# Chapter 18
# Geomorphological Resources for Geoeducation and Geotourism


**Lucie Kubalíková, Karel Kirchner, and Aleš Bajer**

**Abstract** Geodiversity (geological, geomorphological, soil and hydrological features) are considered the main resource for geotourist and geoeducational activities which are (or should be) closely related and should support each other. Geoeducation can help to increase recognition of geodiversity and geoheritage at all the levels, can have a positive effect on the behaviour of visitors to geotouristic attractions, it can help maintain the geotourism activities in a rational scale and it helps to avoid the overexploitation of geoheritage for geotourism purposes. In opposite, sustainable geotourism development can make the geoeducational resources more accessible and available. A specific position within said resources is occupied by geomorphological features. While the geotourist and geoeducational importance of landforms is indisputable, especially thanks to their scientific, aesthetical or cultural values, the geomorphological processes are sometimes considered hazards and not resources for such activities. The example from Kokomeren valley in Kyrgyzstan shows that even an active process can serve geotourist and geoeducationl purposes. Another specific issue of geomorphological resources is represented by anthropogenic landforms: although their position within heritage concept is not clear, their potential for geotourist and geoeducational activities is undeniable which is supported by several examples from all over the world.

**Keywords** Geotourism · Geoeducation · Geomorphological processes · Anthropogenic landforms · Heritage concepts

L. Kubalíková (✉) · K. Kirchner
Department of Environmental Geography, Institute of Geonics of the Czech Academy of Sciences, Drobného 28, 602 00 Brno, Czech Republic
e-mail: Lucie.Kubalikova@ugn.cas.cz

A. Bajer
Department of Geology and Pedology, Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, 613 00 Brno, Czech Republic



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## 18.1 Introduction: Geotourism and Education

Abiotic nature (or geodiversity) is undoubtedly one of the most important resources for human society, it has numerous functions and offers various services and benefits (Gray 2013; Gordon and Barron 2012). Today, the importance of geodiversity is already accepted (Gray 2018; Brilha et al. 2018) and abiotic ecosystem services are included in the classification of ecosystem services (European Environment Agency 2018). Besides the provisioning, supporting and regulating services, cultural and so-called knowledge services of geodiversity are also recognized. The last two include geoeducational and geotourist use of geodiversity (Gray 2013, 2018; Gordon 2018).

Geotourism and education have been always closely related. Environmental education is one of the pillars of the geotourism and it also plays an important role within geoconservation. Since the early 1990s when the concept of geotourism originated, the education and interpretation were emphasized and accepted as an important tool that can raise the awareness of the geodiversity and geoheritage conservation and contribute to the sustainable development of geotourism.

The educational aspect is integrated or reflected in numerous definitions and approaches to geotourism, beginning from the early ones (which define geotourism as niche tourism within ecotourism) up to the present holistic approaches. Hose (1995) says that geotourism means "the provision of interpretive and service facilities to enable tourists to acquire knowledge and understanding of the geology and geomorphology of a site (including its contribution to the development of the Earth sciences) beyond the level of mere aesthetic appreciation". Slomka and Kicinska-Swiderska (2004) offer another definition with emphasis on the educational aspect: geotourism as "an offshoot of cognitive tourism and/or adventure tourism based upon visits to geological objects (geosites) and recognition of geological processes integrated with aesthetic experiences gained by the contact with a geosite". Joyce (2006) also includes education and learning into his brief definition: "People going to a place to look at and learn about one or more aspects of geology and geomorphology".

Likewise, an approach to geotourism as a geographical tourism introduced by National Geographic Society (2005) include the educational (or interpretation) aspect: the key features of geotourism are represented by integrity of place, international codes, market selectivity and diversity, tourist satisfaction, community involvement and benefit, protection and enhancement of destination appeal, land use and planning, conservation of resources, interactive interpretation and evaluation. In addition, National Geographic has adopted the term geoeducation to describe education about our world; a well-rounded geoeducation provides young people with a fundamental understanding of how the human and natural worlds work at local, regional and global scales (National Geographic Society 2018). This approach is wide and it includes both natural features and anthropogenic impact on them (and vice versa).

