



## GEO PARKS — THE MOST VALUABLE LANDSCAPE PARKS IN SOUTHERN POLAND

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**Abstract.** Landscape parks (LP) in Poland are large areas which according to the legal regulation act are closest to the concept of European Geoparks. Such areas, most interesting from the geological point of view and particularly important for geoconservation and development of geotourism, should be promoted to this international category. Two landscape parks: Complex of Jurassic LP, supplemented by the Ojców National Park, and the Muskau Arch LP with the adjacent area on the Western site of the Polish–German boundary, have been preliminary indicated as the potential candidates to the European Network of Geoparks. Four further landscape parks from Southern Poland should be suggested as the next ones.

**Key words:** landscape park, lithosphere reserve, European geopark, Southern Poland.

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**Abstrakt.** Parki krajobrazowe w Polsce zajmują rozległe obszary. Według obowiązujących aktów prawnych najlepiej odpowiadają koncepcji ochrony przyrody, określonej jako europejski geopark. Obszary te, szczególnie interesujące z geologicznego punktu widzenia oraz ważne dla geoochrony i rozwoju geoturystyki, powinny wejść do tej międzynarodowej kategorii ochrony przyrody. Dwa parki krajobrazowe: Zespół Jurajskich Parków Krajobrazowych wraz z Ojcowskim Parkiem Narodowym i Park Krajobrazowy Łuk Mużakowa z otaczającą go strefą, rozciągającą się po zachodniej stronie granicy Polski i Niemiec, zostały wstępnie wskazane jako kandydaci do europejskiej sieci geoparków. Cztery kolejne parki krajobrazowe z obszaru południowej Polski powinny zostać uwzględnione w następnej kolejności.

**Słowa kluczowe:** park krajobrazowy, rezerwat litosfery, europejski geopark, Polska południowa.

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### INTRODUCTION

Protection of inanimate nature or geoconservation had only a national range up to the late 1980-ties. During this time, international conventions and programs dealing with wildlife have functioned just for several years. The progressing degradation of natural environment and changes of earth surface caused by the human impact, mainly landuse, industrialisation, mining and urbanisation, were a challenge to global initiatives for the conservation of geological heritage. The first international conference in Digne les Bains (France, 1991) gave important im-

pulse to this activity. It was preceded many years earlier by the appeal issued by the World Geological Congress (London, 1946) and directed to governments of participated countries. Following the IUGS initiative, Cowie (1993, 1994) set up the Global Indicative List of Geological Sites (GILGES). This draft list enclosed selected sites from the whole world and was the first step to the Global GEOSITES program, announced a few years later by IUGS (Wimbledon, 1999).

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## THE IDEA OF WORLD LITHOSPHERE RESERVES

Areas considerably valuable with regard to geo(morpho)logical features, rich in protected geosites and their groups (set-sites) should be favoured as a special international category of conservation. A parallel solution has been established at 1968 for safeguarding of wildlife by creating of Biosphere Reserves MAB-UNESCO. The relief and geological background are only of subordinate importance in relation to biocenoses and biotops in these reserves.

During the Second International Symposium of ProGEO in Rome in 1996, a new category, Word Lithosphere Reserve, was proposed as an equivalent of the Biosphere Reserve in the world system of nature conservation. This concept had been presented on the conference session of this symposium, printed as an abstract and published in special issue (Alexandrowicz, Wimbledon, 1996, 1999). It was supported by general meeting of ProGEO in the point 5 of their declaration (Declarations..., 1999).

Lithosphere reserves were considered as areas protected by national authorities. The following targets have been attributed to this international category:

- conservation of geological and geomorphological elements together with contemporary processes including the human impact within geosystems and physiographical units;
- protection of natural surfaces for geological and geomorphological research;

— facilitation of educational and training opportunities in Earth sciences including specialisation connected with geoenvironmental protection and the possibility of research work.

To attain the above mentioned goals, protected area should be relatively large enclosing numerous outcrops of different lithostratigraphical units, particularly valuable sites, landscapes reflecting elements of geological structure and evolution of the relief with evidences of natural processes and traces of mineral exploitation. The above proposal was supplemented by several examples of areas which should be taken into consideration if the international system of nature conservation legally accepts the Word Lithosphere Reserve. There were 12 areas from Poland, protected mainly as national parks, and 7 areas from United Kingdom (Alexandrowicz, Wimbledon, 1999).

