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Reviewal paper

GEOCONSERVATION IN THE BALKAN REGION PRACTICES AND LEGAL INSTRUMENTS

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Geoconservation implies the identification and conservation of geodiversity phenomena (variety of geological, geomorphological and pedological features, systems and processes) for their intrinsic, ecological and heritage values. Among Balkan countries, it is necessary to provide relevant vital information at all levels of nature management and planning, and thereby raise awareness of the links between geodiversity and biodiversity as well as between geodiversity and cultural heritage. The main challenge is to accomplish a more effective collaboration between agencies responsible for the protection of nature and other governmental agencies in order to ensure systematic national surveys of geodiversity resources.

Key words: geodiversity, geoheritage, geoconservation, Balkan region, legislation, administration structures, management.

INTRODUCTION

Nature as a dynamic complex system entails both biotic and abiotic subsystems that created the frame for life on earth. According to the World Heritage Convention (UNESCO General Conference, 1972), Natural Heritage consists of natural phenomena, processes and forms represented by diversified physical and biological features, and recogni-

zed as having particular natural values from the point of view of science, conservation or natural beauty (aesthetic value). Physiographical and geological processes and features include habitats (abiotic component), a wide range of indigenous species (biotic component) and ecosystems (interaction between biotic and abiotic components). The significance of natural heritage means the importance of ecosystems, biodiversity and geodiversity for present and future generations, in terms of their scientific, social and life-support value.

Fig. 1. - Conserving an environment: a) Zagros Mts., N. Iraq (photo A. Maran); b) the threatened species, golden eagle (photo J. L. Himenez).

During recent decades, a great deal of attention has been given to protecting and enhancing the biological diversity of the planet. The principles of biological diversity emphasize the variability among living organisms. Biodiversity is usually divided into genetic diversity (conserving the gene pool), species diversity and ecosystem diversity (biotopes and biocenosis). Increasing concern for species and the loss of their habitats has led to some important international environmental agreements and legislation (Ramsar Convention on Wetland Conservation, 1971; Convention on International Trade in Endangered Species, 1973; Bonn Convention on Conservation of Migratory Species, 1979; Convention on Biological Diversity, 1992 etc.). The principle of a sustainable development was formulated for the first time during the

UN Conference on Environment and Development (Rio de Janeiro, 1992). Intending to prevent further environmental degradation of the earth, new ideas that have opened a new epoch in the human approach to the management of natural resources have been devised.

It is difficult to trace the first usage of the term geodiversity but some geologists and geomorphologists started using it in the 1990s to describe the variety within the abiotic world. According to Sharples (1995), Eberhard (1997), and the Australian Heritage Commission (1999; 2002) the term "geodiversity" signifies the natural range (diversity) of geological (bedrocks), geomorphological (landforms) and pedological (soils) features, assemblages, systems and processes. Geodiversity includes evidence of the history of the earth (evidence of past life, ecosystems, and environments) and a range of processes (biological, hydrological and atmospheric) currently acting on rocks, landforms and soils.

GEOCONSERVATION

There is a general trend towards consideration of the biological world and its diversity as fragile and vulnerable and therefore in need of conservation, whereas "*the abiotic world is seen as static, stable and much too prolific ever to be endangered*" (Gray 2004). The material resources of the earth are finite and the principles of sustainable development advise wise use of these resources for the sake of future generations who might also want to use them. Most geological resourses are non-renewable or renewable only over very long periods of time. The term geoconservation implies the identification and conservation of geological, geomorphological and soil features, assemblages, systems and processes for their intrinsic, ecological and heritage values.

GEOHERITAGE

Geoheritage refers to the outstanding values of rocks, landforms and soils. Geoheritage may be valued for the purposes of scientific research, education and aesthetics. Alternatively, almost synonymous terms include geological heritage, geological monuments and significant geological features.

GEOTOPE (GEOSITE)

The term geotope designates a body of rocks accessible from the surface where geologic or geomorphologic features and phenomena can be observed and studied (Grigorescu & Andrasanu 2003). The geotope is usually unique and irreplaceable and has to be protected against forces that could damage its substance, form or natural evolution. The impacts on geodiversity can be summarized as: complete loss of an element of geodiversity, partial loss or physical damage, fragmentation of interest, loss of visibility or inter-visibility, loss of access, interruption of natural processes, pollution, and visual impact.