Dowling and Newsome (2010) state that "geotourism is a form of natural area tourism that specifically focuses on geology and landscape. It promotes tourism to geosites and the conservation of geodiversity and an understanding of Earth sciences through appreciation and learning". According to the authors, geotourism should

be geologically based, environmentally educative, generating tourist satisfaction, sustainable and being locally beneficial. Here, geoeducation can be considered a part of the environmental education which is focused especially on Earth sciences and which seeks to create interlinks among geology, pedology and geomorphology within the landscape. The importance of geoeducation and interpretation is also emphasized by Hose (2012) who presents three key interrelated aspects of modern geotourism: geoconservation, geohistory and geo-interpretation.

Later, Dowling and Newsome (2018) say that geotourism promotes geoconservation and foster geoeducation through geo-interpretation among others. The promotion and communication of knowledge about geology and geomorphology (education and interpretation) is vital for the protection of geoheritage and geotourism development.

Farsani et al. (2018) consider the geotourism a form of educational tourism and state that one of the main tasks of geotourism is the transfer and communication of geoscientific knowledge and ideas. The geoeducation is, of course, an important tool for increasing public geoliteracy (Clary 2018). The importance of education and interpretation is also emphasized in Arouca Declaration (2011).

Numerous geoconservation approaches and projects also count on education. For example, Digne Declaration (1991) mentions the importance of education and learning within geoconservation in the article 7: "We have always been aware of the need to preserve our memories—our cultural heritage. Now the time has come to protect our natural heritage. The past of the Earth is no less important than that of Man. It is time for us to learn to protect this Earth heritage, and by doing so learn about the past of the Earth, to learn to read this 'book', the record in the rocks and the landscape, which was mostly written before our advent". Andersen et al. (1990) emphasize the relationships between education and Earth science conservation and state that if Earth-science sites are conserved, they can be used for teaching or research. This form of general education is vital if geological conservation is to become better understood and more widely supported. The authors also stress the importance of links between education and management.

The UNESCO Framework for geological conservation also mentions the vital importance of education and defines the principles of geoparks and heritage sites (Dingwall 2005). Prosser et al. (2013) and Prosser (2019) mention close relationships between geoconservation, appropriate management of geological, geomorphological and soil features and processes and education or research.

The education relevance was emphasized within the Geosite project (IUGS): one of the objectives was to provide a factual basis to support national and international initiatives to protect geological resources for research and education. Likewise, the national projects of inventorying geosites include sites that are primarily used for education (e.g. Czech Geological Survey 2018; MNHN 2018).

This brief overview of selected approaches, definitions and project brings evidence that geoeducation, geotourism and geoconservation are really closely linked and that geoeducation has numerous functions, for example, (1) it helps to increase recognition of geodiversity and geoheritage in international, national, regional and local levels which contribute to the geoconservation activities (inventorying, assessing), (2) it makes geodiversity relevant to where the people live and the places they visit,

(3) it helps to interpret, utilize and widen understanding of geodiversity and geoheritage for numerous purposes (including geoconservation, geotourism and other forms of sustainable tourism), (4) it helps to create and foster the sense of place and regional identity, (5) it contributes to discover the links between abiotic, biotic and cultural components of the landscape by public. These selected aspects make the geoeducation really fundamental for geoconservation and geotourism purposes.

## 18.2 Geomorphological Resources for Geotourism and Geoeducation

Geodiversity (according to definitions presented by Dixon 1996; Australian Heritage Commission 2002; Gray 2004, 2013 or Brocx and Semeniuk 2007) includes geological, geomorphological, hydrological and soil features, their systems, assemblages and contribution to the landscapes.

In this section, emphasis is given on the geomorphological resources for geotourism and geoeducation. While the geotourist and geoeducational importance of natural landforms is indisputable, especially thanks to their scientific, aesthetical or cultural values (Pralong 2005; Panizza and Piacente 2005; Gordon 2012, 2018), the geomorphological processes are sometimes considered hazards and not resources for such activities. In some cases, ongoing geomorphological processes stand against the geotourism development or they represent a threat to the geoheritage (Smith 2005; Alcántara-Ayala 2017; Cesaro et al. 2017). However, rational geotourist and geoeducational use of these processes can help better explanation of the origin and evolution of the landforms and the correct interpretation can help to know the complex relationships between process and resulting landform. The knowledge and explication of the processes can help the understanding of possible geohazards (e.g. rock fall, landslides) and thus make the planning of geoeducational, geotourist and other locally beneficial activities more effective. It is therefore obvious that geomorphological processes (including the dangerous ones) should be also considered important resources for geotourism and should be also taken into account when planning and managing geotourist and geoeducational activities which are (or should be) closely linked.

