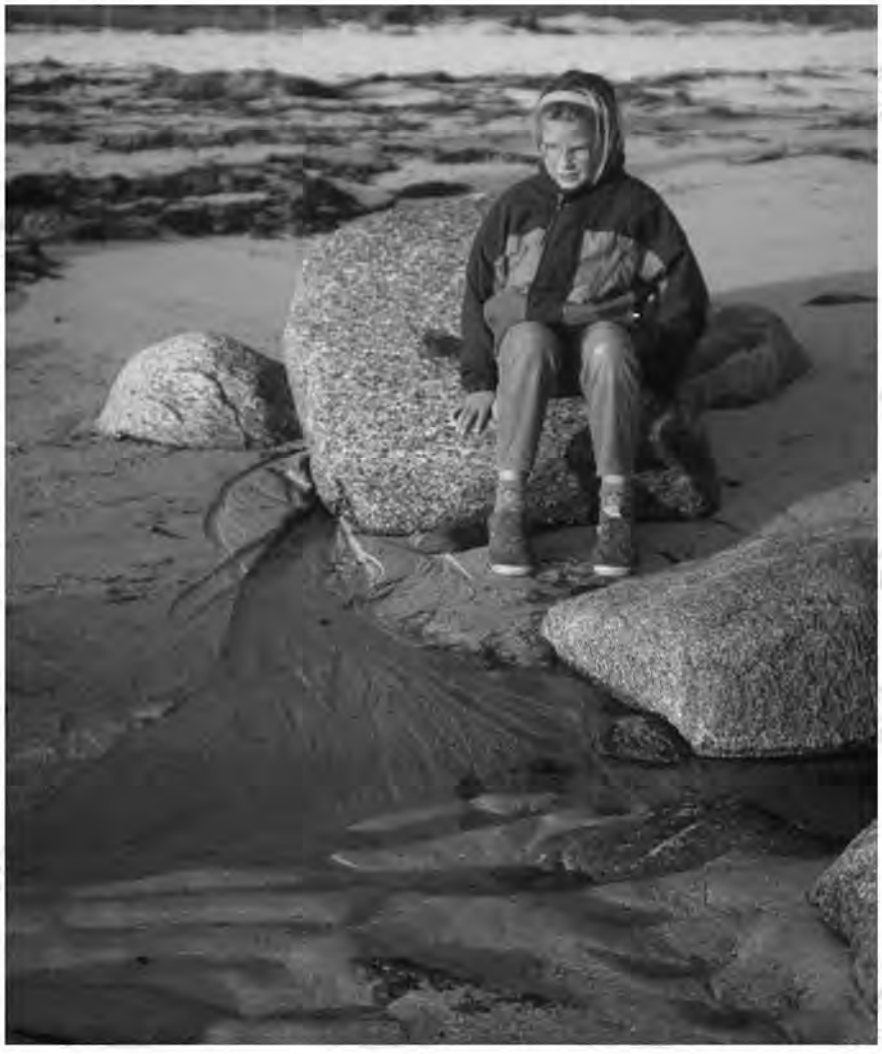
ProGEO NEWS

No.1 1999



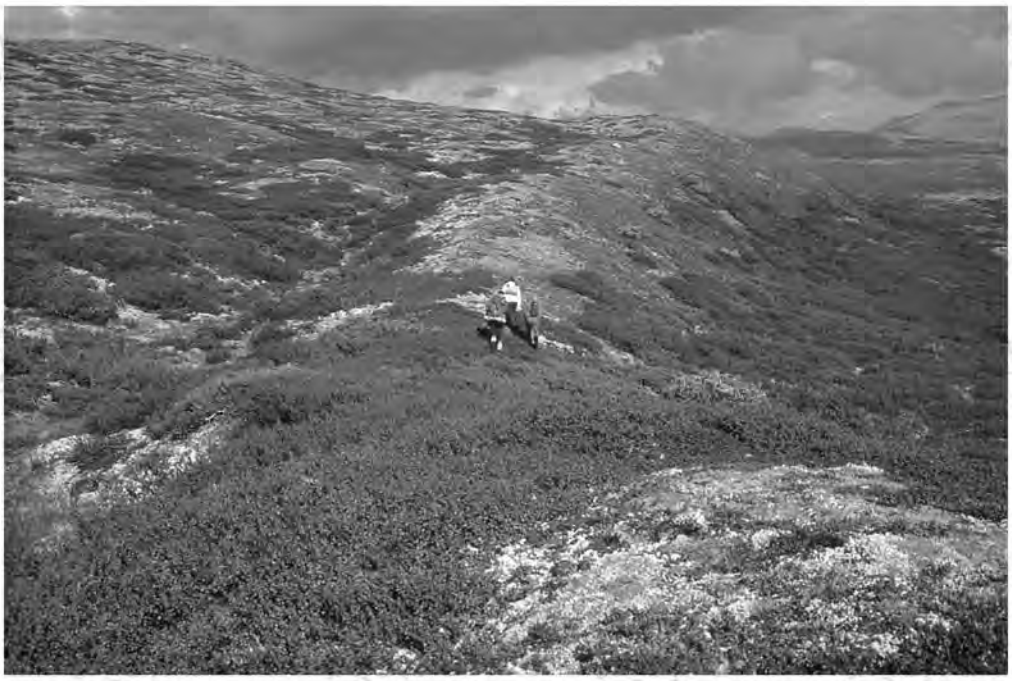
Geodiversity on a detailed and personal scale
Photo: Lars Erikstad

Geodiversity in The Nordic countries

Over the last years a project under the Nordic Council of Ministers has been running to develop the idea of geodiversity and its relevance for nature management in the Nordic countries. This project has been reported in ProGEO NEWS on several occasions and now when the work soon is completed, we present the draft for the summary of our report. Comments on the draft will be welcomed. The project group consists of the following members: Carl Erik Johansson (Sweden), Steen Andersen (Denmark), Markus Alapassi (Finland) with the help of Veli Suominen, Kristjan Geirsson (Island) and Lars Erikstad (Norway). Annika Jansson is secretary of the group. The full report is scheduled to be completed as manuscript during spring 1999.

The concept 'Geodiversity' means the variation of the bedrock, the deposits, the terrain forms, and the geological processes that form landscapes. The project *Geodiversity in Nordic Nature conservation* aims at introducing the idea of geodiversity in the Nordic countries. The introduction is directed to planners, nature managers and decision-makers in connection with land-use and nature management but also to schools and the public.

Geodiversity founds and manifests important parts of



Nordic geodiversity in end moraine formation. Above: late Younger Dryas moraine from Dovre, South Norway. Under: much older moraine complex " Mols Bjerge" , Jylland, Denmark. Note the diversity in age, location, scale and complexity within this same landform group. Both photos: Lars Erikstad

landscape diversity. It gives the frames and structures for ecosystems and biodiversity.