Fig. 2. - UNESCO World heritage site, Petra, Jordan (photo A. Maran).

Site selection criteria

Those countries that have geoconservation site networks have different means of selecting sites. Some have used literature reviews to identify sites or boards of experts who judge the sites for their suitability for inclusion. Proposals for site selection must be scientific-based and explained in detail and the selected objects must be of top quality, well-preserved, and the most representative in their group of phenomena (Maran 2005). In practical terms, site preferences entail various operational criteria: 1) the site can be conserved in a practical sense; 2) the replication of interests between sites is minimal; 3) the site is least vulnerable to potential threat; 4) the site shows an extended

or relatively complete record of the feature of interest; 5) the site has a long history of detailed research study; 6) it has potential for future study; 7) it is accessible; and 8) it has played an important part in the development of the earth sciences. The best method is to establish systematic national surveys or inventories of geodiversity resources as the basis for site selection.

Site conservation strategy (SCS)

In the long term, site conservation strategy implies the involvement of governmental and non-governmental agencies as well as scientific and educational institutions. This strategy has to be incorporated into the policy and management of protected natural areas. Some principles of SCS encompass: a) increasing awareness of geology by highlighting its importance in education, science, tourism and economics; b) cooperation at all levels (international, national, regional, local), particularly with policy makers and also with institutions and individuals interested in geosite conservation; c) scientific, cultural and economic profit related to the development of job opportunities.

Site management

The management regimes for sites vary worldwide. Well-documented site explanation, which achieves the greatest public interest, is the most effective approach to site management. Some site documentation which outlines the site location, its importance and potential threats to it is usually required before a site is designated. The site documentation regularly consists of basic details such as site name, location, type and date of registration, and local authority, followed by a statement of interest, geological settings (context) and references. In addition, there are sections covering such information as accessibility, current and potential usage, site conditions, potential threats and management alternatives.

HISTORICAL OVERVIEW OF INTERNATIONAL GEOHERITAGE CONSERVATION PRACTICES

The International Union for the Conservation of Nature and Natural resources (IUCN) was founded in 1948. As one of the IUCN Commissions, the World Commission on Protected Areas (WCPA)

works to help governments and others to plan, manage, strengthen and enhance this world network. The United Nations is also deeply involved in international conservation mainly through UNESCO and UNEP (the UN Environmental Program). UNESCO has a World Heritage Sites (WHS) network and it is working with other agencies to support world efforts to establish international Geosite and Geopark networks. UNEP initiated the World Conservation Monitoring Centre (WCMC), which has a Protected Areas Program aimed at establishing a Nationally Designated Protected Areas Database. In the last decade, UNESCO worked with IUCN, the International Union of Geological Sciences (IUGS), and the International Geological Correlation Program (IGCP) to select, nominate and evaluate geological sites worldwide for protection and conservation according to basic criteria and conditions. ProGEO, the European association for the conservation of geological heritage, was established in 1991 with the promotion of the conservation of the world's geoheritage as an integrated approach to nature conservation as its main purpose. Each ProGEO member is asked to nominate candidate sites for the frameworks relevant to their country.

Fig. 3. - ProGEO WG1 annual meeting in Albania, 2005 (photo A. Maran).

The Global Indicative List of Geological Sites (GILGES) was established by UNESCO, the IUCN and IUGS in the early 1990s (Gray 2004). The list included hundreds of sites that were intended to be of first-class importance to global geology. The IUGS replaced GILGES in 1995 with a more rigorous and comprehensive scheme known as Global Geosites; UNESCO subsequently endorsed this scheme. Its aim is to compile a complete global list of the world's most important geological sites with supporting documentation. The work is being coordinated by the IUGS Global Geosites Working Group and its intention is to encourage geoscientists in all countries to compile their own registers, which can then be analyzed by the wider geological communities.

