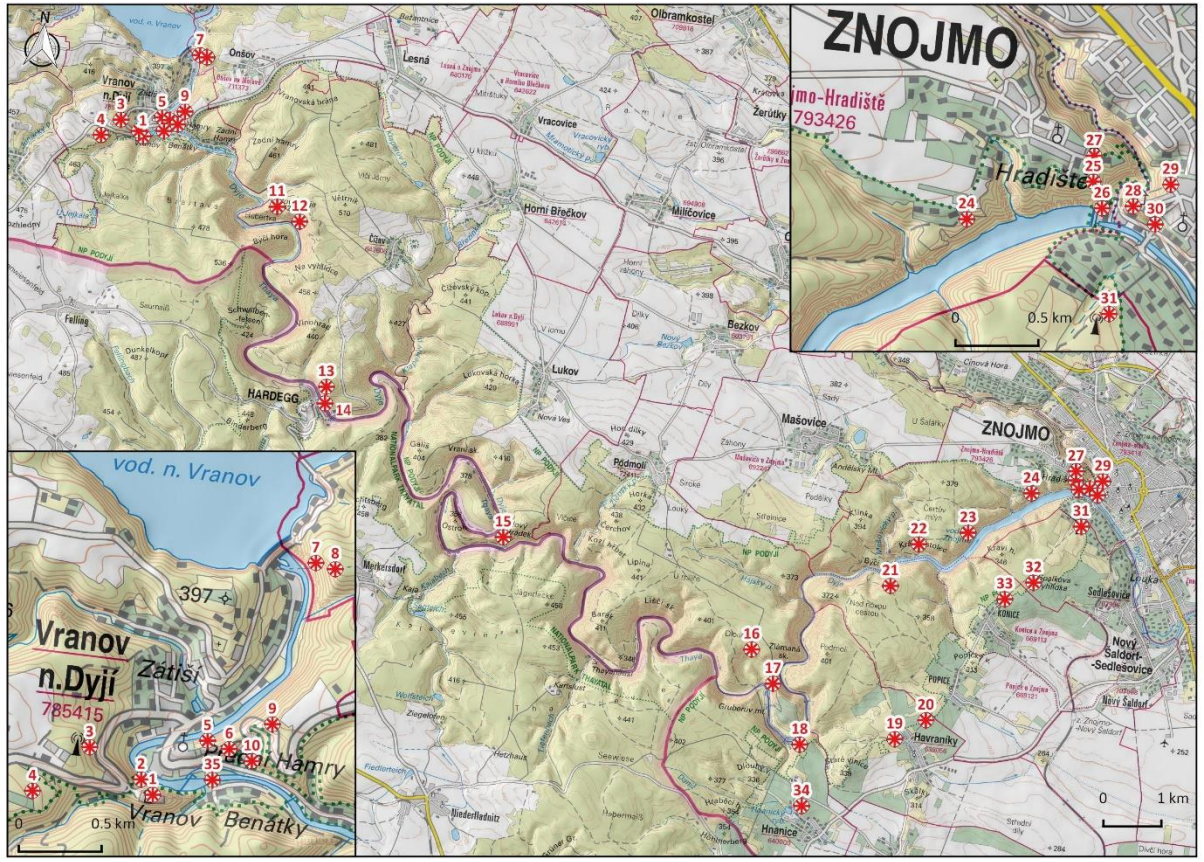
- Situated in the SW part of the South-Moravian Region in the Czech Republic
- The canyon-like valley of the Dyje River is deeply incised into the original peneplenized surface and forms the axis of the study area between the towns of Znojmo and Vranov nad Dyjí
- The area has been used by humans since Medieval times (border castles, forts, agriculture, wineyards, use of water resources)
- Due to Iron Curtain established after WWII, the economic activities in the area were limited, so the natural values were preserved, in 1991, National Park was declared
- Geology: Bíteš orthogneiss, two-mica schist of the Lukov unit and granite of the Dyje Massif
- Geomorphology: fluvial landforms (incised meanders, alluvial plains and terraces), cryogenic landforms (frost cliffs, blocky accumulations, debris flows, rock towers) and anthropogenic landforms (mill races, agricultural terraces, defensive military constructions or castle moats)