Geodiversity describes the variation of geological phenomena and processes in a defined area. This may be a district, a region, a continent etc. Geodiversity is related to scale depending on the size and the detail degree when studying and describing an geological phenomena. Different levels and scales can be distinguished for geodiversity as well as for biodiversity. Geodiversity is an expression of different *geological environments*, such as volcanic, glacial, fluvial or littoral; and themes; e.g. stratigraphy, morphology. *Biodiversity* depends essentially on *geodiversity* - on the geological environment with its variations. For instance, some plants need certain minerals and elements; certain plant societies are rooted in specific substrata, and some animals are adapted to sand dunes, others to river banks. Certain vegetation types indicate specific geological features. Geodiversity gives *landscapes* their profiles with *landscape elements* built up

by geological building-stones.

Diversity is one of the factors and criteria that determine the nature values of a site or landscape area. Diversity can be directly measured as well as size. Incisions and disturbances can also be recorded. Rarity, representativeness and scientific importance are derived from comparisons based on a wider knowledge. Remarkable conditions, such as scenery (beauty) are the most subjective criterion.

Minerals, bedrock and cover deposits are *natural resources* that cannot be regenerated after excavation. *Geotopes* are sites with defined geological and morphological phenomena and processes. They have basic importance for *biotopes*, landscape parts with a relatively uniform character and structure. Biotopes are living places for different plant and animal species - *habitats*.

Geodiversity is related to geological nature types, land forms and regions. These are developed and described from a framework for Geosites in Northern Europe drafted by Johansson et al (1998). The headlines of the framework are: principal features of the bedrock, the Quaternary cover, the land forms and geomorphological regions.

