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The Dushi Cave, Mirusha river basin, Kosovo

Geoheritage and Geotourism in the Mirusha river basin

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ProGEO-Kosovo visited the Mirusha River Basin in March this year.

The Mirusha river basin lies in the central part of Kosovo on the eastern side of the Dukagjini plain. The Mirusha river forms the left branch of the "Drini i Bardhe" river that covers an area of 337 km^2, 3.1% of the total land area of Kosovo.

Its geological structure consists of ultra basic rocks and volcanic-sedimentary formations (diabase cheart) of Jurassic age and the carbonates from the lower and upper Cretaceous. The area has large geoheritage value and a great potential for tourism. The most important geoheritage values are the canyon itself with lakes, waterfalls, caves, (Dushi cave, Ponorci cave, Zatriqi cave, cave of Azem Galices, etc.), karst forms, (ponds, scribes, karsts valleys, etc.) as well as decorative stones, bauxite, fossils, thermal spring water and a

The Mirusha Canyon

very characteristic appearance of the rocks. These values are important for science, education as well as for touristic use.

The canyon is the most interesting and beautiful part of the Mirusha river landscape. The canyon imposes a variety of morphological features and has 13 lakes and 12 waterfalls with different shapes and in different altitudes which represent a real tourist attraction. The largest width of the canyon is associated with the last lake, while the narrowest part is located in a segment of the fourth lake. This part is also the deepest with a depth of about 200 m. The shape and the size of lakes are conditioned by canyon position and the structure and lithological composition of limestone blocks. In 1983 a part of the lower Mirusha River was declared as a Regional Park (category V - according to IUCN (Protected Landscape)). The total area of Mirusha Regional Park is 556 ha.

The geodiversity of the Mirusha river basin represents important heritage components linked to geology, geomorphology and hydrology that should be managed and protected for the future. The area has also large biodiversity values. The largest part of the area is covered by a special form of oak forest (Associations Querrcetum farnetto - cerris scardicum Krasniqi 1968), which is one of the most widespread forest types in Kosovo.

Within the protected area it is identified 330 species of vascular plants and 44 species of high fungus (macromycete). Within the larger area of Mirusha 838 taxa are known including 590 species of vascular plants. The total number of endemic species is 21. Among them the species *Aristolochia merxmuelleri*, which is a steno-endemic species and so far it is not found elsewhere in the world.

Boar (*Sus scrofa*), badger (*Meles meles*), rabbit (*Lepus europaeus*), squirrel (*Scirius vulgaris*), wolf (*Canis lupus*), wild cat (*Felis silvestris*), (*Martes Martes*), maus (*Ondatra zibethica*), mountainous mous (*Apodemus flaviocollis*), hedgehog (*Erinaceus concolor L.*), terrestrial turtle (*Testudo sp.*). rocky poisonous snake (*Vipera amodytes*) are found. There also exists good condition for amphibian and fish species.

Urgent need for creation of the first Geopark in Ukraine

Bernashivka quarry.

Volodymyr Grytsenko, National Natural History Museum NAS of Ukraine, Kyiv National University of Taras Shevchenko, 15 Bogdan Khmelnitsky str., 01054, Kyiv, Ukraine (UA)

The sequent of Vendian rocks near Dniester River has been known only for fifty years. Before it was formally consider as Cambrian. After the work of the Russian academician B.S. Sokolov, Upper Precambrian was determined and it was established a connection with Ediacarian. V.Ya. Velikanov and others geologist have proven scientifically a more complete volume of Vendian than the Ediacarian sequence [1]. The Vendian reference section was a target exploration by many researchers since the 1966. V.M. Palij and V.S. Zaika-Novatsky first described Ediacarian fossils in 1968. A list of paleontological remains in the quarry now consist from numerous names prints of softbodies animals and ichnofossils.

The quarry was a sources of raw materials during a dam construction of the Dniester Electric Power Station and for bank consolidation. Now the base of the depression is much lower than the average level of the Dniester River. This is the reason for some springs in the quarry which are compensated by pumping.