UNESCO GEOPARK CONCEPT

Since the UN Conference on Environment and Development (Rio de Janeiro, 1992), scientists, decision makers and the public alike have acknowledged that the protection and management of the environment are a top priority. Responding to the international initiative for the recognition of sites and terrains of earth science interest, UNESCO introduced the concept of Geoparks in the1990s (Eder 1998; UNESCO source 2004). The main preconditions for recognition as a Geopark are the active participation and involvement of the local population in decision-making and an economically and scientifically sound management. The UNESCO Geopark concept implies: a) a territory encompassing one or more sites of scientific significance for geology as well as archaeology, ecology or cultural value; b) a management plan that fosters sustainable geotourism and socio-economic development; c) a means of teaching geoscientific disciplines and broader environmental issues; and d) a demonstration of best practices in earth heritage conservation and its integration into sustainable development strategies.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The environmental impact assessment (EIA) originated in the USA under the National Environmental Policy Act (1969) and gradually has been adopted by many countries worldwide. The European Community formally established a Directive on EIA in 1985. Later, the EU adopted the Strategic Environmental Assessment Directive (2001) and member

states were required to incorporate it into their national legislation by 2004.

The Environmental Impact Assessment (EIA) is defined as a formal process used to predict the environmental consequences of any development project. The EIA thus ensures that potential problems are foreseen and addressed at an early stage in the project's planning and design. The Environmental Impact Assessment should have the following objectives: a) predict environmental impact of projects; b) find ways and means to reduce adverse impacts; c) shape projects to suit local environment; and d) present the predictions and options to the decision-makers. The EIA statement should cover a brief description of project, a brief description of the existing environment, the likely impact of the project, mitigation and protection measures, a consideration of alternatives, and a summary with conclusions.

Fig. 4. - Greek Geopark: the Lesvos Petrified Forest (UNESCO source).

GEOCONSERVATION AMONG THE BALKAN COUNTRIES – – PROGEO ACTIVITIES IN SOUTHEASTERN EUROPE (PROGEO WG 1)

Nature conservation systems differed considerably among Balkan countries, particularly the position of geoconservation within the formal systems for nature conservation. In the early 1990s, many southeastern European countries passed through very dramatic political, economic and social changes. The ProGEO WG 1 was founded in 1995, and its first members were Albania, Bulgaria, Greece, Macedonia, Romania, Slovenia and FR Yugoslavia. The main aims of WG 1 were to exchange

information about the geosites, to set up the national nature conservation strategies and policies, to establish the list of geoheritage sites as well as to select and nominate sites for the World Heritage List. After 1995, the situation concerning geoconservation was improved and numerous activities were initiated mainly by national representatives who were putting ProGEO objectives into practice. Scientific contributions and results of diverse geoconservation activities of WG 1 members are published in periodicals and special issues like ProGEO News, Geologica Balcanica, Geomemoria, Geohazards etc.

ALBANIA

The first laws for nature protection were established in the second half of the last century. At that time, some protected areas were defined with 136 listed natural monuments. The first document concerning natural heritage global values was the Convention for protection of the world cultural and natural heritage in 1960. A special decision by the Council of Ministers (DCM, 1966) first proclaimed 6 protected areas, and later added five new national parks (Serjani & Cara 1996). Some recent acts and laws (2002) defined the categories of protected areas in accordance with the strategy "Environment for Europe". The first findings concerning geological heritage were *Barbatica albani*ca Openheim within the Miocene molasses noted in the Drenova coal mine (Korca region) and the Triassic ammonite collection from the Puka region (1911).

Fig. 5. - Cukali zone, Albania (photo A. Maran).

Intensive geology development and geological mapping took place all over Albania between 1950 and 1990, and Albanian geoheritage conservation was presented for the first time at the ProGEO Meeting in Sofia, 1995. In late 1997, the Union of Geologists of Albania was founded as a nongovernmental organization, intended to protect and conserve the geological heritage. Today there are some state institutional organizations in Albania dealing with natural monuments and environmental protection such as the Committee of Environment Preservation and Protection, the Centre of Geographical Studies of the Academy of Sciences of Albania and the Tourist Committee of Albania (Serjani *et al*. 2005).