Nordic geological nature and landscape types with a great importance in an external perspective are, e g: Icelandic lava fields and geysirs, the sandur (outwash) fields of Svalbard, S Iceland and W Denmark, the Norwegian fjords and coastal flat, the bedrock archipelagos of E Sweden and SW Finland; the moraine archipelagos of the Botnian Sea and Gulf, the 'drowned' moraine landscape of Denmark, glaciers, ice-margin formations and eskers, raised cobble-fields, dune fields, and large mires in Sweden and Finland.

The above-mentioned nature and landscape types are all characteristic for their physical geographical regions. They may seem trivial in a local perspective - but many of them have a great international importance because they are very characteristic and well representative for their regions, landscape and nature types, geological development and morphological processes.

Geosites are geological or geomorphological sites, terrains or landscapes of outstanding value, making an indispensable contributions to the understanding of the geological history of a country, region or continent, and of broader or global patterns (Wimbledon et al 1997).

The introduction of the geodiversity concept is directed to planners, nature managers and decision-makers in connection with land-use and nature management but also to schools and the public. Management includes planning, handling matters and environment impact analyses in connection with the use of natural resources and the influence on landscapes, geotopes and biotopes from land use of different kinds. A management strategy must comprise far more than selecting and delimiting sites and areas for special nature management measures. All management measures should be directed towards specific targets for landscape and nature protection with regard to geodiversity as well as biodiversity. Nature protection is an integrated part of a total strategy to safeguard the diversity nature.

Management of geodiversity takes place in different levels and contexts: national (state), regional (counties) and local (municipalities), and in the private property. It is performed by community organs, companies and individuals. Overall consideration to the nature-values (including geological ones) is an important part of nature management. The Nordic countries have a special responsibility to protect, for instance, landscape and nature types characteristic of Norden. Some of them are exemplified above.

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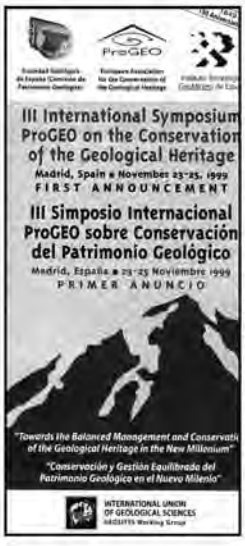
Symposium



III International Symposium
ProGEO
On the Conservation of the Geological Heritage
23-25 November 1999

First announcement is now out: contact:

TILESA O.P.C., S.L.
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ProGEO 98

Quotations from the messages sent by the participants in ProGEO'98 Meeting after the Meeting:

"Thanks for everything, the good time spent together, the good organisation, the nice excursions, the friendliness of Bulgarian and everything else I'm forgetting" (Jo De Waele, Sardinia, Italy);