The samples imprints of different animals on sandstones

The excavation outcropped a sequence of the Mogiliv-Podil'sky series. This sequence includes the sections called the Mogiliv and Yaryshiv suites, which are represented by interbedding siltstones, sandstones and argillites. In the quarry some levels of soft body fossils and track fossils has been discovered [1]. Our last field work allowed us to find several new samples of Vendian fauna which could be compared with the Ediacarian one and the White Sea locality in Russia.

Before the Lomoziv suite was lacking paleontological characteristic. Only twenty years ago in the beds firstly outcropped by the quarry many samples of soft body fossils were discovered by Mikhail Fedonkin. Then the level with the fossils was covered by water. Now some new localities have been outcropped by excavations in the quarry.

The huge quarry show geological diversity from crystalline rocks to Vendian sedimentary rocks and Quaternary sediments.

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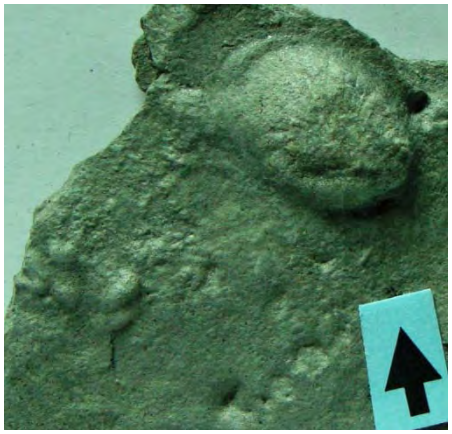

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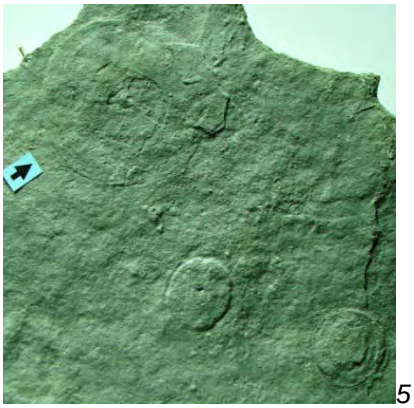

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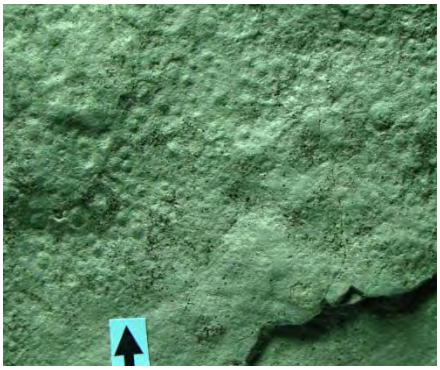

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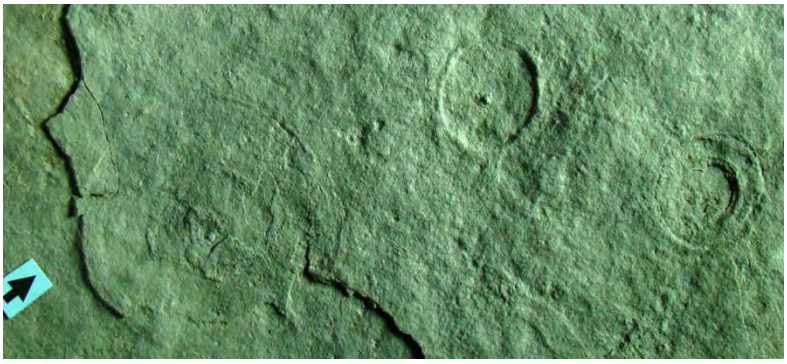

The samples imprints of different animals on siltstones (1-5, 7,8) and sandstones (6)

The locality has international importance as a geological, mineralogical, stratigraphical and paleontological site and do also have a tourist interest [1]. Active exploitation of the open-cut mine was stopped from 2010. And now we see two dangers for the site. The first is water, which eventually can cover place of fossil occurrence. The second hazard is activity of “black” paleontologist which has illegal business. They are robbers of national heritage and sell samples in wholesale and by retail to foreign countries with internet facilities.