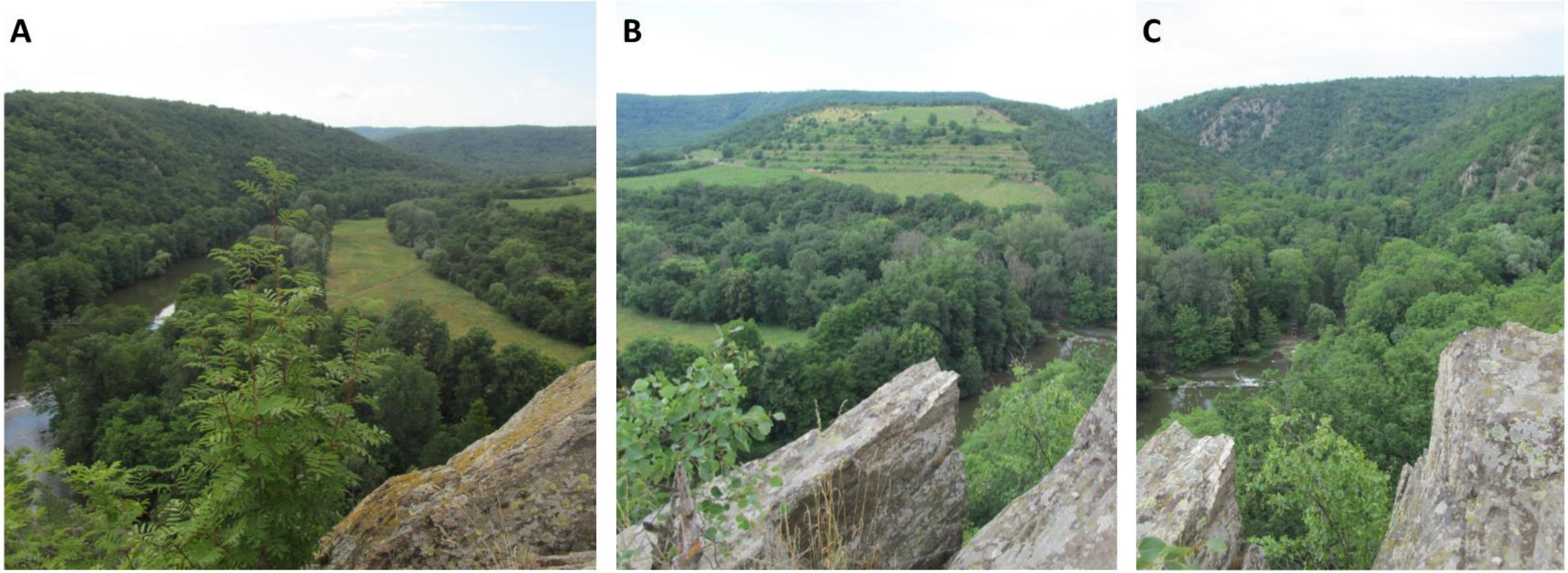
Figures: remains of Iron Curtain near Čížov; Bíteš gneiss - blocky accumulation below Braitava ridge; Dyje River near Vranov

Viewpoints in Podyjí NP

1 – Vranov zámek
2 – Halamasskova vyhlídka
3 – Tanečnice
4 – Nad Felicitinou studánkou
5 – Švédský příkop
6 – Mniszkův kříž
7 – Claryho kříž
8 – Claryho okruh
9 – Nejsvětější Trojice
10 – Vyhlídka zamilovaných
11 – Obelisk
12 – Pašerácká stezka
13 – Hardeggská vyhlídka
14 – Vyhlídka u splavu
15 – Nový Hrádek
16 – Železné schody
17 – Šobes
18 – Devět mlýnů
19 – Havraníky, Sv. Cyril a Metoděj
20 – Havraníky Nad kaplí
21 – Sealsfieldův kámen
22 – Králův stolec
23 – Dlouhá řeka
24 – Nad lomem
25 – Eliášova kaple
26 – Krammerova villa
27 – Sv. Antonín Paduánský
28 – Znojemský hrad
29 – Znojmo, museum
30 – Vyhlídka pod hradbami,
31 – Kraví hora
32 – Špalkova vyhlídka
33 – Konice, sever
34 – Hnanice, kaplička
35 – Bridge in Vranov
36 – Tower of St. Wenceslas Church