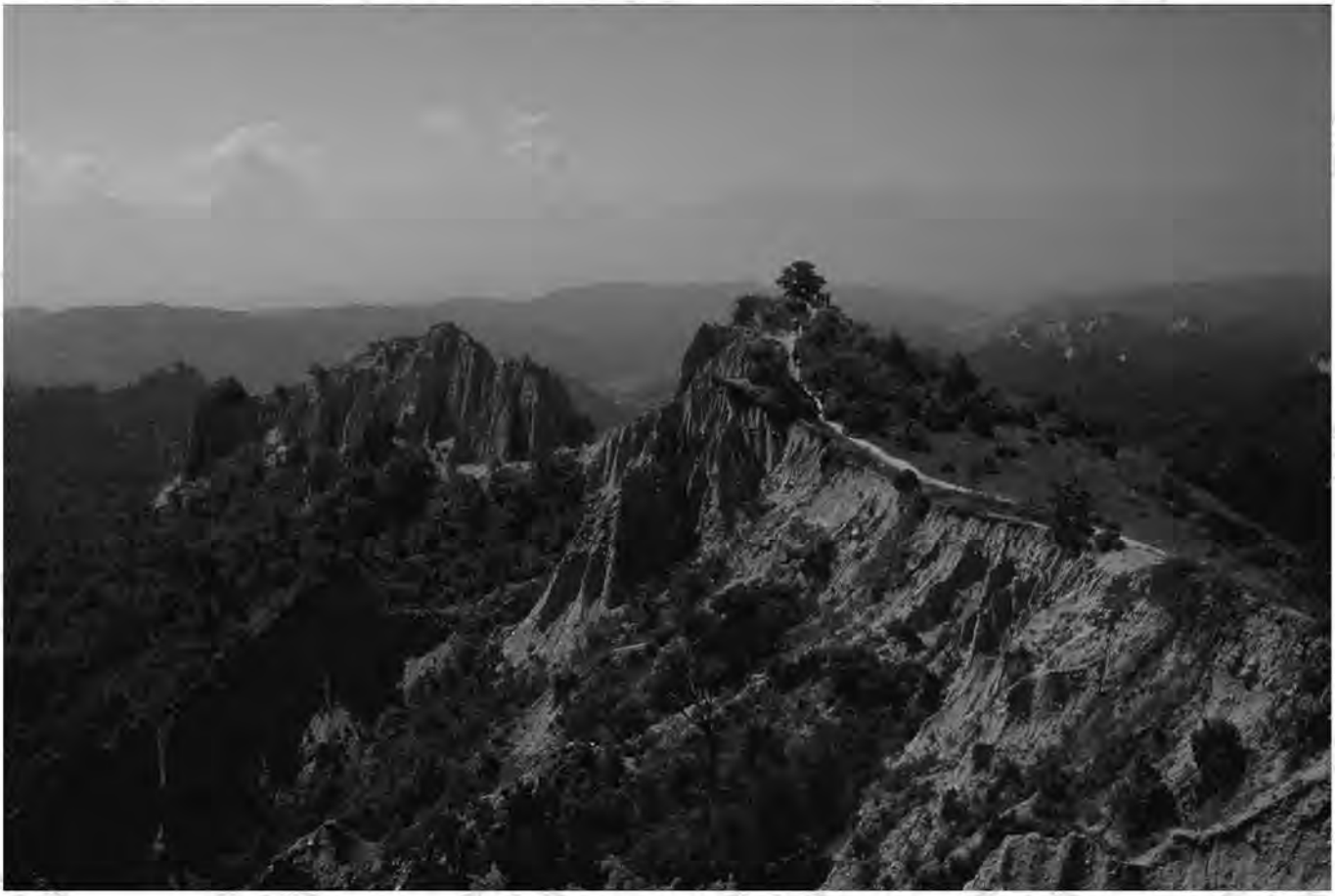
"I have no words to thank you about the wonderful week I spent in Bulgaria. You were so kind and pleasant as I couldn't imagine before. It was really interesting meeting, I saw wonderful landscapes and geosites, I knew nice people, I received very kind hospitality and help from all Bulgarian friends... I was so exciting to be with ProGEO friends in Bulgaria... Many congratulations for your organisation and again.... MANY THANKS" (Maurizio Burlando, Secretary of ProGEO Italy);

".... it was a great pleasure for me to participate the meeting in Bulgaria. I have got a lot of inspirations and contacts with very good fellows" (Werner Kube, Germany);

"Thank you very much indeed for your hospitality during the Meeting, allowing us to see your wonderful Bulgaria" (Jonas Satkunas, Deputy Director of the Lithuanian Geological Survey, Vilnius, Lithuania);

"Back in my country I remember with pleasure your beautiful country, your kind hospitality and the interesting people I met in the ProGEO'98 meeting" (Dimitri Charalambous, Athens, Greece);

"In Belogradchik it was hot but the air was clean and the landscape beautiful. I must say, I liked it very much, the geology but also the way you took care of everything with perfect timing and good sense of organisation and always smiling and friendly....Please give my best regards to him (Prof. Todor Todorov) and many thanks for his good organisation and the very interesting meeting we could have together in this wonderful environment...." (Margaret Patzak, UNESCO, Paris, France);



Melnik piramids at the ProGEO 98 excursion, Bulgaria. Photo: Veli Suominen

"I would like to thank you again for the successful and very interesting meeting we had. Everything was perfectly organised and I enjoyed a lot the program with Bulgarian folk music, dancing and signing..." (Margaret Patzak, UNESCO, Paris, France, new e-mail message);

"Thanks again for all. Was perfect. Congratulation. Best regards to our Bulgarian colleagues" (Alexandru Andrasanu, Romania);