To solve of the problems we propose to create a National Geopark in the quarry and outcrops nearby it [2]. It will be an outdoor museum of large blocks of the rocks with samples of fossils and minerals. This includes fluorite, pyrite and galena into sandstones and garnet into granite.

A future National Geopark could be a good place for educational and scientific work and a way for employment of local citizen which could be guards for an unique geological site and guides for tourists [3]. This

combination may be necessary to achieve an active management of the site. The establishment of a geo-park here is urgent to avoid the loss of a unique fossil site for the future

.

We expect to demonstrate the site and discuss these issues on the next conference of Eastern WG ProGEO, which will be organized in Kamenets-Podilsky this spring. Among the fossils we expect to find some new species and genus. We hope to protect the site from "black paleontologist" and get support of our efforts in creating the first Geopark in Ukraine. Our link for connection:
www.museumkiev.org and favosites@gmail.com.
The imprints and track fossils is collected in National Museum of Natural History NAS of Ukraine.

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3. *V.P. Grytsenko. New discovery of Vendian fossils is reason for Creation of "Mourafa" Geological Park SDGS Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften. 2010, Heft 66, pp.50-51.*

New publication

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The results of a partnership project between Scottish Natural Heritage and the British Geological survey to develop an evidence base for a geodiversity framework for Scotland were published recently. The aim of the project was to undertake an assessment of the value and status of geodiversity in Scotland and to develop the basis for a national framework to enable better integration of geodiversity within relevant policy areas. The report includes chapters on: the scientific and educational value of geodiversity; the contribution of geodiversity to ecosystem services; the role of geodiversity in informing adaptation to climate change; pressures and threats; links to the wider policy framework; and an outline for a national framework for geodiversity that addresses both the protection and conservation of geodiversity, and also the integration of geodiversity into wider relevant policies and guidance.

Gordon, J.E. & Barron, H.F 2011. Scotland's geodiversity: development of the basis for a national framework. Scottish Natural Heritage Commissioned Report No. 417. Available at:
http://www.snh.org.uk/pdfs/publications/commissioned_reports/417.pdf

Conference report: 'Engaging with geodiversity – why it matters'

John Gordon, john.gordon@snh.gov.uk

Over 100 participants attended this conference at Our Dynamic Earth in Edinburgh on 1 December 2010. The aim of the conference, organised jointly by Scottish Natural Heritage, the British Geological Survey (BGS), the Royal Scottish Geographical Society (RSGS) and the British Society of Soil Science (BSSS), was to examine the scope, values, relevance and applications of geodiversity within Scotland, particularly in the context of ecosystem services and climate change, two important drivers for current environmental policy.

The Conference was opened by the Scottish Environment Minister, Roseanna Cunningham MSP. During her speech, she emphasised the importance of Scotland's geodiversity as one of the key determinants of our quality of life and the nature of the environment. She also recognised the vital role that geodiversity has in underpinning and delivering ecosystem services for the benefit of Scotland's people and environment.

The presentations and posters at the conference addressed the benefits of geodiversity to society through its contributions across the whole range of ecosystem services. They showed how geodiversity provides the foundation upon which plants, animals and human beings live and interact, and that understanding of geodiversity has a vital part to play in shaping how we adapt to climate change and in sustainable management of the land, river catchments and the coast. Geodiversity is also a source of inspiration for art, sculpture, music and literature, and provides assets for greenspace and recreation. Papers from the conference will be published later in a special issue of Scottish Geographical Journal.

Roseanna Cunningham, MSP, Minister for Environment, introduces the conference.

A major challenge is to develop a more holistic approach that recognises the services and benefits to society of protecting and enhancing geodiversity and working with natural processes at a time of significant changes in the natural world as a result of climate change and sea-level rise. It is vital for society today and for future generations to maintain these services. Understanding the way the Earth works is fundamental to the long-term and sustainable management of our natural environment. Better application of existing knowledge of geodiversity would enable the development of more integrated strategies and policies for sustainable management, based on working with, rather than against, natural processes as part of an ecosystem approach. This is crucial if effective policies addressing climate change, energy security, environmental stewardship and wealth creation are to be put in place. Equally there is a need for raised awareness of the benefits of such approaches among policy makers and their advisors. However, the core message must be clear, simple and effective, setting out why geodiversity matters and what is needed.