The proposed category corresponded with the Biosphere Reserve MAB UNESCO and was similar to the IUGS Geosites Programme. It was the first step to fill a gap in the world system of nature conservation, enclosing both animate and inanimate nature. Although this concept was not put into force, its main principles were already used. Dingwall (2000) was the only author who followed the development of this idea from the *Declaration of the Rights of the Memory of the Earth* (Digne, 1991), to the later applied category — Geopark, through the proposition presented by Z. Alexandrowicz and Wimbledon (1996, 1999).

## THE IDEA OF GEOPARKS

It was the ProGEO Symposium “Geological Heritage of Europe” in Sofia (1998) where the Geopark was firstly submitted as a new UNESCO label by Patzak and Eder (1998) in accordance with the plan of activity adopted at the 29<sup>th</sup> General Conference (November 1997). In their definition, all values and purposes as well as criteria prepared for the lithosphere reserve were repeated and supplemented by fostering socio-economical regional activity and sustainable development. Archaeological, ecological, historical or cultural values have been taken into consideration additionally.

In the next year (February 1999), the nomination procedure was presented in Operational Guidelines for UNESCO Geoparks. The new defined category was compared with the Man and Biosphere Reserve (MAB) which must have guaranteed appropriate long-term legal protection established by national authorities. In spite of this statement, the relation between geopark and already protected areas has not been cleared.

The following year brought the convention concerning the establishment of the European Geoparks Network (June 2000). It was proposed by four operators from France, Spain, Greece and Germany within the framework of the European LEADER-IIC Transnational Co-operation *Project Development of Geotourism in Europe*. This convention encloses two annexes in which details on the definition and nomination of Geoparks were explained. Comprehensive analysis of the potential advancement of geotourism has been indicated as one

of arguments justifying their creation. The sustainable development of territorial strategy connected with the socio-economical possibilities of the region was another important argument. It is noteworthy that the relation between different categories of national protection and geoparks was not mentioned in the convention.

The Co-ordination Unit for the European Geoparks Network with headquarters at the Reserve Geologique de Haute-Provence in Digne co-ordinates the activity of organising enterprises. During the last few years, the first list of European Geoparks have been prepared. Since October 2003, it enclosed 15 areas from seven EU countries: Reserve Geologique de Haute-Provence (France), Lesvos Petrified Forest (Greece), Geopark Gerolstein/Vulkaneifel (Germany), Maestrazgo Cultural Park (Spain), Psiloritis Natural History (Crete — Greece), Meteoritic crater from Rochechouart (France), Marble Arch Caves and Cuilcagh Mountain Park (Ireland), Cooper Coast Tourism (Ireland), Culture Park Rocca di Cerere (Italy), Park Madonie (Italy), Nature Park Cabo de Gata-Nijar (Spain), Naturpark Steierische Eisenwurzten (Austria), Kulturpark Kamptal (Austria), Geological Naturpark Terra Vita (Germany) and Naturpark Bergstrasse-Odenwald (Germany). The documentation of several others is more or less advanced. First proposals from Poland are now discussed and will be prepared in a short time. Details are presented on the internet ([www.europeangeopark.org](http://www.europeangeopark.org)).

## RELATIONS BETWEEN GEOPARKS AND LANDSCAPE PARKS

According to regulations and tradition, a considerable part of sites and areas included in a geopark should be protected. Different national categories of protection are used in order to attain it. Geopark should have large enough area and must comprise a number of important protected geosites. In particular countries such areas are protected as national parks, landscape parks, nature parks, natural parks, regional parks, zones of protected landscape or even nature reserves. The meaning of these and other categories is comparable but differs somewhat from one country to another.

National parks are frequently regarded as similar to the concept of geopark creation although the considerable part of their territory is subject of strict reserve protection. Farming and settlement are either quite limited or even excluded and only selected paths are accessible for public. Economical development of these areas complied exclusively with the necessity and purposes of safeguarding. In consequence, national parks correspond to principles of the MAB Biosphere Reserve and some of them have already attained such status.

On the other hand, landscape parks, nature parks, natural parks and regional parks have less restrictive protection as the areas with economical management, admitted forest economy, agriculture and settlement. Within such parks are situated more or less numerous nature reserves, nature monuments and fully

accessible protected sites. They are very convenient for development of tourism and education on different levels. Landscape parks rich in geological outcrops and instructive landforms are particularly interesting for geotourists, and favour organisation of training centres and active recreation. These areas are best prepared to receive a geopark labels.