BULGARIA

The idea for conservation of particular landscapes and sites in Bulgaria dates from the beginning of last century. The first official legislation originated in 1937 and only 50 natural sites were protected by the late 1950s (Nakov & Todorov 2005). The Decree on Natural Protection was passed in 1960 and the number of protected sites increased to 200. A new nature protection law was approved in 1967 and 1,500 new sites were protected. In 2007, more than 3,500 sites were under protection (Nakov *et al.* 2005). However, with the exception of some natural landscape and rock formations, the majority of the protected sites represent biodiversity.

The Bulgarian National Service for the protection of nature together with the Ministry of the Environment and Waters was established in 1994 as the state body responsible for the conservation of biological variety and inanimate nature. According to a 1998 law, preserved territories were divided into 6 groups: reserves, national parks, natural beauty spots, supported reserves, nature and preserved parks, and the geological sites within these groups (Nakov & Todorov 2005). The first protected geological monument was the Pobitite Kamani site, identified in 1937. The first list of geological heritage numbering 55 geological sites in Bulgaria was published in 1964. In 1974 protected geological sites included 224 objects and at present the number surpasses 360. Until 1995, the protection of the Bulgarian geosites had not been done systematically and by an established methodology. The majority of protected sites belong to geomorphological objects. In 1995, the first

Regional ProGEO meeting, "Conservation of the geological heritage in SE Europe", took place in Bulgaria and the Bulgarian National Group for geological conservation was organized. From 1995, it initiated important activities towards an inventory of geodiversity. After the foundation of the Bulgarian National Group, the first Framework list of Bulgaria was published (Wimbledon *et al*. 1998). The first project on conservation, "The Geological heritage of Bulgaria: sites of special scientific interest", was undertaken (1996-2000) and finished in 2003. More than 200 geological sites have been described in detail and registered within a database (Nakov & Todorov 2005).

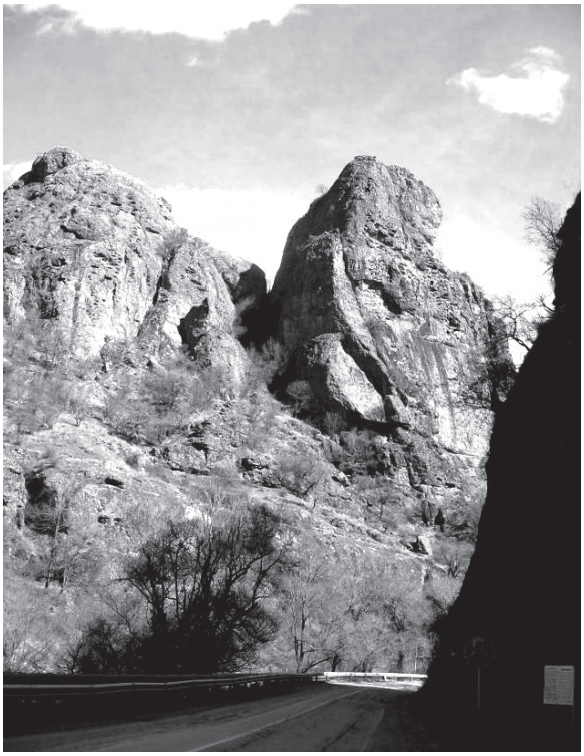

Fig. 6. - Rila Mt., Bulgaria (photo A. Maran).

BOSNIA AND HERZEGOVINA

Situated in the middle of the Balkan Peninsula, Bosnia and Herzegovina occupies an area of about 51,000 km^2. The country is rich in well-exposed and distributed geological phenomena, especially

in the karstic regions (e.g. Vrela Bosne springs, Skakavac waterfall, Rakitnica canyon). Although about 9,000 speleological objects have been registered, only a few of them have been examined in detail and protected (Sijarić 2005). Due to many political and economic problems, the protection and preservation of geodiversity and geoheritage have not been a social priority. But for the first time in 2003, preservation of the geoheritage was included within the Environmental action plan, separate from biodiversity conservation. Different associations and non-governmental organizations took part in the realization of projects regarding the protection of the geoheritage but their purposes concentrated mostly on tourism. In 2005, some endangered geological phenomena as the Pliva waterfalls and Una River and its tributaries were designated for conservation.