"I just talked to Gunnel, and we recapitulated some lovely memories of our visit. All of us are very happy we have had the opportunity to see your country, not for the last time, we hope..." (Lars Karis, Uppsala, Sweden);

"Everything was OK... I enjoyed a lot the meeting and I want to express my gratitude to you for organisation and great attention..." (Elena Druget, Barcelona, Spain);

"I very much enjoyed the meeting. It was a great success! " (Chris Cleal, Cardiff, Wales, UK);

"I am writing to thank you very much for the nicest conference you kindly organised for us. It was a great time with absolutely fantastic sites and interesting meetings. I am very impressed with gigantic work you have carried out to host the conference. All was perfect..." (Natalia Gerasimenko, Kiev, Ukraine);

"I am thankful to you and the whole Bulgarian Organising Committee for the well organised ProGEO'98 Meeting. It was a great pleasure to participate in it. We had the opportunity to see many outstanding geosites of world-wide importance. The conference and excursions were well organised .... The time spent in Bulgaria was wonderful..." (Rein Raudsep, Deputy Director of the Estonian Geological Survey, Member of the ProGEO Executive Committee, Tallinn, Estonia);

"First thanks for everything to you and Vanya and to all friends in Bulgaria. The opinion generally was that it was a splendid meeting!" (Bill Wimbledon, ProGEO Executive Secretary, UK).

ProGEO **Carpathian-Balkan Geological Association**

VI Congress In Vienna, Austria (30/8 – 2/9 1998)

For the first time in the Programmes of the Congresses of the Carpathian-Balkan Geological Association Special Symposium on the Natural Heritage and Nature Conservation was included.

The following papers were presented in the oral session, chaired by Dr. Werner Janoschek, the President of the Organising Committee:

- UNESCO geoparks - a new initiative for conservation and development (F.W. Eder, Paris);
- Conservation of geological heritage in Bulgaria: present state and future initiatives (T. Todorov, Bulgaria);
- information for the ProGEO and its Working Groups;
- Geotope research in Austria: an overview (T. Hofmann, Austria);
- One billion years of Earth history and 30.000 years of human settlements."Kulturpark -Kamptal" - a tourist-project at the SE Edge of the Bohemian-massive, Austria (F. Steininger, Germany);
- Protection of the natural monument in the Erdobenye region (Tokaj Mts., NE Hungary) (P. Rozsa, M. Kozak, Hungary);
- Differences in weathering of the Carpathian flysch sandstones related to the concentration of atmospheric pollution (W. Wilczynska-Michalik, Poland).

In the poster session the following papers were included:

- Characteristics of environmental disruptions caused by exploration and processing of magmatic and carbonate rocks (S. Cmiljanic, Yugoslavia);
- The impact of alteration processes onto the technical properties of andesites within certain deposits of Serbia (S. Cmiljanic, Yugoslavia);
- Depositional architecture of the Serravallian deposits: silococlastic turbidity fans - Zvernec outcrop in Albania (C. Durmishi, Albania);
- Important paleontological sites in Eastern Serbia (A. Maran).

Related to the Symposium topic, the following presentations were also included in an other Symposium session:

E.W. Eder (UNESCO, Paris) "Geological Heritage and the Role of UNESCO" given as an Introductory lecture during the Open Ceremony

Mrs. I. Theodossiou-Drandaki (Greece) "Let's give space to the urban natural environment"

The abstracts of all presentations are included in the Abstract volume of the Congress. More than 25 participants took place in the Symposium session.

As a ProGEO President I would especially like to thank to the Organising Committee for possibilities to have this interesting Symposium in the framework of the 16th Carpathian-Balkan Geological Association Congress.

Prof. Todor Todorov

ProGEO **On the net: http:// www.sgu.se/**

From the President

Dear ProGEO Members and Friends

1998 has already passed and it brought us some good and some bad things. First of all 1998 marked a jubilee for ProGEO! In 1998 we celebrated that it was five years from the creation of our Association and 10 years from the starting of the predecessor of ProGEO, the so-called "European Earth Science Conservation Working Group". These small anniversaries were noted shortly during the 1998 ProGEO Meeting in Belogradchik, Bulgaria, with the hope that our Association will continue to increase and develop in the future, and thus will reach its 25th as well as its 50th , 75th and 100th Anniversary! We, the Founders and the Current Members, hope very much that our followers will make their best for the prosperity of ProGEO! I do not doubt, no, I do indeed believe, this will going to happen! Good luck to ProGEO and to its members who indeed work for pro-GEO and for geoconservation all over our continent!