The conference programme and abstracts are available through the BGS website - http://www.bgs.ac.uk/research/highlights/geodiversityConference.html

Maragheh Mammalian Fossiliferous Geosite

Reza Khoshraftar, Assistant professor, Department of Geography, Zanjan University, Iran

The Maragheh Fossiliferous Geosite is situated in 46° 23' to 46° 30' latitude and 37 ° 77' to 37 ° 20' altitude in the northwestern parts of Iran. It has been known as a Natural Monument since 2004 (Department of the Environment of Iran, 2004) .It has an area of about 12.4 km^2 northeast of Maragheh city, on the southern slope of the inactive Sahand volcanic cone. Mesozoic marine sedimentary sandstones and shale dominate the site but horizontal layers consisting of a sequence of sandstone and tuff mudstone are also present.

The landscape at 1650 to 2000 m a.s.l. consists of hills about 20-30 m in height with an erosional feather-edge beyond with shallow knolls. The fossil bearing sequences of Maragheh is found both within the Natural Monument and in adjacent regions. These beds have been studied over 150 years by several groups and have a special significance due to its content of diverse and abundant fossils remains including Hipparion, Mastodont, Giraffe and their propinquity with the Pikermi fauna.

Investigations has revealed that the Maragheh fauna consists of 15 family, 37 genera and 37 species of