Another aim of this chapter is to present the geoeducational and geotourist potential of anthropogenic processes and consequent anthropogenic landforms because they can be also viewed as an important resource for the abovementioned activities. The position of the anthropogenic landforms within natural and cultural heritage is discussed, some specifics of anthropogenic geomorphological heritage are outlined and particular examples of geotourist and geoeducational use of anthropogenic landforms from all around the world are presented.

## *18.2.1 Active Geomorphological Processes as a Resource for Geotourist and Geoeducational Activities: A Case Study from Kyrgystan (The Ak-Kiol Rockslide Dam)*

### 18.2.1.1 The Geological and Geomorphological Settings of the Study Area

The Ak-Kiol Lake (rockslide dam) is located on the Unkursay river which is the local name of left-hand inflow of the Kokomeren river (Fig. 18.1a) belonging to the Tien Shan Basin. It is a typical basin and mountain range system that has been formed mainly in Neogene and Quarternary (orogenesis has been still running) most likely due to north–south compression. This neotectonic deformation started after a long period of planation which took place during the Mesozoic era. Older intensive tectonic deformations come from Caledonian and Variscan orogenic stages that formed the complex structure of the basement. The basement rocks are formed mainly from Paleozoic granites and Late Precambrian metasediments and granites. The north-east part of the study area is formed by Devonian sandstone and Ordovician, Devonian and Carboniferous sediments. In depressions and valleys, the Neogene deposits represented by red beds (layers of conglomerate, sandstone, siltstone and mudstone) are situated. The Pliocene and Pleistocene sedimentary deposits which show intensive neotectonic orogenesis are also present here. In higher altitudes,

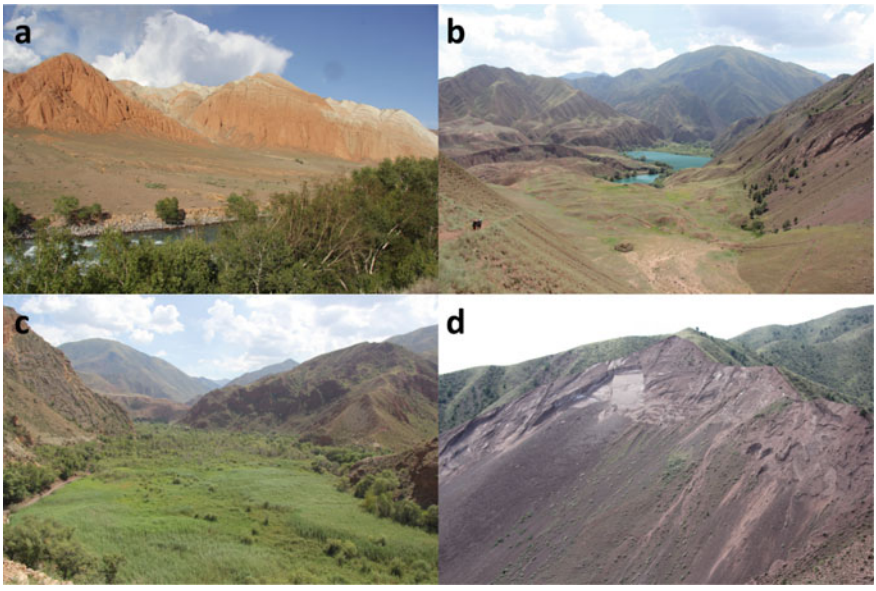


**Fig. 18.1** Rockslide dam in Kokomeren valley: **a**, **b** overall views, **c** former lake covered with vegetation, **d** detail of the rockslide with head scarp. Photos: Aleš Bajer

Quaternary deposits represented by glacial moraine and alluvial and fluvial-deluvial deposits are situated (Chedia 1986; Sadybakasov 1972). The extreme neotectonic features occur together with rockslides, rock avalanches and rockfalls which resulted in dammed lakes. Some lakes have persisted to this day, some of them are present only in the form of lacustrine sediments. The most evident tectonic activities are associated with neotectonic faults along which uplifts and depressions of rupturing surface occur (Sadybakasov 1972; Strom and Korp 2006; Evans et al. 2006).

