

Geology at different education levels in Europe



19 May 2011 Budapest

Abstracts



Secondary School Level

Education policy of the MOL Group: how to promote and improve education in Natural Sciences at secondary-school level

by *Laszlo Szocs¹*

The MOL Group has consciously built up succession management as a key HR activity. MOL's integrated approach is innovative because it offers programmes and competitions to young people from secondary school through to university level. MOL has been advancing in new, innovative directions in the succession management of highly-trained professionals. Recognizing the needs of the industry, universities are also putting growing pressure on secondary schools to improve the standards of instruction in the Natural Sciences and to give particular support to outstanding young talented people. With this in mind MOL has helped organize a number of competitions for secondary schools.

In 2010 it was the first time that an online Natural Science competition, "Junior Freshhh", was organized, in Hungary, as well as from countries outside the national borders. The scenario would be incomplete without recognizing the work of teachers. This year the company has created the Mester-M Award to acknowledge the efforts of secondary school teachers of Chemistry, Physics and Mathematics and the outstanding role they play in supporting talented youngsters. Teachers received nominations from their own former students, now working or studying in one of these technical areas. In 2011 MOL organized a Conference called "Dialog" for those teachers, professionals who develop the future generation in the field of Natural Sciences and there were workshops where the governmental and the business side collaborated with teachers on how we could help each other to achieve our goals.

From the sustainable growth point of view it is essential that engineers, skilled workers and technicians be available in the labour market in sufficient numbers.

All these actions that we have started will have measurable results within a few years according to our expectations.

¹Senior Vice President of HR, MOL Group
lszocs@mol.hu

Geology in the 3rd basic school cycle and at secondary level in Portugal

by *Margarida Silva¹*

In the last four decades various reforms have been introduced in the education system in Portugal (in 1970, 1979/80, 1989/90 and 2001/02), affecting the Geology content of teaching programmes. In the 1979/80 - 1989/90 decade, science disciplines lacked geological content. In this context, the Portuguese Geological Association had an important role during the discussion of the 1989/90 and 2001/02 education reforms, contributing to a progressive enrichment of geological content in science disciplines. Presently, the implemented programme guide to "research teaching" approach, presents a situation-problem for each geological theme. Also, they provide some aims and procedures examples that reflect some didactic investigation guidelines.

¹Escola Secundária Rafael Bordalo Pinheiro
2500- 209 Caldas da Rainha
mms.apgeologos@gmail.com

The teaching of geology in secondary schools in England

by *S.D. Smallwood¹*

Geology forms part of the National Curriculum (for children aged 11-14) in England - it forms less than 10% of the core Science component at Key Stage 3, and also forms part of the Geography programme of study too. This should mean that the vast majority of pupils in the first part of secondary education have some exposure to Earth Science education.

In the next stage of education (Key Stage 4), children aged 14-16 take GCSE (General Certificate of Secondary Education) Level Core Science, and can then go on to take either 'Additional' or 'Applied' Science. The most able take all three sciences (Biology, Chemistry & Physics) separately to GCSE; all of these include some aspects of Geology. Pupils can also choose to take Geology as a separate subject to GCSE, though this has a very small entry nationally.

At post-16 level, students can opt for AS (Advanced Subsidiary) and then (if they choose to continue)

A2 (Advanced Level) Geology 1-year courses. These are complementary to a range of other qualifications and provide good quality preparation for most Science-based university courses. In terms of the numbers of entries for examination, Geology is a small subject at secondary level in England, but it continues to be one that bridges successfully between the sciences and the humanities. The true extent of Earth Science Education in secondary schools is far greater than this, however, with aspects of Physical Geography, Palaeontology, Economics, Resource Development and Geopolitical and Historical Development occurring at all different Key Stages.

Issues for the future of Geology in England's secondary schools concern the training and recruitment of specialist teachers, the safeguarding of fieldwork in the secondary curriculum, the resourcing of geology as a minority subject and fitting Geology examinations to the requirements of university courses.

¹Head of Geology @ Bishop Wordsworth's School, Salisbury, UK

Dealing with outstanding secondary-school students: student conference on Earth Sciences

by *Éva Hartai*¹

Geology is not taught in public education in Hungary. Only a few hours are devoted to the most important topics – rocks, minerals, plate tectonics – within the framework of geography. Still, there are many young students who would like to know more about geology.