CROATIA

Within its relatively small territory, Croatia has about 450 designated protected areas. The Law of Nature Conservation (2005) recognized three categories of national natural heritage: 1) protected areas (reserves, national parks, nature parks, park-forests and natural monuments); 2) protected biodiversity objects (flora, fauna, fungi); and 3) protected minerals, resources and fossils. Until 1996, Croatia did not have a distinct decree regarding geoheritage. The Law of Nature Conservation registered some geological features (geomorphologic, paleontological and mineralogy objects and sites) but only within the designated protected areas. In 1996, the National strategy for environment protection finally distinguished geoheritage geoconservation. During the past five years, many efforts have been made to identify geological phenomena as an especially valuable part of nature. The Croatian Geological Society joined ProGEO in 1997 and started to build the national geoheritage database in cooperation with other geological institutions. Geoconservation has finally become an official working topic in the Institute of Quaternary paleontology and geology in the Croatian Academy of Sciences and Arts.

FYROM

Geoconservation activities in Macedonia started 50 years ago. The geological heritage was recorded and protected as an inseparable part of the natural resources and the Institute for Protection of Natural Rarities was the institution responsible for these activities. About 50 sites have been identified and 22 have been legally protected. In the last five years, however, attention to geoconservation has been considerably reduced as a result of an inadequate institutional base and state indifference concerning fundamental geological research. Recently, though, the Agency of Environment, National television and the Speleological Association have made significant efforts to popularize geoheritage.

GREECE

Greece is located in the south-eastern part of Europe, in the eastern Mediterranean region, on the convergence area of two tectonic plates. Such a geographic position results in a complex geological structure and a great variety of geological features, formations and processes, some of which are very significant both internationally and nationally. It was the Institute of Geology and Mineral Exploration of Greece (IGME) that first undertook the idea of geoconservation. In 1982, the representative geological sites were registered for the first time and disposed to the Ministry of Culture. This initiative was suspended, however, until 1995 when a new working group was established in order to compile systematically a complete network of the most instructive Greek geotopes (Teodossiou-Drandaki 2005). Other tasks were to find out how geoconservation appears in the Greek legislation and work towards further legislative proposals and geotopes protection. Subsequently, many relevant activities have contributed to a new concept of geological heritage conservation and new terminology as well as education and training. Besides IGME, universities and other institutions, namely the Natural History Museum of the Lesvos Petrified Forest, the first Greek European Geopark, and the Natural History Museum of Crete among others, have taken part in the conservation of the geological heritage.

ROMANIA

The Romanian territory has very complex geological structures comprising orogenic belts and foreland areas. The age of exposed rocks ranges from Archean to Holocene. The first law concerning nature conservation in Romania was enacted in 1930 (Grigorescu & Andrasanu 2003). As a result of this law, in 1935 the Ministry of Agriculture and the Regional Commission began to act towards the foundation of the first National Park, the Retezat Mountains. The first designated geological site was the Detunata basalt columns in Apuseni Mountains (1938). New laws for nature protection were promulgated in 1950, 1973 and 1995. Local administrations received strong support from The National and Regional Commissions for the protection of natural monuments to

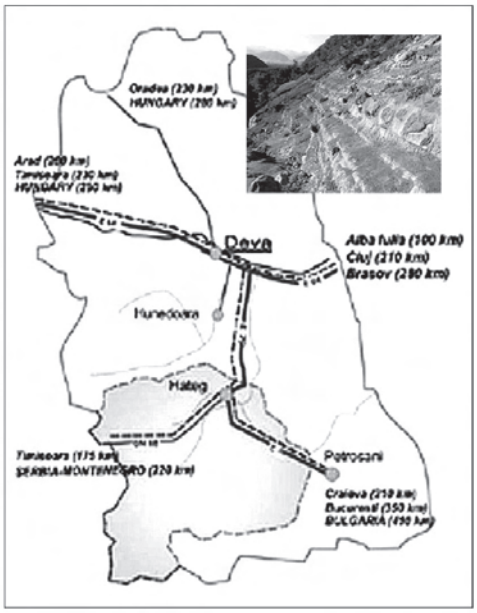

Fig. 7. - Geographic position of the Hateg Geopark with the Upper Cretaceous fossiliferous site.

