

## Geoconservation in Poland for progresses of long-lasting development

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Nature conservation is an interdisciplinary field of activities, both cognitive and practical. In this field, research achievements in diverse scientific domains are integrated to constitute a basis for practical activities, which continually become more and more indispensable in various economic, social, and administrative sectors of any country. A specific feature of nature conservation is its region-oriented character that consists in the necessity to solve; first of all, nature endangering local problems. However, since the second half of the previous century, nature conservation has become a subject of interest on a global scale owing to the expansion of various types of far-reaching dangers and pessimistic forecasts. Nowadays, nature conservation encompasses a complex set of actions and educating objectives aimed at the holistic and comprehensive protection and conservation systems to protect and secure interrelated biotic and abiotic components of nature. Thus, it is an educational activity concerned with protecting bio- and geodiversity, which makes up the natural heritage of Earth. Nature conservation is highly important for the cultural development of societies because it moulds societies respect for their natural environment.

Similar to other countries, especially to European countries, nature conservation in Poland is widely dimensioned and not limited exclusively to the issues within the scope of biological diversity. The subject of nature conservation includes both animated and inanimated nature including elements of contemporary natural, culture, and anthropogenic landscape, as well as the preserved transformation traces of former landforms. From the beginning, the need to keep and preserve diverse geological and geomorphologic elements was inseparably connected with the history of nature conservation in Poland because many outstanding geologists, including J. Mrozewicz, S. Kreutz, J. Czarnocki, S. Małkowski, W. Goetel, H. Świdziński, and M. Klimaszewski actively participated therein. The precursors of the idea of nature conservation, comprehended in this specific way, were also scientists representing other specializations, for example: J.G. Pawlikowski, M. Raciborski, A. Wodziczko, and W. Szafer.

By official orders and laws on nature conservation, successively enforced in Poland since 1919, forms/structures and principles of geological monument conservation have been introduced; if compared with many other countries of the world, Poland was among the first countries to introduce geological monument conservation into legal regulations and laws. As to the promotion of the Polish concepts and achievements related to inanimated nature conservation, presently defined as geoconservation, the first publications from the interwar period are worth mentioning. To

begin with, there were four magazines entitled *Zabytki Przyrody Nieożywionej Ziemi Rzeczypospolitej Polskiej* (Inanimated Nature Monuments of the Polish Republic's Territories). The first magazine was published in 1928 (and the last one, no. 4, in 1951). In those days, this magazine was one of the first publications of this type throughout the world as was the annual *Ochrona Przyrody* (Protection of Nature) that has been continuously issued from 1920 to date as *Nature Conservation*. The theoretical and planning papers published in those magazines created a scientific basis for the further development of nature conservation, i.e. of geoconservation.

### Outline of geoconservation development in Poland

Nature conservation has a long tradition in Poland (Szafer, 1973). Several stages are distinguished in nature protection; they refer to the broader background of its development in the world, or even initialize new trends. This is evidenced both by the historical data from the period preceding Poland gaining its independence (1918) and by Polish achievements after 1919, when nature conservation was forever incorporated into the Polish state's administration structure.

During World War I and II, the activities in the field of nature conservation based, at the beginning, on an Order by the Minister of Religious Creeds and Public Education (1919); then, on a separate *Nature Protection Law*, issued in 1934. This law put into effect some conservation forms, such as national park, nature reserve, and a nature monument. It was the duty of the Minister of Religious Creeds and Public Education to supervise the practical realization of nature conservation. In individual administrative districts (voivodships), nature conservators were appointed. Hence, the *Nature Protection Law* was one of the few legal regulations of this type in Europe. On its basis, about 20 geological reserves and many nature monuments, mainly erratic boulders, were established during the interwar period. Usually, the conservation objects were randomly selected and the selection depended on the individual interests of appointing scientists. Another achievement of the international importance, during the period under discussion was that initial scientific basics of inanimated nature monument conservation were developed (Małkowski, 1928).