#### 18.2.1.2 The Ak-Kiol Rockslide Dam

The upper rockslide forms a dam with a beautiful lake behind (Fig. 18.1b). Another large rockslide dammed the same valley 2.5 km downstream, but this dam has breached and today, there is a plain covered by vegetation (Fig. 18.1c) with several meters of lake deposits. On the side slopes, the former coastline can be observed. The rockslide originated in Paleozoic brown-red conglomerate and sandstone with thin gypsum interbeds. Figure 18.1d illustrates the rockslide with a head scarp. The thickness of the debris flow is up to 200 m which is evident from 150 m deep gullies below the dam. The rockslide is of Holocene period but the exact age is not known (Strom 2010, 2013, 2014; Evans et al. 2006).

Local people recognize these processes and consider them a geohazard; no buildings are constructed under the rocks and inside the valley, asphalt roads are neither constructed because of the moving terrain. However, locals are able to use these processes and consequent landforms (small depressions filled with water—ponds or swamps) for pasture and agriculture. In nearby Suusamyr, there is a little tourist agency offering horse tours. Local people offer guiding services and their own horses and mules for transporting tourists and their baggage. Accommodation is possible within family houses or it is allowed to camp on the private lands for a fee.

This area serves as an open-air laboratory for studying landslides and rockslides, the annual International Summer School on Rockslides and Related Phenomena has been organized here since 2006 (Strom and Abdrakhmatov 2009; Strom 2014; The International Programme on Landslides 2018).

The whole area is aesthetically attractive which can be considered one of the most important prerequisites for geotourist development. Thanks to its scientific importance and representativeness the area has a high potential for research activities (which are already taking place here) with outreach to public environmental education. The basic tourist infrastructure is also present and it depends mainly on the local people whether they want to continue in developing sustainable geotourist and geoeducational activities.

## *18.2.2 Anthropogenic Landforms: A Bridge Between Geoheritage and Cultural Heritage*

### 18.2.2.1 Importance of the Anthropogenic Landforms

Already in prehistoric time, people used the geodiversity in different ways: they exploited mineral resources (stone, gems, metals), various landforms served as shelters, communication paths or suitable places for the construction of important buildings, e.g. castles, forts or sacral objects (Fig. 18.2). All these activities have been accompanied by modifications of landscape and terrain and nowadays, the human agent is equal to natural factors in the shaping of landforms (Szabó 2010). New landforms are created and new processes even surpass the effectiveness of natural exogenic processes (Szabó et al. 2010; Goudie 2006a, b). The impact of these activities (respectively, anthropogenic processes) is often very destructive and in some cases, "humans are often victims of an environment created or modified by themselves" (Szabó 2010).

The anthropogenic processes result in anthropogenic landforms. An anthropogenic landform is created by human activity, especially by construction, excavation, hydrological interference and farming (Goudie 2006a, b). Anthropogenic landforms can be sorted by the character of the impact: direct or indirect, respectively, intentional or unintentional (or according to Szabó et al. (2010): primary anthropogenic landforms and secondary anthropogenic landforms), but for the purposes of geotourism and geoconservation, the genetic classification of the landforms is probably the most suitable.

According to the processes which formed the landform, several groups of landforms can be defined: mining, industrial, agricultural, urban/residential, communication/traffic, water management, military, funeral and others (Szabó et al. 2010; Kirchner and Smolová 2010). These landforms often change the original appearance of the landscape, create new dominants or influence the original natural environment and conditions. The creation of such landforms is accompanied by processes which would not normally exist at a place (e.g. superficial subsidence depressions in the


**Fig. 18.2** Geomorphological conditions of an area have always influenced the situation of important buildings, e.g. significant elevations have been always suitable for castles, forts or monasteries: **a** Mehrangarh Fort in Jodhpur in Rajasthan, India, **b** Trosky castle ruins in the Czech Republic, **c** Aït Benhaddou—fortified village (ksar) in Morocco. Photos: Lucie Kubalíková

areas of underground mining, landslides and other slope movements on the artificial slopes or abrasion on the shores of artificial lakes and dams).