More than hundred landscape parks have been established in Poland so far, and about half of them was situated in southern part of the country, in mountains and uplands. They have their own administration boards, scientific councils and plans of long term conservation. Parks situated close to each other group in some cases as complexes of landscape parks with joint administration. In few of them, didactic centres for pupils, students and tourists have been organised. Areas and objects particularly important and interesting, situated within landscape parks, are additionally, more strictly protected as nature reserves, nature monuments, geological documentary sites, areas of ecological use and natural-landscape complexes.

Polish legal regulation act determines a landscape park as an area protected with regard to natural, scenic, historical and cultural values with the aim of safeguarding, education and popularisation. Landscape parks are still utilised by forestry and agriculture complying with principles of sustainable development. Consequently selected landscape parks in Poland should be and will be suggested as candidates for the European Geoparks Network.

## PROPOSED GEOPARKS IN SOUTHERN POLAND

Six protected areas are recommended as Polish candidates for the list of European Geoparks (Fig. 1). The first draft project of geopark in Poland — the Jurassic Geopark of the Kraków–Częstochowa Upland, was presented by the authors in June 2000 during the Annual Meeting of ProGEO in Prague and repeated a year later during the conference in the Ojców National Park (Alexandrowicz, Alexandrowicz, 2000, 2001). The second proposition concerns the Muskau Arch Geopark, situated on both sides of the Polish–German boundary at the Nysa Łyżycka River (Badura *et al.*, 2003). Few years earlier (1996), another landscape park, situated in the south-western part of the Holy Cross Mountains was established as the Chęciny–Kielce Geological Landscape Park (Wróblewski, 2000).

### JURASSIC GEOPARK OF THE KRAKÓW –CZĘSTOCHOWA UPLAND

The area in question is located within the Polish Jura Chain, the most typical karstland of the country (Fig. 2). The upland extends across the Silesian–Cracow Monocline build of geological formations of Middle Devonian–Upper Cretaceous age, inclined to NE. The relief reflects both the differentiated resistance of the bedrock and geological structures, such as

framework of faults, fault blocks, horsts and grabens bordering the Fore-Carpathian Trough. A thick complex of Upper Jurassic massive and bedded limestones shapes two main elements of the landscape: the widespread Tertiary planation surface crowned by monadnocks, and deep, narrow rocky valleys

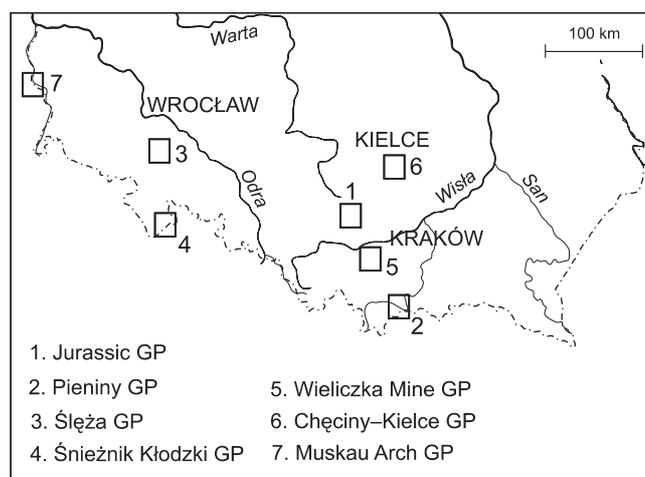
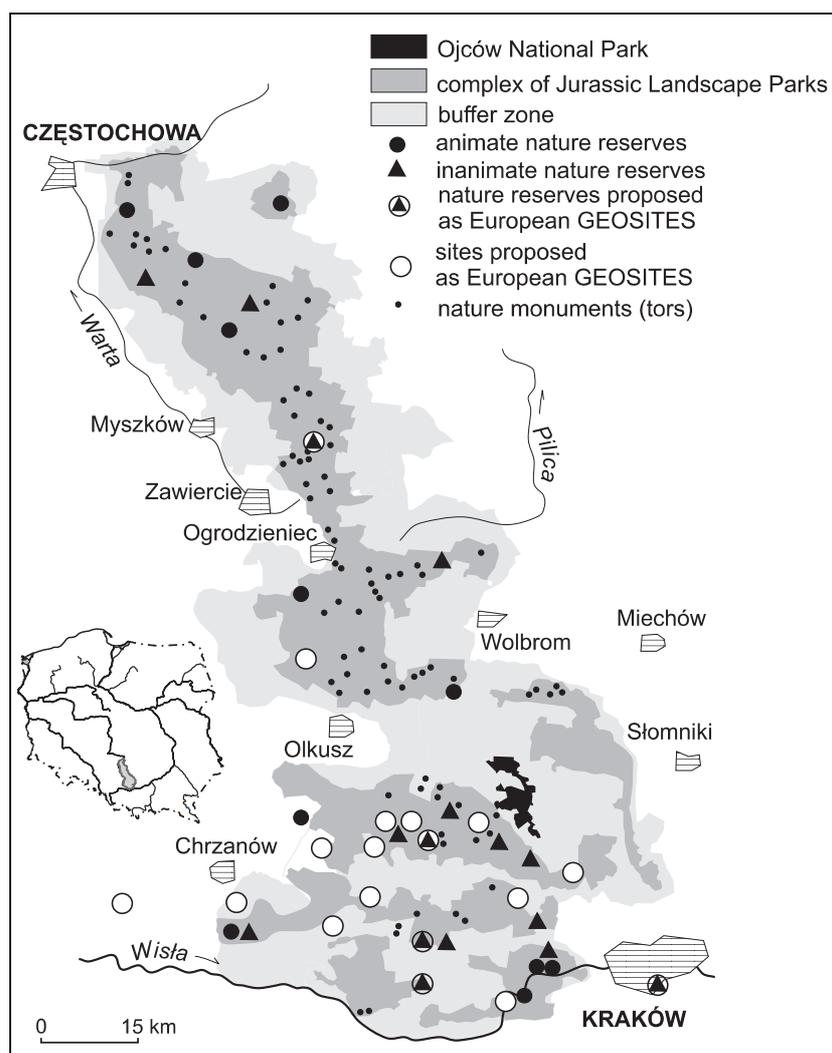