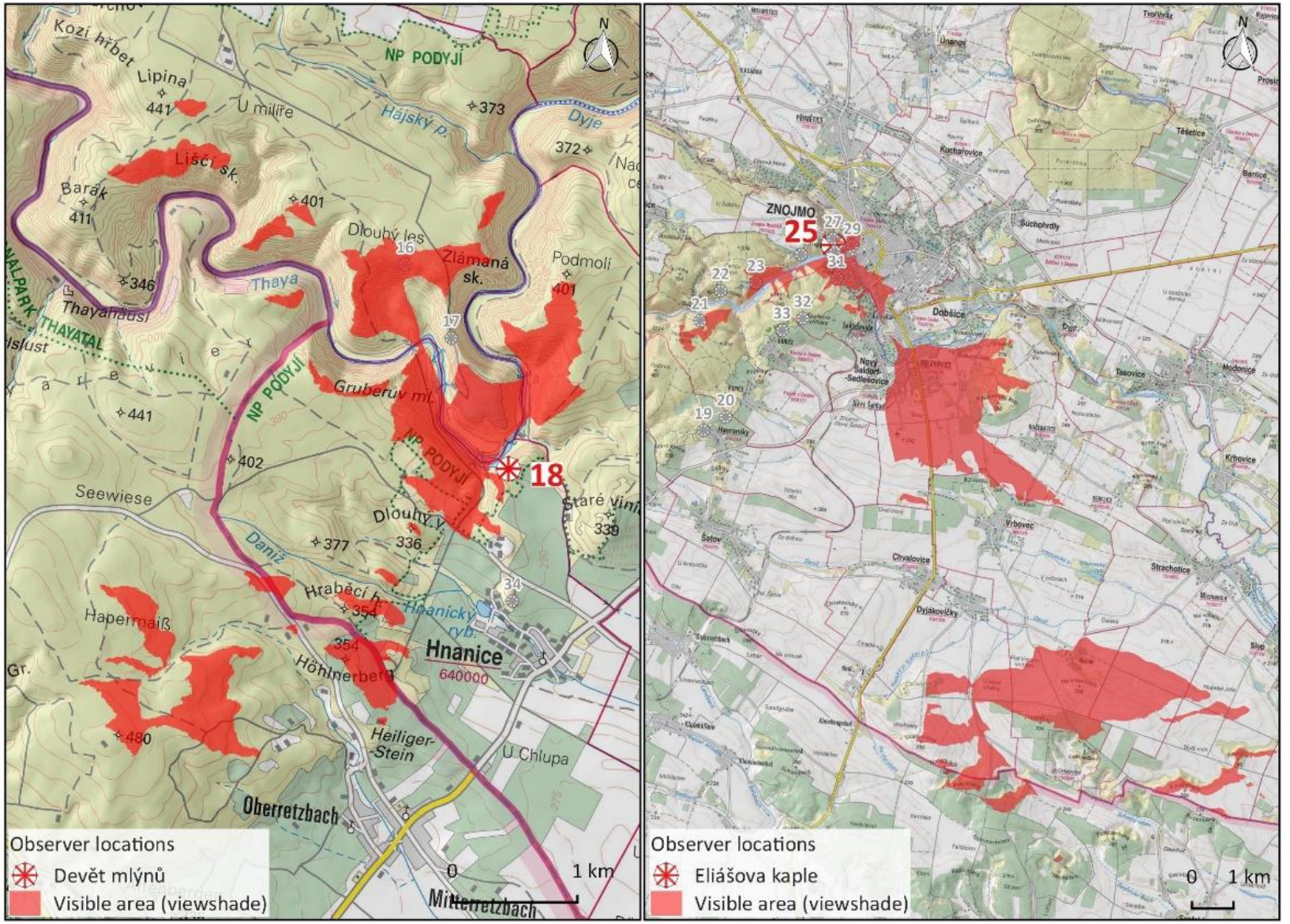
Devět mlýnů viewpoint geosite and geomorphological features that can be observed: A – deeply incised valley into the peneplenized surface, alluvial plains; B – anthropogenic terraces (Šobes wineyard); C – river bottom, frost cliffs, block fields, rocky outcrops.