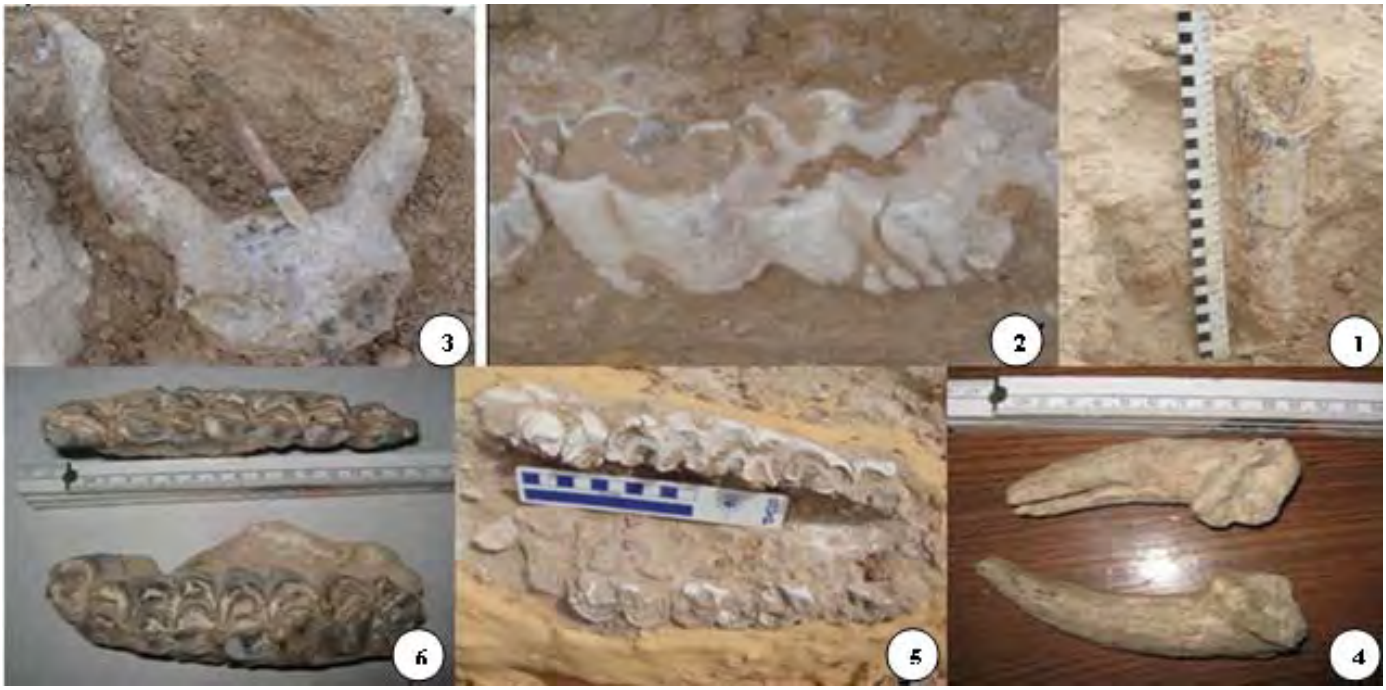

Fig 1: Fossils of Marageh geosite. 1) Ivory 2) Tooth of hipparin 3) Skull of bovidae 4) horn of bovidae 5, 6) jaw of hipparion.

mammals (Bernor, 1986). With respect to fossils related to Hipparion horses and systematic studies of *Bovidae* and *Hyaenidae* and a similar synopsis and especial correlation with those of so called Pontian mammals communities, the Maragheh fauna obviously belongs to late Miocene and early Pliocene (Campbel et al,1980 & Sohraby Hashjin, 2008). In addition some species of Hyena (Sen & et al 2008), Rodenta as *Pliohyrax kruppi* and *Pliohyrax graecus* (Pickford ,2009) and two new species of *Rhino*, *Chilotherian persia* and *Iranoterrium* (Representation of speciation in Iran) (Zaare, 2010 & Safaripaskeh, 2009) occurs and makes the site even more significant.

When there has yielded some fossils of primate as *Mesopithecus penteliciin maragheh*, it is reasonable to suppose that early hominines who expanded eastward, could survive in this region and Iran is a natural bridge connecting south-western Asia to southern and central Asia (Biglary & Shidrang, 2006). Based on types and abundance of yielded fossils, there are three kinds of fossils in the Maragheh geosite:

- Fossils with a plentiful occurrence in the region as hipparion;
- Rare and perfect fossils with an onsite significance and where a removal reduce their scientific and research value (Giraffe);
- Rare fossils that seldom are yielded in the site (Carnivorous).

Fig 2a: The Dar-e- gorg site of Maragheh

Reports have documented that the Maragheh remains are one of the richest Miocene vertebrate localities in the world judged from preservation, diversity and abundance of fossils and potential for close geochronologic control (Bernor, 1986). Although it is a necessity to transfer and study these fossils with special conservative equipments in scientific centres and laboratories, there is a lack of scientific explanation and assessment of the geosite and the results of surveys are diffused. Such geoheritage assessments have an essential role to facilitate planning and conservation management of the site.

There are many factors, originated from developing activities or as result of natural process which depredated the site and affected it through lack of management. With the respect to global significance of the site for understanding Earth Science and evolution and the vulnerability of the site due to human activities and natural process conservation measures should be considered. The area has been proposes as geopark in the "Atlas of Geopark and Geotourism Resources of Iran" (Amrykazemi, 2010). It seems necessary to perform an academic and integrated assessment to determine effective conservation and sustainable usage methods of the site.

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Fig 2b: The Dar-e-azim site of Maragheh

ProGEO - Albania Inter border GeoTrip – October 2010

Afat SERJANI, Xhume KUMANOVA, Tirana, Albania.

Last autumn, ProGEO-Albania organized an inter border geotour with participation of ProGEO members from Albania, Kosovo and FYROM (Macedonia), supported by "BERALB" Turkish-Albanian Mining Co- The event is inspired by Gerard Gonggrijp's idea of yearly geotours arranged by ProGEO. This year focused on education of new generations in protection of the geodiversity and biodiversity in every country.

During the first day we visited the Krraba canyon in sandstone rocks and with big echinus fossils. On the road to Elbasani City we studied environment damages by human activity, the Shkumbin River Valley landscape, and the castle at the center of Elbasani (a historical monument since the Ottoman times). From Elbasan City to Librazhdi and Prrenjasi we traveled along the Shkumbini River valley, and watched Red Series of Librazhdi and Skanderbeg Table, a natural and historical geological site. On the way from the border up to Struga city in Macedonia (FYROM) we met the fresh air of Ohrid-Pogradeci Lake, of about 800 m above the sea level.