survey and popularize all protected areas. Based on this framework, the National Protected Areas Network (NPAN) was established and tens of geological monuments and reserves were assigned for protection. By late 1995, NPAN comprised more than 200 officially protected geosites (e.g. geological reserves, geological and paleontological monuments). In the last ten years, cooperation among several institutions has allowed

a new geoconservation strategy to be set up; it is closely connected to similar strategies in other European countries, particularly with the ProGEO activities. The National Board for Geotopes Conservation was created and officially recognised by the Romanian Academy and the Ministry of Environment. The role of the Board is to supervise sites inventory, including classification criteria, geotopes database and protection. The Board established the National List of Geotopes, which comprises 26 sites of international interest.

Hateg Park was promoted as a European Geopark in 2005. Hateg is located in southern Transylvania, close to the main route to Hungary, Serbia and Bulgaria, covering an area of 103,400 ha and comprising 11 municipalities with 38,500 inhabitants. The geological history of the Hateg area dates back more than 300 million years. Within the area numerous geosites are presented (bauxite quarries, reef limestones, areas of volcanic activity, Upper Jurassic, Paleogene and Neogene fossiliferous sites, karst and cave systems) as well as famous archaeological, historical and cultural sites. Hateg is well-known as the "dwarf dinosaurs of Transylvania" (Grigorescu 1983; Grigorescu & Andrasanu 2003; 2004; Maran & Grigorescu 2006); it contains fossil remains of the last dinosaur assemblages in the world that belong to Maastrichtian age (Upper Cretaceous).

SERBIA

The territory of Serbia entails six major geological units: the Dinarides, the Vardar Zone, the Serbian-Macedonian Massif, the Carpatho-Balkanides, Danubicum, and the Pannonian Basin. Due to its complex geological evolution and history, many geologists are involved in systematic and detailed surveys and research. The first geological investigations in Serbia originated in the early part of the 19th century. The beginning of the 20th century was the golden age for nature research and geology. The first conservation appeal, the proposal for the conservation of the Zlot caves in eastern Serbia, was initiated in 1924; the first legislation for nature protection which related to natural park selection and its conservation dates back to 1938. Protection of geological monuments was mentioned for the first time in 1946 in the

Law for conservation of cultural properties and natural rarities (Maran 2005). Until the foundation of the Institute for Nature Protection of Serbia in 1948, the conservation of nature and natural rarities was under the competence of the Natural History Museum (Maran 1998).

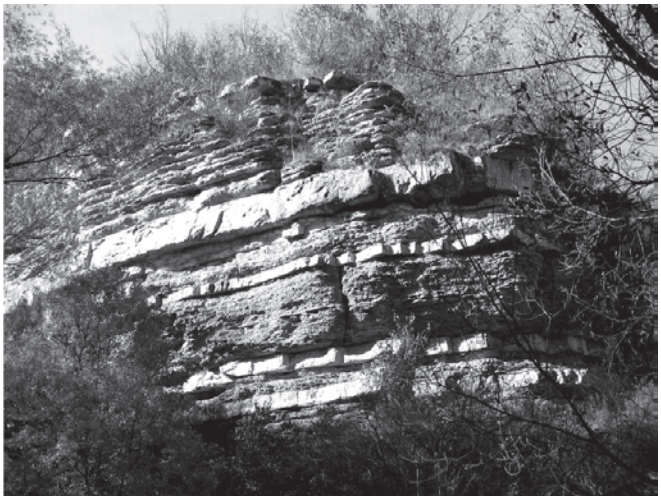

Fig. 8. - Protected Jurassic Geosite "Boljetin", Djerdap Gorge, eastern Serbia (photo A. Maran).