After World War II, a systematic inventory-making project of valuable geological objects was initiated. The Institute of Nature Conservation, Polish Academy of Sciences (PAS), Polish Geological Institute, and higher education institutes participated in this project. At the world level, a memorandum of the International Geological Congress in London (1948) inspired a similar action and was addressed to governments of the countries in the world. As for Poland, as early as in 1927, the Board for Nature Conservation Affairs, a unit of the Polish Geological Institute, drew up a special form to register objects while making an inventory. In 1949, a new *Nature Protection Law* was issued and officially approved the hitherto protection and conservation forms. It also specified the principles of plant and animal species conservation. Its innovativeness lay in

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two facts: an organizational structure for nature conservation in the Ministry of Forestry, later on transformed into the Ministry of Forestry and Wood Industry, was established; for the first time, there was a reference to problems connected with the conservation of nature resources. The comprehensiveness of this law became a model example for other countries in the period immediately after World War II.

During the 1970s and 1980s, economic and social problems grew and produced hazards to the native landscape and natural environment in individual regions of Poland. Both hazards and the necessity to prevent them were recognized as a matter of urgency, thus, the *Nature Protection Law* was amended in 1991, and the implementation of the amended law was assigned to the Minister of Environmental Protection, Natural Resources and Forestry. This law introduced two new spatial conservation categories: landscape park and area of protected landscape. Their concept was approved much earlier, in 1971, during the session of the Polish Nature Conservation Council, and its first implementations were supported by the orders passed at the voivodship level and by the *Environment Conservation and Management Law* of 1980 (Kozłowski, 1973). The law of 1991 also introduced other protection categories, such as documentary site (especially for inanimated nature elements), site of ecological use, and nature-landscape complex. The extension of national protection and conservation forms prompted the conservatory service units to take actions, and this fact became evident by arranging landscape parks. Up to the present day, 120 landscape parks have been established, and their total surface area is 8.33% of the whole of Poland's surface area. Alas, their managers did not sufficiently see to creating a network of reserves, documentary sites, and inanimated nature monuments within those landscape parks. Thus, their utilization for educational purposes and geotourism is presently very low. Today new concepts and actions are needed of how to properly manage those landscape parks and how to make them available to the public.

The *Nature Protection Law*, now in force, was issued in 2004, and its highest supervisor, on the part of the governmental administration, is the Minister of Environment. Besides the amendments in some provisions, the law of 2004 has legalized a new protection and conservation form: area of Natura 2000. The present legal system of nature conservation in Poland comprises the total of 10 differently ranked protection categories: national park, nature reserve, landscape park, area of protected landscape, area of Natura 2000, nature monument, documentary site, site of ecological use, nature-landscape complex, as well as plant, animal, and fungus species conservation. The total surface under protection in different principles of conservation comprises about 32.5% of the country.

National parks present the highest scale of differentiation in the geological structure and landforms, in particular those located in the mountain and upland districts of southern Poland. At the same time, they represent, as the multi-space areas under a complex protection scheme, the most valuable fragments of the geological regions. The 23 established, to date, national parks, cover 1.01% of the total Polish surface area. Within other multi-space categories: landscape parks, areas of protected landscape, and nature-landscape complexes, there is a requirement to create a basic network of inanimate nature conservation consisting of such legal categories as nature reserve, nature

monument, and documentary site. Having databases and numerous publications including maps, which deal with the condition, values, and arrangement of the already conservation geological objects and of those suggested to be protected makes it possible to successively assess the developmental progress of their networks (Alexandrowicz et al., 1975, 1992; Alexandrowicz & Poprawa, 2000; Gawlikowska, 2000; Wróblewski, 2000). From among the hitherto established 1412 nature reserves (0.54% of the country's surface area), about 110 areas were classified as particularly valuable geocomplexes. They are concentrated mainly in the regions with a high geodiversity. Moreover, abundant reserves of other types, especially landscape reserves, are very important for the Earth sciences. Nature monuments are a predominant form of conservation; they include ca 1630 individual objects. In northern Poland, first and foremost, there are erratic boulders, whereas in the southern part of Poland, diverse types of natural rocky forms are particularly abundant. The documentary site, a relatively recently established conservation category, is far too rarely applied. Presently, there are only 115 documentary sites, set up by voivodship orders. This form, introduced in 1991 by the *Nature Protection Law*, generated new protection and conservation possibilities, in the first line for the non-working quarries and all other types of exposures of important lithostratigraphic sequences (Alexandrowicz, 1991).