The Faculty of Earth Science and Engineering, University of Miskolc, together with the Hungarian Geological Society have organized annually, since 2007, a scientific conference for secondary-school students. The aim of the Student's conference on Earth Sciences is to assemble students who are working in a particular field of Earth Sciences and doing research, and provide an opportunity for them to share their knowledge with other students and interested teachers. Students between 14 and 18 years can participate in the conference.

There are several scientific and professional organizations in the fields of meteorology, geophysics, astronomy, pedology, and even the Earth Science Section of the Hungarian Academy of Sciences, which support the conference.

Students have to submit an abstract before the conference and an abstract volume is printed each year. The studies in the fields of mineralogy, petrography, geology, palaeontology, hydrogeology, environmental geology, astronomy, geophysics are presented in power point form, in 15 minute slots, in four or five sections. The conference lasts for two days. There are 70-100 participants each year.

The best presentations are awarded by sessions, and there are special awards by the Hungarian Academy of Sciences.

The best students can take part in the Hungarian Students' Research Conference and compete with university students.

The success of the conferences was summarized by a young participant as follows: "It is such a good opportunity that the future scientists and professionals can meet as early as that".

¹University of Miskolc, Faculty of Earth Science and Engineering
H3515 Miskolc-Egyetemvaros, Hungary

Higher Education Level

The one-year masters degree: a British qualification in a Bologna context

by *David Manning*¹

For many years, British universities have offered M.Sc. degrees based on the outcome of 12 months of study. These have a strong reputation as the preferred route into major areas of employment within geology, especially hydrogeology and engineering geology, as well as more specialized areas. Part of the strength of M.Sc. provision is the intensity of work expected of a student; a well designed M.Sc. programme pedagogically acts as a bridge from academia to practice. Typically, a lecture/exam-based mode of learning, as encountered in undergraduate programmes, progresses to project-based work assessed through a dissertation that in some cases can take the form of a consultancy report.

In terms of ECTS credits, a British one-year M.Sc. accumulates 90 ECTS credits compared with 120 ECTS credits required for a typical two-year Bologna second cycle masters qualification. It is fully compliant with the requirements of Bologna, even though it is delivered within a 12 month period. It extends beyond the normal academic year, being a 3-semester programme that has no summer vacation period. Typically, students enroll in September, and complete at the end of the following August to enter the job market little more than 12 months after registration.

The School of Civil Engineering and Geosciences at Newcastle University offers 18 M.Sc. programmes with over 200 M.Sc. students, many part-time. The course structure favours life-long learning, with modules predominantly delivered as 1-week short courses that are open to occasional students as part of the School's CPD provision. The demographic profile of students includes a significant number of mature students who are using the opportunity to change career. In addition, there are students who left the Newcastle region to study elsewhere, return with a first degree and require a second degree to enter professional employment. Such students represent repatriation of skills to the region.

¹School of Civil Engineering & Geosciences, Newcastle University, Newcastle upon Tyne, UK, NE1 7RU
david.manning@ncl.ac.uk

Integrated higher education in palaeontology: bridging the academic gap between Denmark and Sweden

by David A.T. Harper¹, Per Ahlberg², Johan Lindgren², Maria Liljeroth¹ and Jan A. Rassmussen¹

The initial EU student mobility programmes, developed through the Erasmus and Socrates schemes, involved both formal inter-university networks and the more independent movement of students, by free-movers, for periods of up to one year at mainly bachelor levels. The 'Celtic fringe network', including the universities in Brest, Galway and Oviedo, was the first in the Earth Sciences, engaging students in 'pre-honours' field mapping projects abroad and participation in part of the final year of courses in the host department (Harper, D.A.T. 1996: *European Geologist* **3-4**, 57-59). The field mapping component was particularly popular, the courses less so when taught in the native language of the host institution. The Bologna Agreement and subsequent fine-tuning process (Ryan, P.D. 2010: *European Geologist* **30**, 9-13) have provided for a more unified structure in third level education across Europe (and indeed elsewhere), defining a three-cycle structure with specific learning goals and outcomes at each level in the hierarchy. Supported by funding from the INTERREG IIIA EU programme, staff members in the universities of Copenhagen and Lund are developing a joint Masters-level programme in palaeontology. Both Copenhagen and Lund have active and relevant teaching and research programmes, generally drawing on the population in southern Scandinavia with occasional overseas students from elsewhere in Europe and beyond. The programme not only provides for the mobility of staff and students within the system through a short commute over the Øresund Bridge, but also the 'mobility' of a menu of compact courses and field excursions. The programme forms the middle part of a 3-2-3 cycle, is taught in English and is split into one year of taught courses and one year of research, culminating in a thesis together with a short scientific paper. Fieldwork is an important part of the programme involving excursions to the Greek island of Rhodes and Swedish island of Gotland during the two-year programme. The programme promises to establish a wide variety of high-quality courses and project material relevant to both third-cycle research programmes or future careers in, for example, the exploration sector.