As you know, the last annual Meeting of ProGEO took place in Bulgaria in June 1998. The participants in the Meeting will remember their stay in Bulgaria, I hope, with thrills of joy. I am very sorry some were busy or of other causes were not able to come. But the information and Report for the Meeting were already published in the ProGEO News No. 1 for 1998 and the Proceedings will reach everybody in the first half of the year. They should be of interest for everyone who want to repeat the Field Trips and get informed about the results of the meeting.

Since ProGEO meetings will be held every second year, the next meeting will be in the year 2000. According to the latest information ProGEO'2000 (with elections) will be organised by our Czech Friends in Prague in the beginning of June 2000. Before that there will be a big Symposium in Spain this Autumn, which will be organised by our Spanish Friends during the celebration of the 100th Anniversary of the Spanish Geological Survey. I hope very much to meet many of you during the Symposium with new results and ideas!

Among other good things were the fact that our ideas concerning conservation of the Geological Heritage conquered new spaces and were included in the Programmes of other Geological and Congenial Organisations and Institutions, such as: International Geological Congress, Carpatho-Balkan Geological Association, International Association of Engineering Geology and the Environment, Institute for Protection of Nature of Serbia etc. I especially would like to note the presented New Geopark and Geosite Programme of UNESCO Earth Science Division. ProGEO wants to play an important role in the development of this program. The IUGS/UNESCO Project on Global Geosite List and the Project on Geodiversity in the Nordic countries were developed further. The Balkan Peninsula countries continue their efforts entering the SE European Geoconservation Project in some of the International Programmes and to involve ProGEO in the Pan-European Bio- and Landscape Diversity Strategy Programme. Some new perspectives will come soon by the acceptance of the Fifth European Framework Programme of the EU. I hope very much that ProGEO as a whole and many of you will succeed with the Projects in this Programme. The Projects on the National levels are in a process of development in many of the European countries.

Now some words for the bad things, which happened during 1998. They can be divided into two:

The news, which brought grief to all of us - the death of one of the founders and the first President of ProGEO - George Black. It was a heavy loss for ProGEO because one of our best friends left us! I do not doubt that we in memory of George will do our best to continue and develop his ideas related to the Geoconservation. The Proceedings Volume of ProGEO'98 Meeting will be devoted to his Memory.

The other bad news from 1998 are practical problems that can be corrected. Let us therefore concentrate on the aims of correction:
* As ProGEO President I would like to see a regular publishing of our ProGEO News and more impressing contributions from all ProGEO friends and from all countries
* good and useful contacts with other International Programmes, Organisations and Institutions
* more active involving of some of the ProGEO Executive Committee and ProGEO Council members in the ProGEO activity
* regular payment of the ProGEO membership fee.

As an overall conclusion I think ProGEO and its members had a good and successful year in 1998! I hope very much that 1999 will be happy and successful for all of you and for ProGEO. To improve ProGEO for the new millenium, we have to continue our efforts to develop and realise our ideas in Geological Heritage Conservation!

Good luck, Friends!

Site management

Making geological localities accessible and visible

Introduction

The task of managing geotopes building up our geological heritage is as complex as the geotopes themselves. Although most geotopes are threatened by the activity of man, natural processes also may represent problems for the geotopes as we want to see them. This especially when fossil geotopes are overrun by natural processes (by themselves producing new geotope characteristics which may bee in conflict with what is considered to be the most important aspect of the site). This may be observed in different scales in nature.

In a mesoscale we observe that geotopes may be covered with scree or disturbed by floods and earth slides, and they may loose accessibility by growth of forests or different kind of vegetation. On a more detailed level the quality of especially rock surfaces may be obscured by weathering, lichen and algae growth, dirt and similar.

Although Norway, situated far to the north, is blessed with less plant growth, and that our active geological processes from glaciers, high mountainous erosion and river activity give us quite a lot of selfcleening geotopes, we observe these problems especially on artficial rock surfaces. These localities often need some help to maintain their quality in telling us about the formation of the Earth and its transformation, trough rocks, fossils and landforms.