The hitherto condition of the networks of protected geological and geomorphological objects is not fully representative when referring to the geodiversity scale of individual regions. The established valorization and selection criteria of the objects to be protected facilitate the accomplishment of further documentary work and projects (Alexandrowicz et al., 1992; Alexandrowicz, 1996). In particular, they should refer to securing valuable, artificial exposures in order to prevent their loss by land-filling them with waste, by building them up, and also, by reducing their accessibility owing to uncontrolled, excessive plant succession. When properly managing those sites and places, considerable potential can be created to propagate geoconservation when applying it to education and tourism purposes. For improving the condition of geoconservation, it is also indispensable to rationalize and improve the legislation procedure, to apply active conservation, and to stir up interest in those affairs among local authorities and within the local community.

#### **International perspectives of geoconservation development in relevance to Poland**

Although the main objectives of geoconservation aimed at preserving the geological heritage are commonly accepted in terms of general concepts of nature conservation, in many countries they have not yet reached the required level, and often, they are limited to local or regional initiatives and activities (Alexandrowicz, 2007). As late as by the end of the 1980s, a potential for international collaboration in the field of geoconservation was generated. The "ProGEO" European Association for the Geological Heritage, formally established in 1993, but since 1988, run as a Working Group, is the first international forum for collaboration and exchange of experiences. Furthermore, other decisive events were two international conferences at the beginning of the 1990s held under the auspices of UNESCO. During the first con-

ference in Digne-les-Bains (France, 1991), the invited participants described the condition and prospects of geoconservation development in individual countries, mainly in Europe. What's more, an important document, the *International Declaration of the Rights of Memory of the Earth*, was issued. The second conference in Great Malvern (U.K., 1993) debated the necessity of elaborating an international geological heritage conservation convention. For this purpose, a special board was set up with the aim to determine initially the possibilities for UNESCO to work out and issue such a document on the model of international standards for protecting and conserving the contemporary world of plants and animals that had been functioning for a long time. Up until now, there exists neither a convention of this type nor respective directives of the Council of Europe and/or of the European Union, and this fact is a serious difficulty and obstacle in carrying out the targets of ProGEO and other initiatives on an international scale. From among the world conventions issued to date, there are two, which are the most connected with the geoconservation issues, namely: the *Convention of the World Cultural and Natural Heritage* of UNESCO and the *European Landscape Convention* of the Council of Europe.

In the range of geoconservation, international collaboration is a contemporary challenge appearing indispensable to obtain efficient achievements and to accentuate its due rank in various programs, conventions, and directives related to nature conservation on the local, regional, and global scale. To date, international organizations recommend and support this collaboration; this is well evidenced in succeeding documents to be found on the Internet:

□ Act of the creation of an international category "geopark" (Decision of UNESCO 156 EX/SR 14, 1999) and recommendations by the MAB International Coordinating Council on the feasibility study on developing a UNESCO Geosites/Geoparks Program (Decision of UNESCO 161 EX/SR 12, 2001) [<http://unesdoc.unesco.org/images/0012/001229/122959E.pdf>].

□ *Recommendation on conservation of the geological heritage and areas of special geological interest* (Council of Europe, Rec(2004)3) [<https://wcd.coe.int/ViewDoc.jsp?id=740629&Lang=en>].

□ *Operational Guideline for National Geoparks seeking UNESCO's assistance, Global UNESCO Network of Geoparks UNESCO* (Paris, 2004) [<http://unesdoc.unesco.org/images/0015/001503/150332eo.pdf>].

□ *Geological World Heritage: a Global Framework. A Contribution to the Global Theme Study of World Heritage Natural Sites* (prepared by P. Dingwall, T. Weighell, T. Badman). The World Conservation Union — IUCN (Gland, 2005) [<http://www.iucn.org/themes/wcpa/pubs/pdfs/heritage/geology.pdf>].

□ *Guideline and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks Network*. UNESCO (Paris, 2006) [<http://www.unesco.org/science/earth/geoparks/2005guidelinesfinal030406.pdf>].

□ *Applicant's self-evaluation and progress evaluation forms for National Geoparks seeking assistance of UNESCO to become member of Global Network of National Geoparks* (Annex UNESCO, 2006) [<http://www.unb.br/ig/sigep/destaques/GGNselfevaluationDocument060406.doc>].