Fig. 1. The network of proposed geoparks in southern Poland



**Fig. 2. Map of the proposed Jurassic Geopark of the Kraków–Częstochowa Upland**

(Alexandrowicz, Alexandrowicz, 2003). A number of caves with archaeological findings as well as ruins of medieval castles supplements values of this area, very attractive for tourists. The proposed geopark covers both the complex of six landscape parks called “Jurassic Landscape Parks” (about 1200 km<sup>2</sup>) and the Ojców National Park (19 km<sup>2</sup>). A tourist route — “Jurassic Ring” is a new proposition for the improvement of infrastructure in the southern part of the region (Musielewicz, 2002). Geological and geomorphological features of the area are accessible in numerous nature reserves, nature monuments and geological documentary sites as well as in natural and artificial outcrops (Figs. 3, 4). The most interesting are: the sequence of Middle–Upper Devonian and Lower Carboniferous fossiliferous limestones and dolomites, Lower Permian volcanical rocks, Middle–Upper Jurassic deposits rich in fossils, traces of Upper Cretaceous transgression events and Holocene travertines as well as differentiated landforms connected with faults, karst and fluvial processes.



**Fig. 3. Góra Zborów Hill near Zawiercie, nature reserve in the proposed Jurassic Geopark — Tertiary planation surface with monadnocks (Photo by Z. Alexandrowicz)**



**Fig. 4. Jerzmanowice near Kraków, nature monument in the proposed Jurassic Geopark – monadnocks formed of Upper Jurassic massive limestones (Photo by Z. Alexandrowicz)**