It is necessary to develop different cleaning techniques which can fill the need for management on localities important for science research, teaching and information to the public. The various engineering techniques is often well described in different journals, reports and similar. Among important journals of this type is the British "Earth heritage" and the French "Strata". The lack of more common and widespread international journals dealing with issues like this do, however, represent an obstacle for the development within this field. Although the need for local adjustments and non-scientific practical solutions, the existence of a more widespread and common literature would surly benefit the field.

Wet sandblasting performed on a rock surface at Domkirkeodden, Hamar. Photo: Jon Markussen

A small experiment

Ten years ago we carried out some cleaning tests in order to expose and improve the quality of three rock surfaces of different geology within the Oslo field.

At **Gjettum**, near Oslo, a vertically tilted limestone of Silurian age was treated with wet sandblasting. The rock surface belonged to a road cutting several decades old that was going to be expanded due to the building of a new bicycle route. Therefore heavy damage could be risked as part of the experiment. The wet sandblasting method proved very efficient, and removed easily grass, mosses and lichens. However, we also discovered that this method had the capacity to alter the surface characteristics. Naturally weathering on this rock give a positive relief to the fossils

(brachiopods and chrinoids), as they stand out of the surrounding matrix. Treated with sandblasting, the fossils proved less durable than the matrix, and heavy treatment showed fossils as a negative relief.

Careful wet sandblasting was an excellent method here to pin point the geological content of the site for school classes and the general public, but proved too rough for scientific purposes because delicate details too easily were destroyed. Treatment with high pressure water or

The locality at Moelv Brygge. Note the outcrop to the right in the picture above compared with the rest of the outcrops. The difference is due to the treatment. The picture below is a detail from this outcrop after treatment.
Photos:
Lars Erikstad

acids may be good alternatives.

At **Domkirkeodden** in Hamar, north of Oslo, two segments of the same rock surface with shaly bedplanes of Ordovician age was treated separately, one with diluted hydrochloric acid (10%), and the other with wet sandblasting. This geotope was under nature protection and extreme care had to be performed to avoid damage to the site. The experience from the tests at Gjettum was used as guideline to find the balance between effective and too rough treatment on the segment where wet sandblasting was used.

The acid treatment gave a good result with excellent details of trace fossils, but heavy and time-consuming scrubbing was needed to get a nice surface. The wet sandblasting was far more efficient, and with careful performance to avoid damage to the surface, this method was considered the best for this locality.

At **Moelven brygge** just north of Hamar a late Precambrian tillite was treated with wet sandblasting. This rock surface was very much harder and robust than the two others with far less danger of destroying surface details. The wet sandblasting produced excellent results and proved highly efficient. The positive relief of the rocks in the more fine-grained matrix accentuated the visual as well as the physical feeling of this conglomerate really to be a fossil till deposit.

People from the neighbourhood was very pleased and proud of the result and expressed gratitude that formal nature protection was followed up in this manner. The management on this locality was later strengthened with an information sign, explaining the geological interests of the site.

This geotope is seen by many people every summer as it also is one of the harbours for the oldest Norwegian paddle steamer cruising the largest lake in Norway - Mjøsa. The treatment has, however, not been followed up by regular cleaning procedure as it should have been.

Conclusions

Wet sandblasting is a technique developed for careful removal of graffiti on building rock surfaces. It is easier to grade the impact of erosion than by using dry sandblasting. It is therefore an interesting technique for managing geotopes with delicate rock surfaces that has been covered by lichens, dirt and lost its direct visual information value by weathering.

On soft rocks with many details, however, it is a danger that too rough treatment may destroy important details. Great care must therefore be taken using this technique on soft rocks.

Active management of geotopes with high educational qualities is extremely important and will also benefit scientific interests as it raises awareness about our geological heritage. It is, however difficult to raise money for this purpose. Research and development of relevant techniques is hampered both by this, but also by the lack of international contacts and fora for discussion and publication.

Jon A. Markussen & Lars Erikstad

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Errata

The article "Study & Protection of the Geological Heritage" in "ProGEO News" 1998 N1 was written entirely by Marina Vdovets not by A. Lapo. We are sorry for this mistake.

The editor

Deadline for contributions to next issue of ProGEO NEWS: 15.3.99

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ProGEO NEWS

A PRIORITAIRE PAR AVION

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OG KULTURMINNEFORSKNING