□ *Guideline and Criteria for National Geoparks seeking UNESCO's assistance to join the Global Geoparks*

*Network*. UNESCO (Paris, 2007) [<http://www.unesco.org/science/earth/geoparks/2007guidelinesJanuary.pdf>].

Presently, in Europe, the internationally scaled collaboration in the domain of protecting the geological heritage aims at:

- creating a European Network of Geosites;
- creating a European Network of Geoparks;
- verifying and completing the World Heritage List by adding geological and geomorphological values to it.

**European Network of Geosites.** The Global Geosites Program, launched by the International Union of Geological Sciences (IUGS) and, since 1995 carried on under the auspices of the ProGEO association, is focused on setting up a network of valuable geosites in Europe. Regional working groups, organized to accomplish this task, unite countries in individual parts of Europe. Poland presides over the Regional Working Group 2 of Central Europe. Within this group, the Institute of Nature Conservation of PAS, and the Polish Geological Institute convened two conferences in Poland (Cracow, 1997, 2003), devoted to geosites and geoparks (Alexandrowicz, 1999; Ber et al., 2004). The Global Geosites Program is a continuation of the earlier projects run by IUGS under the name of Global Indicative List of Geological Sites (GILGES). A then compiled list comprises some important geosites from diverse parts of the world, however, it does not correspond with the extensive scale of diversity of geological formations (Cowie, 1993; Cowie & Wimbledon, 1994). There was only one object in Poland entered into this list, an inanimated nature reserve known as Skalka Rogoźnicka (Rogoża Rock) in the Pieniny Klippen Belt (see p. 670). This object represents a bio-stratigraphic ammonite level of the Rogoźnik Coquina Member as the standard biota in the Alpine-Carpathian area, and, also, a type of the locality of the Tithonian and Lower Berriasian sequences.

With the Global Geosites Program, individual countries can show their native values of geological heritage, and, against this background, single out those elements which possess standard, European, and world importance. Geosites are selected according to the accepted valorization criteria (Wimbledon, 1998, 1999; Wimbledon et al., 1999). Pursuant to the initially accepted intention, the uniformly elaborated national networks of important geosites and the information about them, archived in databases, should constitute a basis to decide on and choose the most representative objects, and, consequently, to set up a European (Global) Network of Geosites.

The progress level of developing geosite databases is different in individual European countries. All the works in this range, based on national programs, advance very slowly and not always in compliance with the ProGEO instruction on how to draw up databases (Wimbledon, 1998, 1999; Wimbledon et al., 1999). The Polish database of geosites was prepared in the Institute of Nature Conservation of PAS with the collaboration of some universities and other scientific institutions. It is easy to access through the Internet: [<http://www.iop.krakow.pl/geosites/default.asp>] and [<http://www.progeo.se>].

This database created according to the scheme as suggested by ProGEO appears to be the first one of its kind in Europe. It comprises 142 single sites and 33 areas with site-set, which are denoted by the common name "geosites" regardless of their size. Within the total number of 175 geo-sites, 96 are protected by different legal categories.



ries, and 79 are suggested to be protected. The special arrangement of geosites is irregular (Alexandrowicz, 2006a). It depends not only on the patterns of geodiversity, but, also, on the progress in the legislation work. Among the geosites standing for the European Network of Geosites, the objects representing important stratigraphic sequences and geomorphologic values are the most numerous.

**The European Network of Geoparks.** In each country, areas can be marked out where the concentration of important geosites is very high; those most valuable ones, if regarded jointly, let us follow, comprehend, and interpret transformations in the natural environments that occurred over the course of geologic time. During the Second International ProGEO Symposium in Rome (1996), a concept was presented, and entered into the declaration at the end of the symposium; the concept read that areas of this particular type should be arranged as and denoted by the World Lithosphere/Geosphere Reserves (Alexandrowicz & Wimbledon, 1999). Those reserves would generate a potential for geological heritage to be protected in an all-embracing way, and, they would be a counterpart of the Biosphere Reserves MAB/UNESCO. This concept modified and received its final shape; then, based on the UNESCO decisions of 1999 and 2001, the realization of the European Network of Geoparks was commenced, with the financial support of the European Union. The territory of any geopark must serve the basic ideas and goals of sustainable, social-economic and cultural development policy, i.e., the natural values of any geopark must be utilized in a peaceful way ensuring that no conflicts occur (Eder & Patzak, 2004). For this purpose, a network of geo-sites with diverse values-oriented rank is developed and promoted, especially, in the field of education and tourism. Additionally, it is very essential for any geopark that it is selected, nominated, and set up based on the consent and approval of local communities. The geopark forming procedure is regulated by operational guidelines that are successively issued by UNESCO. Those guidelines determine individual stages under the whole application procedure, to start with the National Geopark, assisted by UNESCO, European Geopark and World Geopark UNESCO (Alexandrowicz, 2006b; Alexandrowicz & Miśkiewicz, 2007).