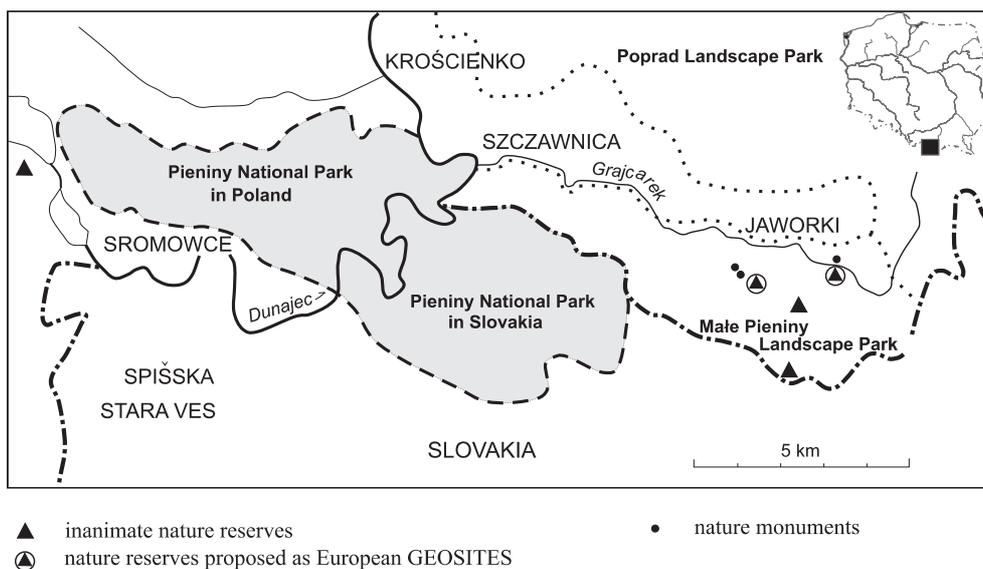
the geopark obtain the transboundary status. In the rocky landscape, geological formations and structures crop out excellently. Six main lithostratigraphical successions consist of deposits of Jurassic–Cretaceous age, forming steep folds and even overthrust nappes. The Maestrichtian–Palaeogene flysch occurs as a cover folded secondarily together with older formations. Many stratotypes documented by fossils have been distinguished and described in this area (Birkenmajer, 1977). A lot of steep upright limestone klippen, separated by hills and passes with gently slopes, formed within soft rocks (marls and shales), characterise the mountain relief (Fig. 6). The proposed geopark is of particular value due to the accessibility of geological outcrops as well as the unique and picturesque structural landscape with the famous, deep meandering Dunajec River valley, forming a rocky ravine (Fig. 7). It is particularly predisposed to geological/geomorphological education at different levels and for the development of tourism, ecological tourism and geotourism.

## ŚLĘŻA GEOPARK

### PIENINY GEOPARK

A part of the Polish fragment of the Pieniny Klippen Belt embodies a mosaic of differentiated and complicated geological structures (Birkenmajer, 1979). It is protected as the Pieniny National Park (23 km<sup>2</sup>) as well as several nature reserves and monuments (Alexandrowicz, Poprawa eds., 2000). A new project of the landscape park in the easternmost zone of the belt has been just prepared and is ready for legal registration. Along the gap of the Dunajec River, the Pieniny National Park in Poland borders on the Pieniny National Park in Slovakia (Fig. 5). The proposed geopark should be composed of two areas protected in Poland. If the Slovakian part will be enclosed,

The Ślęża Mt. raises about 500 m above the lowland of the Sudetic Foreland. Several types of Late Proterozoic and Palaeozoic crystalline rocks build this massif. Its highest part is formed of gabbro surrounded by amphibolites, serpentinites and ultrabasic rocks regarded as an old ophiolitic complex, while the Carboniferous granite occur in their north-western and western parts (Grocholski ed., 1969). Numerous pegmatitic, aplitic and quartzitic veins cross the bedrock. The mountain has the shape of a dome with a few culminations. Two highest: Ślęża Mt. and Skalna Mt. are formed of the most resistant rock — gabbro, while the others — of amphibolites and serpentinites. Slopes are covered by block fields developed during the Pleistocene, and are in some places crowned by numerous tors and groups of tors.



**Fig. 5. Map of the proposed Pieniny Geopark**



**Fig. 6. Czajakowa Skala Klippe in the Homole Nature Reserve, eastern part of the proposed Pieniny Geopark**  
(Photo by Z. Alexandrowicz)

The whole area is protected as Ślęza Landscape Park (74 km<sup>2</sup>) with three nature reserves and a nature-landscape complex. Several geological documentary sites have also been proposed by Jerzmański (1994) and other authors. The described isolated mountain is a very important archaeological site called the Silesian Olympus. Numerous cult sculptures made of stone, an old rampart arranged as archaeological reserve and historical monuments supplement extraordinary values of this area. Paths for tourists and didactic trails with nature and geological context as well as the regional museum facilitate the understanding of the Landscape Park.