On the other hand, some anthropogenic landforms (e.g. quarries, pits, communication cuttings or underground landforms) can be considered important from the from scientific, educational, cultural, historical, environmental and tourist point of view (Prosser 1992, 2019; Dávid 2008; Parkes and Gatley 2018): (1) they can be seen as elements that increase the overall landscape diversity and influence the biodiversity (e.g. old quarries, flooded pits), (2) they provide information about the landscape changes or modification in the past which can be an important resource for understanding the cultural and technical level of the society, (3) they allow to trace the use of geodiversity in the past and interpret cultural heritage in relation to abiotic nature, (4) some specific anthropogenic landforms form an inseparable part of cultural heritage objects, e.g. fortification earthen ramparts or irrigation channels, (5) they can serve as an important resource for geotourist activities as some of the landforms are visually attractive or allow to interpret the technical aspects of using the geodiversity resources (e.g. mining tourism), (6) they allow observing stratigraphical, tectonic, palaeopedological and other Earth-science features that would normally remain hidden and unrecorded in the literature or on geological maps (Osborne 2000; Petersen 2002) which can be used in both formal and informal geoeducation.

#### 18.2.2.2 Position of Anthropogenic Landforms: Which Heritage?

The importance of anthropogenic landforms is indisputable, however, their position within the geoheritage/natural heritage/cultural heritage concepts still remains a subject of discussion.

The concept of geoheritage is based on the definition of natural heritage, which was presented in 1972 (UNESCO 1972). The term geoheritage was defined as those components of natural geodiversity of significant value to humans, including scientific research, education, aesthetics and inspiration, cultural development, and a sense of place experienced by communities (Dixon 1996; Dingwall 2005). Sharples (1995) says that "geoheritage comprises those aspects of natural geodiversity which are of significant value to humans for purposes which do not decrease their intrinsic or ecological values; such purposes may include scientific research, education, aesthetics and inspiration, recreation, cultural development and contribution to the 'sense of place' experienced by human communities". ProGEO (2011) states that geoheritage is "part of the natural heritage of a certain area constituted by geodiversity elements with particular geological value and hence worthy of safeguard for the benefit of present and future generations".

In the abovementioned definitions, there appears the word "natural" (natural geodiversity or primary geodiversity that means the features formed without the human impact or activity), so in theory, the anthropogenic landforms should not be included into geoheritage in general.

Some authors (e.g. Coratza and Hobléa 2018) include anthropogenic landforms into the concept of "geomorphological heritage". The special situation can be found in

urbanized areas that are usually heavily affected by anthropogenic transformations of relief and thus the abundance of anthropogenic landforms is high there: in these cases, the anthropogenic landforms are also respected as a component of geomorphological heritage (Reynard et al. 2017; Kubalíková et al. 2017, 2019, 2020) or "complex urban geoheritage" (Habibi et al. 2018).

While the position of anthropogenic landforms within geoheritage is still not clear, it is obvious that specific anthropogenic landforms can be respected as a full-value part of mining heritage (Ahmad and Jones 2013; Conlin and Jolliffe 2014; Pearson and McGowan 2000). This type of heritage is considered a subset of cultural heritage, however, the natural aspects of mining are also included (geological settings, type of material extracted) and anthropogenic modifications, landforms and processes are reflected as well. These include mine working and operational areas (open cuts, pits, shafts, adits), infrastructure to support the mine, such as water supply (dams, races, pipelines) and landscape modification due to mining such as deforestation, pollution-induced barren areas, silted dams, open cuts, embankments and mounds, tailings dumps, dredged streams or modified vegetation (Pearson and McGowan 2000).

Other approaches consider some specific examples of anthropogenic landforms as a part of cultural heritage: the following section will present some examples. The convention concerning the protection of the world cultural and natural heritage (UNESCO 1972) defines the term "sites" within the cultural heritage: "works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view". Guidelines on the inscription of specific types of properties on the World Heritage List (UNESCO 2008) specifies also Cultural landscapes and Heritage canals.