In Poland, the process of arranging national geoparks is now in the initial stage of planning. No due legal regulations exist, and therefore, it is very difficult for local governments to take on their own endeavors. Presently, the European Network of Geoparks consists of 34 areas (status as per October 2007) located in the western part of Europe; they were created on the previously legally protected terrains, by virtue of decisions made by regional authorities. A network of geosites within one geopark should come within the domestic state's jurisdiction. Among the Polish categories of legal protection, the territory of landscape park is the most suitable to set up a geopark (Alexandrowicz & Alexandrowicz, 2004). The policy principles of geoparks seem for many landscape parks to be a proper way to stimulate them and to use them for teaching purposes at various levels of education, to propagate knowledge of the Earth, and to develop tourism and recreation. Ten to twenty territories, mainly in southern Poland,

were highlighted as being suitable for geopark status. However, in order to commence work and to properly direct them, it is necessary to create appropriate legal regulations, to develop valorization criteria and procedures of arranging national geoparks, and to work out principles for selecting them from the point of view of prospective incorporation into the European Network of Geoparks. One of proposal of legal regulation reads that "geopark" should be entered in the Nature Protection Law. When developing the project of National Network of Geoparks, it is a requisite to employ and set off social initiatives, to utilize the assistance of local administrations and the national service for nature conservation, and to implement programs, which make it possible to carry out teamwork investigations and survey for preparing necessary official documents for UNESCO. Appointed experts will analyze those documents.

**World Heritage.** The *World Heritage Convention*, former the convention concerning the *Protection of the World Cultural and Natural Heritage* of 1972, refers only to objects characterized by outstanding universal values. They are classified according to the following criteria: the basic C criterion that covers cultural values; the N criterion that refers to natural values; and the L criterion related to landscape values. The World Heritage List comprises approximately 850 areas in total, and it is planned to increase this number to 1000. Only 7% of the currently selected are areas having a recognized geological rank in the N classification group. The selection procedure of objects, their valorization, and their classification based on the results of their assessment according to the criteria applied, undergo periodical revision. Recently, IUCN verified objects under the N group and used a secondary criterion to evaluate those objects (Dingwall et al., 2005). Pursuant to this criterion, the sites must be outstanding examples representing major stages in the Earth's history, including the record of life, significant ongoing geological processes in the development of landforms, or significant geo-morphic features (Dingwall, 2000).

In the World Heritage List, there are 13 objects from Poland (status as per 2007). Only one object is designated to the group of natural values (the Polish-Belarusian area Białowieża Forest), 12 objects are classified as a group of cultural values, and one of them as a group of cultural-landscape values (the Polish-German border Muskau Park; see p. 692). There is hope that the next verification procedure, from the point of view of geological and geo-morphologic values, will evaluate objects contained in the cultural and cultural-landscape group. If this happens, the status of the Wieliczka Salt Mine (see p. 663) and Muskau Park will be enhanced.

### Geoconservation and geotourism

Geotourism is related to nature conservation and is a section of specialist tourism. In the sense of educational objectives of the geological sciences it should be classified as applied geology (Alexandrowicz, 2006c). Its overriding aim is to propagate a knowledge of geology among the whole of society; this aim is important not only because it is essential that people get to know their own country, but also, because inhabitants of a given country shall identify themselves and develop deeper ties with their native nature

and culture. The policy task of geotourism is to make it easier for the whole of society to get to know, to learn, and to comprehend both the geological past of the Earth and the contemporary transformation processes of the environment in the broad context of events (Hose, 2000; Martini, 2000).