### ŚNIEŻNIK KŁODZKI GEOPARK

The Śnieżnik massif is build of Precambrian–Early Palaeozoic metamorphic rocks. The two main complexes are: crystalline schists called Stronie Schists (mica schists, paragneisses, amphibolites, lenses of crystalline limestones and dolomites) and Gierałtów–Śnieżnik gneisses (ortogneisses, granitogneisses, migmatites, granulites, eclogites). In the western part, a fault and flexure limit the massif from the Nysa Kłodzka Graben, filled with Upper Cretaceous deposits, while in the eastern part the Tertiary volcanical rocks occur (Jahn *et al.*, eds., 1997). Karst phenomena are well de-

veloped in old limestones and dolomites. Noteworthy is a famous Niedźwiedzia Cave in Kletno, the nature reserve accessible for tourists. Rich fauna of Quaternary vertebrates and molluscs was excavated both in caves and rock shelters.

A large Palaeogene planation surface, widespread in this mountain range, is a characteristic feature of its relief. Metamorphic rocks are relatively rich in ore deposits, used since an old times. Traces of old exploitation works evidence the ancient mining centre. The protected Wilczka Waterfall, sandstone and gneiss tors as well as mineral springs are other attractive places (Gawlikowska, 2000). The major part of the Śnieżnik Range is protected in Poland as the Śnieżnicki Landscape Park (288 km<sup>2</sup>). On the opposite side of the Polish–Czech frontier, the range is protected as the Králický Sněžník Nature Reserve.

### WIELICZKA MINE GEOPARK (GEOMINING PARK OF WIELICZKA)

The Wieliczka Salt Mine has been included in 1978 into the first list of the UNESCO World Cultural and Natural Heritage. Since 1994, it is also protected in Poland as the National Monument of History. The underground excavation started here in Middle Ages and the exploitation continued during seven centuries up to the recent years. The mine is situated within the Carpathian foredeep, just in front of the folded Carpathian flysch thrust over the Middle Miocene sediments. Different types of salt, anhydrites, clays and sandstones constitute the Badenian Saliferous Formation which crops out in subterranean galleries, passages and chambers on five accessible mining levels.

The salt deposit is bipartite (Gaweł, 1962). Its lower part is stratified, forming three folds inverted from the south to the north. They are covered with boulder deposits consisting of argillous-marly sediments called “Zuber”, containing huge blocks of salt. The considerable part of the mine is adapted to public



**Fig. 7. Rocky ravine of the Dunajec River Gap in the Pieniny National Park** (Photo by K. Romeyko-Hurko)



**Fig. 8.** Strongly folded Miocene bedded salt intercalated with claystones and anhydrites, geological documentary site in the Wieliczka Mine — the proposed Wieliczka Geomining Park (Photo. by A. Grzybowski)

visits. The tourist trail passes through the central part of the three highest mining levels. The underground museum with geological collections and relics evidenced the history of mining is the part of it. Crystal Caves are the extraordinary curiosity of the mine (Z. Alexandrowicz ed., 2000). They are established as the nature reserve situated outside the tourist trail. Another didactic trail has been marked out along the most interesting protected geological outcrops (Fig. 8). About fifty documentary sites are situated in both trails (Wiewiórka *et al.*, 1994). The Wieliczka Salt Mine has a chance to be the first subterranean geopark.

#### CHĘCINY–KIELCE GEOPARK AND MUSKAU ARCH GEOPARK

The other two geoparks: Chęciny–Kielce Geopark and Polish–Germany transboundary Muskau Arch Geopark are characterised separately in this volume (Urban, Wróblewski, 2004; Gawlikowska *et al.*, 2004).

### CONCLUSIONS

According to the Polish legal regulations, geoparks concept is closely connected with the landscape parks one. Both fulfil similar goals and have their own administrative boards. They are established in areas of diversified landscape, considerable geo- and biodiversity, rich in cultural and historic monuments, particularly attractive for tourists and friendly to educational and research activity. Concentration of geological reserves, documentary sites and monuments of inanimate nature, nominated to the Network of European Geosites, is the especially important feature (Z. Alexandrowicz ed., 1999; Z. Alexandrowicz, 2003). On the other hand, these areas are still managed by local authorities enforcing the enhancement and sustainable development. National parks have similar organisation and possibil-

ities, but a more strict protection limits partly some their functions as geoparks.

Data included in documentation and conservation plans of landscape parks, national parks and nature reserves may be used in application dossiers prepared for nomination of Polish geoparks. Several other information, such as overall economical conditions of the area, policy of sustainable development and promotion of geotourism must be regarded additionally. Boards of landscape or national parks, supported by their scientific councils, should initiate the procedure leading to the creation of geoparks. Official application for nomination needs the acceptance of local community and the agreement of competent authority. The financial support will considerably accelerate and facilitate these undertakings.

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