Cultural landscapes represent the "combined works of nature and of man" and embrace a diversity of manifestations of the interaction between humankind and its natural environment. Cultural landscapes often reflect specific techniques of sustainable land use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relationship to nature. The same document presents the concept of Heritage canals: "A canal is a human-engineered waterway. It may be of outstanding universal value from the point of view of history or technology, either intrinsically or as an exceptional example representative of this category of cultural property. The canal may be a monumental work, the defining feature of a linear cultural landscape, or an integral component of a complex cultural landscape" (UNESCO 2008). These subtypes of cultural heritage were recognized and established in the early 1990s.

Anthropogenic modifications of relief and resulting landforms are an inseparable part of the landscape in general (Szabó et al. 2010; Goudie 2006a, b). European Landscape Convention (Council of Europe 2000) describes the landscape as an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors: although it is not mentioned to the letter, it can be assumed that anthropogenic landforms are also a part of the landscape that should be protected.

Specific anthropogenic landforms are included in the archaeological heritage: according to the European Convention on the Protection of the Archaeological Heritage, Revised (Council of Europe 1992), some anthropogenic landforms can be considered "elements of the archaeological heritage ", which include all remains and objects and any other traces of mankind from past epochs. The archaeological heritage shall include structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water.

It is evident that anthropogenic landforms and anthropogenic modifications of the relief are tightly related to the culture and civilization (Szabó et al. 2010) and these links are often presented by spiritual, religious, historical or cultural value of these specific landforms (Gordon 2018). In addition, some anthropogenic landforms have also the scientific, environmental, research and educational value. Based on this, it can be said that anthropogenic landforms are an indisputable part of the heritage, but thanks to the fact that they stand somewhere on the border of cultural and natural heritage and it is not easy to sort them clearly, the position of anthropogenic landforms within the heritage concepts remains a subject of discussions.

#### 18.2.2.3 Examples of Geotourist and Geoeducational Use of Anthropogenic Landforms from All Around the World

Regardless the ambiguities of the position of anthropogenic landforms within heritage concepts, it can be stated that these specific geomorphological features have a high potential for geotourism and geoeducation which have been already widely recognized and supported by numerous papers. The geotourist and geoeducational importance and potential of anthropogenic landforms is discussed, e.g. by Lóczy (2010), who stresses the role of anthropogenic landforms in geoconservation and geotourism, Mata-Perelló (2018), who analyses the relationships between geomining heritage and local/regional development, or Petersen (2002), Powel et al. (2013), who point at the potential of road cuttings or temporary exposures for geoeducation and scientific research. Besides it, there are numerous case studies that underpin the significance of anthropogenic landforms: Hose (2017) introduces mining geoheritage in Peak District in the UK, Lopéz-García et al. (2011) present an example of mines in SE Spain, Margiotta and Sansò (2017) focus on the potential of abandoned quarries for local/regional tourism development in Italy, Pica el al. (2017) and Kubalíková et al. (2017, 2019) outline the importance of anthropogenic transformations of the relief within urban areas, Evans et al. (2018) presents the geotourism within industrial settings with examples of black coal mining in the UK, Carrión Mero et al. (2018) provides an example of using the mining sites for geotourism development in Zaruma-Portovelo mining district in Ecuador, Boukhchim et al. (2018) analyse the geoconservation and geotourism aspects of cave dwellings in Southeast Tunisia, Rybár and Štrba (2015) present the mining heritage at BáňskáŠtiavnica UNESCO WHS in Slovakia, and many others.