Eliášova kaple (Elias‘ Chapel) viewpoint geosite
- observable Earth-science features: deeply incised valley, peneplenized surface, frost cliffs, meandering, gullies
- observable geo-cultural features: anthropogenic landforms, agrarian terraces, castle, church

Viewpoint:	Devět mlýnů	Elias' Chapel
Characteristics		
Coordinates	48.8107919N, 15.9812075E	48.8564908N, 16.0384539E
Characteristics of the site	rock outcrop on the right bank of the Dyje Valley, accessible via marked path	situated on the steep hill on the left bank above the Znojmo Reservoir
Criteria for assessment		
1. Panoramic view: up to 90° (1 point), 90-180° (2 points), 180-270° (3), 270-360° (4)	180-270° (3 points)	180-270° (3 points)
2. Diversity or number of Earth-science elements visible from viewpoint (1 point for each element, max. 5 for each subcriterion)		
2a. geology (lithology, tectonics, stratigraphy...)	lithology (granite) (1 point)	lithology (granite) (1 point)
2b. geomorphology (cryogenic landforms, glacial landforms, karst, fluvial landforms…)	deeply incised valley, peneplenized surface, meandering, frost cliffs, alluvial plain, block accumulations (5 points)	deeply incised valley, peneplenized surface, frost cliffs, meandering, gullies (5 points)
2c. hydrological components (water bodies, rivers…), soils	Dyje River (1 point)	Znojmo Reservoir (1 point)
3. Geo-cultural features: anthropogenic landforms incorporated in landscape, buildings from local material, small sacral objects (1 point for each feature, max. 3)	agrarian terraces (Šobes) (1 point)	agrarian terraces, castle, church, small chapels (3 points)
4. Overall landscape aesthetic (contrasts and structuration): 1 - low, 3 - average, 5 - high	high contrasts, varied landscape mosaic, deep valley (5 points)	high contrasts, varied landscape mosaic, harmonic environment (5 points)
5. Disturbing elements: 0 - elements affecting or obscuring the view (large constructions, industrial plants), 2 - several disturbing elements not obscuring the view, 4 - no disturbance	no disturbances (4 points)	the dam construction of Znojmo Reservoir, anthropogenic transformation of terrain and some buildings in the city of Znojmo (2 points)
6. Tourist and educational characteristics (use characteristics)		
6a. overall visibility: 1 - low (view obscured by trees or other elements), 2 - average (some obstacles), 3 - very good visibility)	several trees partly obscuring the view, but not very much (2 points)	no obstacles (3 points)
6b. readability of Earth-science elements: 1 - low (a need for explication or information provided on site), 2 - average (possible to read and recognize, usually with brief information), 3 - high (easy to read the features)	some geomorphological features need explanation or interpretation by a professional guide or information panel (2 points)	some geomorphological features need explanation or interpretation by a professional guide or information panel (2 points)
6c. safety: 1 - access at own risk, 2 - access with specific issues that may affect the safety (e.g. lack of the fences, poor paths), 3 - no safety issues	limited access for disabled persons, a visitor has to be careful when stepping at the terrace, not suitable for small children (2 points)	no safety issues (3 points)
6d. accessibility: 1 - accessible by walk, 2 - accessible by car (parking near the viewpoint), 3 - accessible by public transport	accessible on foot or bike, car can be parked approximately 1 km away (2 points)	accessible by car and public transport (parking in proximity, bus stop approximately 700 m far) (3 points)
6e. infrastructure: 1 - no infrastructure, only a path leading to the site, 2 - marked paths, information available e.g. on websites, 3 - well equipped site, tourist marked paths leading to it, information panels on-site	tourist marked path, the site is easy to find, information about the site available on internet or tourist maps, on site, there is no information about Earth-science elements (2 points)	tourist marked path, the site is easy to find, information about the site available on internet or tourist maps, on site, there is no information about Earth-science elements (2 points)
7. Current status: 1 - site not very attractive (damaged, overused), 3 - some disturbances (vandalism, destruction of tourist infrastructure), 5 - site managed well, even if visited frequently	site relatively well managed, but suffers from overcrowding during season (vandalism, littering) (5 points)	site managed well, not disturbed, not very frequently visited by tourists (5 points)
TOTAL SCORE	33	38

Analysis of visible area of the Devět mlýnů and Elias' Chapel viewpoint geosites (by using a viewshade method)



Conclusions

- Viewpoint geosites have an **important potential for geotourism and environmental education**
- This type of geosites is **rather omitted within geoheritage studies**
- **Assessing their potential** – a methodological proposal based on “view” criteria and other characteristics of the site (use characteristics and current status) regardless of the Earth-science value of the proper site.
  - Thus, it may be used **both for geosites with and without intrinsic values**.
- Of course, for a **complex estimation** of geotourist and geoeducational potential of a viewpoint geosite, an evaluation of intrinsic characteristics is suitable
- The results of the qualitative and quantitative assessment help to **identify and recognize geotourist and geoeducational potential** of these sites and may contribute to the more effective management and planning geotourist and geoeducational activities with regard to geoconservation

Thank you for your attention!

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