On the second day we traveled from Struga to Gostivar and Tetovo. On both sides of the road very nice forests with different colors of the autum season covered the slopes, deep gorges and high passes. From Gostivari City to Tetovo on the northern side we had a nice view of"High Mountain", the continuation of the Sharri Mountainous Massif in the east.

From Tetovo up to Gllobočica border point with Kosovo, the road crossed the Sharri Mountainous massif at the most northeastern limit.

After Ferizaj city we turned east to Gadime Cave. This cave is a very interesting karst geosite, with a lot of underground rooms, full of stalactites and stalagmites.

Then we visited the Stan Terg mine, part of Trepça polymetalic mineral belt with a museum and outcrops of polymetalic ore. This mineral belt is located in the Vardar tectonic zone. The Trepça polymetallic deposits are known since the pre-Roman times, but the modern mining began in 1930. The mineralization is formed by hydrothermal fluids related with Tertiary volcanism. There are known two types of Pb-Zn-Ag mineralizations; massive Pb-Zn sulfide mineralization of hydrothermal origin formed by carbonate replacement process, and skarn mineralization of metasomatic origin related to paleokarst process. Due to the big size of this ore belt, genetic origin, morphology of ore bodies, geological structure, and economic historic values, this deposit represents an important heritage of regional importance. On the third day we visited the Drini i Bardh (White Drini) canyon at Fshajt Bridge, Prizreni old City with cultural heritage and the National Park of Sharri Mountains.

Some samples of PB-Zn-Ag content in Trepça Museum.

The Drini Bardh (White Drini) canyon

22 ProGEO-Albania members including some students, 6 from ProGEO-Kosova (Contact persons from ProGEO-Kosova: Sheribane ABAZI and Fadil BAJRAKTARI), and 3 from FYROM, Macedonia, (Contact person from Macedonia: Imer IDRIZI) participated. An inspiration for the trip was the resolution of the last IUCN Congress in Barcelona, where it was pointed out the importance of geodiversity: "… that geodiversity is a crucial factor conditioning biology, culture and landscape in their multiple forms, and that geological aspect of high value must be preserved for future generations…" (The Resolution of IUCN Congress in Barcelona, October 2008). It is a pity to say that in all governments and UNESCO institutions there is a very low knowledge of the above mentioned document and very low interest for geodiversity.

ProGEO conference 2010 for the working group of Northern Europe

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The meeting was arranged in Gdansk, Poland 6-10 September with the theme Geodiversity, Natural and Cultural Heritage of the Kaszuby Region. Participants from most of the countries in northern Europe participated. All was well organized, with meetings and excursions. The conference was in Gdansk, an interesting city with cultural heritage, not least due to its World War II and post-war recent history. The presentations gave a great variation of topics. Together they showed the great amount and diversity of ProGEOs working space. Focus was set on management and relation to active processes in the landscape.

During the conference we were taken to an interesting

Walking the sandy shores of the Baltic

bus-trip in Gdansk and shown a variety of locations like the start of the World War II and central areas from the Lech Walesa-period. The city of Gdansk is located to the river with outlet to the Gulf of Gdansk. The location on the delta gave an important geological/geographical aspect to understand its development.

On a 2-days excursion we went to the Kaszuby region in northern Poland (Eastern Pomerania). Over centuries the region has been a land of many cultures and is influenced by Slavonic, German and Scandinavians. The area covers these two different landscape zones: The Lake districts in the inland and the coastal areas along the sea.

The Kaszuby Lakeland represents typical young post glasial landscape with frontal moraine rigdes, outwash plains, deep subglacial tunnel valleys and lakes. This is a fascinating area. The landscape is dominated by hills and lakes with a great diversity, even though all is lowland, not higher than 328,6 masl. We were shown moraine stages from Elster and Weichselian period and ice damned lakes with formation connected to the ice movement during deglaciations.