Geotourism is a young field of science, it is now at a stage when it works out its own basis, definitions and principles, which, next, shall be improved and refined along with completing defined tasks. To achieve this, it is necessary to use adequate methods during field trips and educational classes (Słomka & Kicińska-Świdorska, 2004). The development of geotourism requires that a network of objects is established, which shall be properly sorted out, valorized, well preserved, and adapted to tours of visitors and to exploration purposes (Słomka et al., 2006). They should be interconnected by educational paths and so that the tourists-visitors are able to get to know and to understand the geology and landforms of a given area, as well as the history and other values of the area they visit. The legally protected geosites, which represent particularly interesting geological elements and landscape forms are most of all predisposed to this type of research and illuminating, educating tourism. Thus, there is a direct relationship between geotourism and geoconservation, which appears very important for the popularization of geological knowledge, education, and scientific research in this field, as well as for the forms of recreation and relaxation (Alexandrowicz, 2006c). When establishing geotourism, it is of the utmost importance to follow the rules and principles of nature protection. Arranging national geoparks, and geosites within them, provides a great chance for geotourism to develop as an activity necessary to educate society in various fields, and, in particular, in the field of natural sciences.

## References

- ALEXANDROWICZ Z. 1991 — The site documentation — a new category of inanimate nature conservation [in Polish, English summary]. *Chrońmy Przyrodę Ojczyzną*, 47, 1-2: 5–9.
- ALEXANDROWICZ Z. (ed.) 1996 — Geoconservation of the Beskid Sądecki Mountains and the Sącz Basin, Polish Carpathians [in Polish, English summary]. *Studia Naturae*, 42: 1–148.
- ALEXANDROWICZ Z. (ed.) 1999 — Representative geosites of Central Europe. Proceedings of the Central Europe working group. Workshop Pro-Geo'97. Poland, Kraków, October 14–17, 1997. Polish Geological Institute Special Papers, 2: 1–102.
- ALEXANDROWICZ Z. 2006a — Framework of European geosites in Poland. *Nature Conservation*, 62 (5): 63–87.
- ALEXANDROWICZ Z. 2006b — Geoparki — nowe wyzwanie dla ochrony dziedzictwa geologicznego. *Przegląd Geologiczny*, 54: 36–41.
- ALEXANDROWICZ Z. 2006c — Geopark — nature protection category aiding the promotion of geotourism (Polish perspectives). *Geoturystyka (Geotourism)*, 2 (5): 3–12.
- ALEXANDROWICZ Z. 2007 — Geoconservation in national, European and global aspect (with particular regard to Poland) [in Polish, English summary]. *Biuletyn Państwowego Instytutu Geologicznego*, 425: 21–28.
- ALEXANDROWICZ Z. & ALEXANDROWICZ S.W. 2004 — Geoparks — the most valuable landscape parks in southern Poland. *Polish Geological Institute Special Papers*, 13: 49–56.
- ALEXANDROWICZ Z., DRZAŁ M. & KOZŁOWSKI S. 1975 — A catalogue of inanimate nature reserves and monuments in Poland [in Polish, English summary]. *Studia Naturae*, seria B, 26.
- ALEXANDROWICZ Z., KUĆMIERZ A., URBAN J. & OTĘSKA-BUDZYN J. 1992 — Evaluation of inanimate nature of protected areas and objects in Poland: with map 1 : 750 000 [in Polish, English summary]. Państwowy Instytut Geologiczny, Warszawa.
- ALEXANDROWICZ Z. & MIŚKIEWICZ K. 2007 — Global Network of National Geoparks UNESCO (procedure of the creation) [in Polish, English summary]. *Chrońmy Przyrodę Ojczyzną*, 63, 2: 3–14.
- ALEXANDROWICZ Z. & POPRAWA D. (eds.) 2000 — Geodiversity conservation of the Polish Carpathians: with the map 1 : 400 000 [in Polish, English summary]. Państwowy Instytut Geologiczny, Warszawa.
- ALEXANDROWICZ Z. & WIMBLEDON W.A.P. 1999 — The concept of world lithosphere reserves. *Memorie Descrittive della Carta Geologica d'Italia*, 54: 347–352.