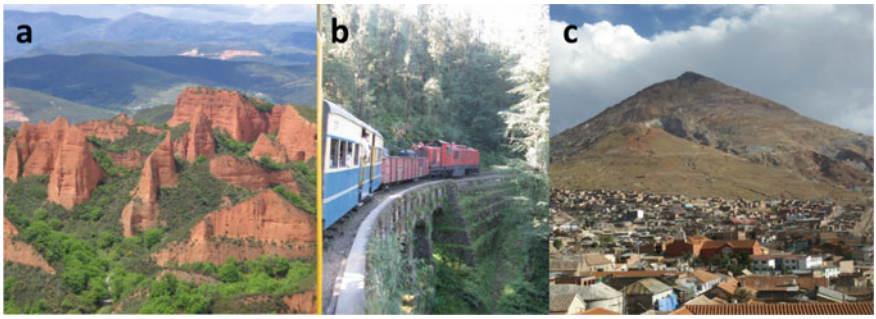


**Fig. 18.3** UNESCO World Heritage Sites which include anthropogenic landforms: **a** Las Médulas in Spain (the most important open gold pit in the Roman Empire), **b** Mountain Railways of India – Kalka Shimla Railway (railway construction is accompanied by numerous cuttings, ramparts or underground structures—tunnels), **c** Cerro Rico in Potosí, Bolivia (silver ore was extracted here using a series of hydraulic mills). Although these sites are inscribed primarily as cultural sites, the landforms that were created are also very significant and attractive (UNESCO 2018). Photos: Lucie Kubalíková

Some UNESCO Global Geoparks operates with mining history and present the anthropogenic mining landforms as their attractivenesses, e.g. Copper Coast Geopark or Tuscan Mining Geopark (Copper Coast Geopark 2018; Tuscan Mining Geopark 2018) and some World Heritage Sites are former mines or include the anthropogenic landforms too (https://whc.unesco.org/en/list/), for particular examples see Fig. 18.3.

Besides it, there are numerous examples of local tourist activities that are related to the active or recent mines, e.g. organized trips to the copper quarry of Chuquicamata near Antofagasta (Chile), "coal safari" in the former brown-coal open mines in the north of the Czech Republic or excursions to the active sulphur mine of Kawah Ijen in eastern Java (Indonesia). Figure 18.4 presents the abovementioned and other examples of geotourist and geoeducational use of anthropogenic landforms from all around the world.

## 18.3 Conclusions

The resources for geotourism and geoeducation are very diverse and they include not only natural geodiversity features (rocks, landforms, processes, soils, etc.) but also their links to the civilization and culture. The geomorphological resources for geotourism and geoeducation encompass both landforms and processes. Geomorphological processes can be considered hazards, however, the case study from Kyrgystan shows that active processes possess a high potential for geoeducational activities. In addition, the resulting aesthetically valuable landforms can serve as an important resource for geotourism development. A specific position within geomorphological resources is occupied by anthropogenic landforms. Although their place within the heritage concepts is questionable, their importance for geotourism and geoeducation


**Fig. 18.4** Examples of geotourist and geoeducational use of anthropogenic landforms: **a** and **b** Agrarian terraces near Ubud, Bali, Indonesia (these terraces form an inseparable part of the landscape appearance and they have a high aesthetic value which can be considered a basis for tourist use), **c** and **d** Copper mine of Chuquicamata near Calama, Chile (the mine represents one of the popular tourist destinations within the region, organized tours are provided here with a possibility of collecting the samples of the copper ore, **e** and **f** Abandoned limestone quarry of Hády in Brno, Czech Republic: numerous Earth-science aspects (stratigraphic, tectonic, geomorphologic, hydrogeological, palaeontological) can be observed and used both for formal education (pupils of local schools, university students) and informal learning (the site is equipped with educational path and possesses basic tourist infrastructure). The nearby road cutting in granodiorites on Jedovnická Street **g** is also used for educational purposes accompanied by collecting the samples of biotite crystals. Photos: Diego Delso—under the License CC-BY-SA (**c**), Lucie Kubalíková (other photos)

is indisputable: numerous anthropogenic landforms form a part of top tourist destinations (including the UNESCO WHS), some of them are used both for formal and informal education as presented on the examples from all around the world.

Geotourism and geoeducation are closely related and should support each other. The rational geotourist development (including the appropriate development of tourist infrastructure or safety measures) can make the geoeducational resources more accessible and usable by more visitors. Geoeducation is one of the pillars of geotourism and it helps to appreciate scientific, cultural and other values of geodiversity and geoheritage. The correct interpretation of geodiversity and setting the links between it and particular components of the cultural heritage can bring Earth-sciences closer to the public, can help to avoid unsustainable use of the geoheritage for tourism purposes and last but not least, it can contribute to better acceptance of geoconservation measures.

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