About 540,000 ha or 10% of Serbian territory is under statutory protection. Protected natural resources of Serbia fall into 6 categories: 1) national parks (5); 2) nature parks (10); 3) nature reserves (72 + 4 areas in the process of being protected); 4) landscapes of outstanding value (14 + 5 areas in the process of being protected); 5) areas of cultural and historical importance (41); 6) natural monuments (botanical, geological and hydrological, 287 + 9 areas envisaged for protection). Until the late 1990s, protected geosites, most with geomorphological phenomena and features, numbered only 80. Reconsideration of the protected sites began in 1991 when the new Environmental Law was passed. In 1995, Serbia (at that time Yugoslavia) joined ProGEO and started to implement its strategy. Since then, after the First Conference of the Geoheritage of Serbia, the Yugoslav National Council for Geoheritage (soon after Serbia & Montenegro, today Serbia only) was organized. Based on the recommendation of the ProGEO, the National Council for the Geoheritage of Serbia and Montenegro initiated a Project for an Inventory of the geoheritage sites of Serbia in 1996. This project was

voluntary and undertaken by eminent geologists divided into 16 working groups. In addition to 80 officially protected geosites, over 650 more have been designated for conservation and categorized. In recent years, various projects and activities have worked to promote and implement geodiversity and geoheritage conservation. The most significant outcome is the foundation of the Stara Planina Geopark (Mijović 2005). The Center for the conservation of the movable geoheritage of Serbia was established at the Natural History Museum in 2007 in order to ensure the acquisition and conservation of important geological objects and their promotion. In addition, specific concerns are dedicated to the definition of national strategic conservation objectives, the registration of all geological collections within institutions and in private property, and the evaluation of movable geoheritage, as well as to the activation and implementation of the legislative procedure.

Currently, Serbia is undergoing an economic transition and development moving towards full membership in the European Union. In this regard, almost all legislation and procedures are adapted to EU standards and have already been put into place. However, geodiversity conservation has still not achieved the adequate status, level and treatment that biodiversity has.

SLOVENIA

Geological heritage preservation as part of nature conservation is under the auspices of the Environmental Agency of Slovenia. Until 1995, about 100 geological sites of national importance (excepting geomorphological ones) were registered, 25 of them protected as geological or complex natural monuments (Hlad 2005). Intensified cooperation with the IUCN Commission on Education and Communication in 1997 resulted in "Nature management in partnership", an international project with a duration of five years. The project was an opportunity for the EA to undertake communication capacity-building and equip conservation staff with the knowledge and skills to plan and use strategic communication to improve nature conservation efficiency and effectiveness.

The new Slovenian Nature Conservation Law was adopted in 1999 and covered all relevant measures in the field of geological

heritage conservation. Its important and challenging task was to develop a proper management system that could cover: 1) designation as a natural monument or other type of protected area (management of the protected area); 2) contractual conservation (agreement with the owner of the property) or 3) custody of the natural heritage

Fig. 9. - Karst nature monument, spring of the Sava River, Slovenia (photo A. Maran).

(agreement with the organisation or individual who is not the owner of the property). Between 1999 and 2003, the expert team constructed major geotectonic, mineralogical, metalogenetic and hydrogeological frameworks in Slovenia. Natural heritage was verified by decree in 2004 and it embraced more than 700 geological sites; 450 have national importance. In addition, movable geological heritage was also listed (the first-described vertebrate and invertebrate fossils and macrofossils in Slovenia).

TURKEY

Turkey is the most eastern of south-eastern European countries, forming a geographical, historical and cultural bridge between Europe and Asia. It occupies an area of 778,000 km^2. Turkish territory lies on

the border between two main geostructural units, the Arabian part of the African platform and the Asian branches of the Alpine geosyncline. Anatolia, the Asian part of Turkey, is characterized by extensive volcanic activity, particularly of the Neogene-Quaternary age, that resulted in such various and spectacular geological features as sleeping stratovolcanoes (Erciyes Mt., Karacadag Mt., Hasandag Mt., Nemrut Mt., and Agro Mt.), calderas, volcano and tuff cones, and pyroclastic covers (Kazanci *et al.* 2005). Since most of the Anatolian geological structures are also made up of carbonaceous and evaporate rocks, the karstic features are very common as caves, pits, dolines and poljes. The Taurus mountain range forms the important part of the Alpine-Himalayan orogenic belt and transverses the whole of Turkey from the west to the east. Many typical tectonic structures such as thrusts, nap folds, fractures, anticlines and synclines can be observed within this belt.