- BER A., ALEXANDROWICZ Z. & BALABANIS P. (eds.) 2004 — Proceedings of the Conference “Geological heritage concept, conservation and protection policy in Central Europe”, October 3–4, 2003, Cracow, Poland. *Polish Geological Institute Special Papers*, 13: 1–212.
- COWIE J.W. 1993 — World Heritage. Report of Working Group on Geological and Paleobiological Sites. UNESCO, IUGS, IGCP, IUCN Nov. 1993.
- COWIE J.W. & WIMBLEDON W.A.P. 1994 — The World Heritage List and its relevance to geology. [In:] O'Halloran D., Green C., Harley M., Stanley M. & Knill J. (eds.) *Geological and Landscape Conservation*. Geological Society of London: 71–74.
- DINGWALL P.R. 2000 — Legislation and international agreements: the integration of the geological heritage in nature conservation policies. [In:] Berettino D., Wimbledon W.A.P. & Gallego E. (eds.) *Geological Heritage: its Conservation and Management*. Sociedad Geológica de España, Madrid: 15–28.
- DINGWALL P.R., WEIGHELL T. & BADMAN T. 2005 — Geological World Heritage: a Global Framework. A Contribution to the Global Theme Study of World Heritage Natural Sites. IUCN, Gland. (<http://www.iucn.org/themes/wcpa/pubs/pdfs/heritage/geology.pdf>).
- EDER F.W. & PATZAK M. 2004 — Geoparks — geological attractions: A tool for public education, recreation and sustainable economic development. *Episodes*, 27 (3): 162–164.
- GAWLIKOWSKA E. 2000 — Geodiversity conservation of the Lower Silesia: with the map of protected area and objects of inanimate nature [in Polish, English summary]. Państwowy Instytut Geologiczny, Warszawa.
- HOSE T.A. 2000 — European “geotourism” — geological interpretation and geoconservation promotion for tourists. [In:] Berettino D., Wimbledon W.A.P. & Gallego E. (eds.) *Geological Heritage: its Conservation and Management*. Sociedad Geológica de España, Madrid: 127–146.
- KOZŁOWSKI S. 1973 — The plan for safeguarding Poland's landscape and its initial accomplishment [in Polish, English summary]. *Ochroń MALKOWSKI S. 1928 — Buts et signification de la protection des monuments de la nature inanimée [in Polish, French summary]. Zabytki Przyrody Nieożywionej Ziemi Rzeczypospolitej Polskiej*, 1: 5–9.
- MARTINI G. 2000 — Geological heritage and geo-tourism. [In:] Barretino D., Wimbledon W.A.P. & Gallego E. (eds.) *Geological Heritage: its Conservation and Management*. Sociedad Geológica de España, Madrid: 147–156.
- SŁOMKA T. & KICIŃSKA-ŚWIDORSKA A. 2004 — The basic concepts of geotourism [in Polish, English summary]. *Geoturystyka (Geotourism)*, 1: 5–7.
- SŁOMKA T., KICIŃSKA-ŚWIDORSKA A., DOKTOR M. & JONIEC A. 2006 — The catalogue of geotouristic sites in Poland [in Polish, English summary]. *Akademia Górniczo-Hutnicza*, Kraków.
- SZAFER W. 1973 — History of nature conservation in the World and in Poland. [In:] Szafer W. & Michajłow W. (eds.) *Protection of Man's Natural Environment*. PWN, Warsaw: 7–51.
- WIMBLEDON W.A.P. (ed.) 1998 — A first attempt at a geosites framework for Europe — an IUGS initiative to support recognition of world heritage and European geodiversity. *Geologica Balcanica*, 28, 3-4: 5–32.
- WIMBLEDON W.A.P. 1999 — Geosites — an International Union of Geological Sciences initiative to conserve our geological heritage. *Polish Geological Institute Special Papers*, 2: 5–8.
- WIMBLEDON W.A.P., ANDERSEN S., CLEAL C.J., COWIE J.W., ERIKSTAD L., GONGGRIJP G.P., JOHANSSON C.E., KARIS L.O. & SUOMINEN V. 1999 — Geological World Heritage: Geosites — a global comparative site inventory to enable prioritisation for conservation. [In:] Proceedings of the Second International Symposium on the Conservation of the Geological Heritage, Roma June 1996. *Memorie Descrittive della Carta Geologica d'Italia*, 54: 45–60.
- WRÓBLEWSKI T. 2000 — Geodiversity conservation in the Góry Świętokrzyskie Region: with the map 1 : 200 000 [in Polish, English summary]. Państwowy Instytut Geologiczny, Warszawa.