The coast of the Baltic Sea in the Kaszuby region is dominated by dunes and sandy beaches as well as by cliffs. The active movement of sandy dunes, were impressing. The activity dominated the area and give major challenges for the management of the area. The same challenge management in areas with ongoing natural processes) were also demonstrated further east were sandy cliffs are eroded by the sea. As a result of the erosion, some locations made it possible to see nice and instructive cross-sections in the sediments, like distinct coal-layer from upper Tertiary

ProGEO Regional meeting in Working Group for Northern Europe

21-23 September 2011 Oslo, Norway

Theme: Geoconservation for the future

Emphasis will be focused on mapping, legislation and management on different scales from sites with international value to local landscape character sites. It will be arranged excursions in the Oslo area focusing on Quaternary geological and paleontology sites. The meeting will be arranged by, and held in the Natural Historical Museum, University of Oslo.

Provisional program

21 sept:	Registration and scientific sessions
22 sept	Excursion to Gardermoen and the Oslo fiord. Geoconservation of Quaternary sites and paleontological sites.
23 sept	Scientific session
24-26 sept	Excursion to West-Norwegian fiord – World Heritage Site by train and boat.

Second circular with information about hotels and travel will be issued in May 2011.

Abstract submissions
Participants are invited to submit abstracts (english). Abstracts should not be more than 2 pages. Times new roman 12, 1.5 spacing. Tables and figures included. Deadline for abstract submissions is June 30th

Abstracts should be sent to
Sylvia Smith-Meyer, e-mail: **ssm@nve.no**

Regitration fee
Preliminary estimation of the registration fee is 100 Euro. This includes coffee breaks, lunch and excursion on September 22nd . The registration does not include daily meals and lodging. The final registration fee will be specified in the second circular.

The post meeting excursion will go the West-Norwegian Fjord – Sognefjorden. It requires at least 10 participants. Total costs (travel, meals and lodging) is estimated to 375 Euro.

Deadlines
Registration: June 10th
Abstract submission: June 30th

IGC Brisbane 2012

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The international geological congress 5-10 August 2012 is planned with sessions on geoheritage and geotourism. These sessions are planned within the framework of the theme “Geoscience for Society”.

Among the planned activities are several Geoheritage Symposia that will examine the importance and diversity of Geoheritage (geological heritage), its history, geoconservation, geoparks and geotourism. Topics include methodologies for the identification and quantification of geoheritage, geosites and geodiversity, the significance of geoconservation, and how UNESCO World Heritage Properties compare and contrast with Global Geoparks, and the current growth of geotourism. We will also consider the extension of the current concept of geosites beyond Europe, and make use

locally of the expertise of ProGEO, so far confined to Europe. The story of Geoheritage in Australia, its history of growth, its World Heritage Properties and Geoparks, and its continental scale major landscapes in comparison to those of smaller countries will be explored.

It is also planned a symposium on Geotourism and Geoparks. The growth of Geotourism and the rapid growth of Geoparks across the world provides both opportunities and problems in Australia and beyond. Follow the development of the program and further information on the website: http://www.34igc.org/

More coming events:

See www.progeo.se for detailed information:

International GeoScience Conference: **GEOALB 2011** – Mineral Resources and their Perspective. Republic of Kosovo, 27–30 September 2011.

Regional meeting: Geo Reg, Forum for the Regional Geosciences of France and Neighbouring Countries. Northern France, 23–27 October 2011.

Open Workshop of the Russian Regional ProGEO Group – Study and Conservation of the Geological Heritage. Saint-Petersburg, Russia, 25–27 May 2011.

International Conference on Geological Heritage – Geological monuments as evidence of the evolution of the Earth. Ukraine, 16–20 May 2011

Meetings on EGN and GGN geoparks :
http://www.europeangeoparks.org/.
http://www.globalgeopark.org/publish/portal1/tab59/.

Waterfalls in Mirusha (Photo2010)

Deadline next issue of ProGEO NEWS: June 15th 2010

Please do not forget to send contributions to ProGEO NEWS. Members are interested in things that happen all over the world, your experiences, geosites, everyday geotopes and landscapes, geoconservation and geotourism efforts! ProGEO news is published on the internet after ½ year:

www.progeo.se

Please send your contributions 500 – 2000 words with photographs, maps and figures (unformatted) to:

lars.erikstad@nina.no

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