JEMIRKO (today the national ProGEO group of Turkey) was established in 2000 as an NGO, registered in Ankara. At the beginning, it was an amateur group, formed by a few lecturers and students from Ankara University that started to work on geoconservation issues. Between 2000 and 2005, a series of meetings and conferences (including ProGEO WG1 Ankara meeting) was organized by JERMIKO and many activities were initiated towards geoheritage conservation.

The selection and nomination of scientifically important geological phenomena are very difficult tasks due to the wide range of geodiversity and geoheritage representatives in Turkey (Saroglu *et al.* 2005). There are so many well-exposed profiles of Caledonian, Hercynian and Alpine orogenesis, a typical succession of epochs from Precambrian to Quaternary, 54% of boron reserves of the world, caves (up to 2,500), modern lakes (more than 300), seismically active normal and transform faults, sedimentary and tectonic basins, valuable rocks, minerals and fossils etc. There are 646 natural sites, 33 national parks, 16 natural parks, 35 nature conservation areas, 58 natural monuments, 12 specially protected areas and 116 wetland areas in Turkey (Inaner *et al.* 2005). However, only two geosites, Pamukkale (famous carbonate terraces) and Cappadocia (erosion earth features), are officially protected and included on the world heritage list of UNESCO.

CONCLUSION

Better understanding of the many profound agents of impact and of significant and potentially damaging activities is required if we want to conserve and manage geodiversity properly. Threats to geodiversity are the result of development pressures and land-use change or of natural processes and human-induced change. Biodiversity (biotic part of nature) and geodiversity (abiotic component of nature) are the two elements which determine the possibility of supporting a sustainable development. However, there is still a great disproportion between studies on biological diversity and on geodiversity. Biodiversity conservation already has international conventions and many outstanding projects, while study on geodiversity is a relatively young scientific field. Although geodiversity is recognized worldwide, there is a need to intensify efforts to achieve better approaches to the conservation of geodiversity: to establish adequate official legislation for protection on a national level, to standardize concepts and geodiversity terminology, to develop mapping of geodiversity, to create a European atlas of geodiversity, as well as to prepare a draft of an international convention on geodiversity protection.

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ГЕОЗАШТИТА У РЕГИОНУ БАЛКАНА ПРАКСА И РЕГУЛАТИВА

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Р Е З И М Е

Појам геодиверзитет уведен је у геолошку литературу деведесетих година прошлог века да би се описали абиотички (геолошки, геоморфолошки, педолошки) феномени и потенцирао њихов егзистенцијални и еколошки значај за развој и еволуцију живог света на земљи. Познавање и вредновање укупног геодиверзитета на планети кроз проучавање геолошке разноврсности појединачних региона чини полазну основу за његово очување, заштиту и рационално коришћење.

Европска асоцијација за заштиту геонаслеђа, ProGEO, основана је 1991, са циљем да очување (репрезентативних) феномена геодиверзитета постане интегрални део заштите природе. Активности ProGEO реализују се кроз активно учешће представника земаља-чланица у оквиру регионалних радних група на издвајању, инвентарисању и заштити објеката геодиверзитета: ProGEO WG1 (група за југоисточну Европу); ProGEO WG2 (група за централну Европу) и ProGEO WG3 (група за северну Европу). Група за југоисточну Европу (ProGEO WG1) формирана је 1995. Прве чланице биле су Албанија, Бугарска, Грчка, бивша југословенска република Македонија, Румунија, Словенија и Југославија (Србија и Црна Гора). Приоритети WG1 су: а) размена информација и искустава о начинима и могућностима заштите геонаслеђа, б) израда инвентара геолошких објеката од интернационалног, националног и регионалног значаја, в) компјутеризација база података и формирање јединственог геолошког информационог система (GIS), г) утврђивање законских и институционалних оквира за очување геонаслеђа, д) селекција и номинација интернанационално и национално значајних геолошких објеката за листу светске културне и природне баштине, ђ) промоција и презентација објеката геонаслеђа кроз светски препознатљив UNESCO Геопарк програм.