¹Natural History Museum of Denmark (Geological Museum), University of Copenhagen, Øster Voldgade 5-7, DK-1350 Copenhagen K, Denmark
DHarper@snm.ku.dk

²Division of Geology, Department of Earth and Ecosystem Sciences, Lund University, Sölvegatan 12, SE-223 62, Lund, Sweden
Per.Ahlberg@geol.lu.se

The Euro-Ages project: qualification framework for higher education in geology

by Dr Isabel Fernandez Fuentes¹

The European Federation of Geologists has participated in the Euro-Ages project, a European pilot project in the context of the European Qualifications Framework (EQF), Lifelong Learning Programme. The project took place from January 2009 - January 2011. The project aims at developing Europe-wide applicable quality standards and criteria for the assessment of higher education programmes in geology in the context of the Bologna Process.

Combining the common interests and individual strengths of ASIIN (Germany), EFG (Belgium), ICOG (Spain), MFT (Hungary) and SACO (Sweden), Euro-Ages has provided important reference documents such as: mapping of the structure of geology study-programmes across Europe, and the existing qualification framework, including a set of learning outcomes which graduates of first and second cycle degree programmes are expected to achieve, and accreditation criteria and procedures.

The mapping of the existing qualifications for Geology supported the increase transparency of Earth Sciences qualifications across Europe and therefore to facilitate improved academic and professional mobility across Europe. The document consists of reports from 27 countries with information about: implementation of Bologna process, education in Geology programmes and structure, learning outcomes, professional pre-requisites and accreditation systems.

The Standards and Criteria are intended to provide a means for reviewing the quality of higher education geology qualifications in the European Higher Education Area (EHEA), in a way that encourages the dissemination of good practice and a culture of continuous improvement of geology programmes. They have been developed within the Euro-Ages Project, the principal aim of which is to develop a qualification framework for the assessment of geology degree programmes in the EHEA. Given the great diversity of geology education across Europe, the attempt to create framework standards comprising all areas of the geology discipline appears ambitious. The Euro-Ages Framework is thus intended as a broad common denominator, or overarching reference point, for the variety of geology programmes. In order to allow for possible inclusion of existing geology specializations within European Higher Education Institutions, the framework must be formulated in rather general terms. The Standards and Criteria contained in this document represent a quality threshold. All graduates of programmes assessed against the Euro-Ages Standards are expected to achieve the programme learning outcomes stated therein.

¹EFG Director Office
European Federation of Geologists
isabel.fernandez@eurogeologists.eu

Postgraduate Level

Challenging professional education: the EAGE way

by Davide Calcagni¹

Education for professional communities is one of the key elements in the mission of the European Association of Geoscientists & Engineers (EAGE).

Founded in 1951, with deep European roots, EAGE is nowadays probably one of the largest worldwide multidisciplinary professional associations in the field of the Geosciences. With nearly 16,000 members worldwide, EAGE is facing the "not easy to solve" challenge of serving its membership and supporting them in their professional activities by playing the role of the hinge point between formal educational entities (academy, post academy and private trainers) and the ever increasing demand of continuous and specific dedicated events for the professional development of our Members.

The challenge is boosted by the multidisciplinary/multiregional nature of the association in which the stakeholders and members cover the fields of Geophysics, Geology, Petroleum Exploration and Engineering as well as the vast community of professionals gathered under the name of Near Surface Geoscience, distributed world wide and with a variety of logistical conditions in their country of residence.

EAGE is coping with such requirements via a specific Educational Programme and a structure consisting of four offices (one main and three regional), two divisions (O&G and Near Surface) and a set of dedicated committees.

The EAGE commitment on professional education is reflected in a vast effort that extends from organizing Events (from large conferences and exhibitions to one day workshops), Publications (5 journals, and an extensive selection of books), Student Activities, support of the Industry in recruitment and delivering short courses and lectures regionally. One of the key elements in the Association's efforts is supporting and promoting the exchange of knowledge. EAGE, via an extensive and dense network, invites acknowledged experts (both industry professionals and academics) to lecture on the latest developments in the various geoscience disciplines. The worldwide EAGE education programmes include EAGE Education Tour short courses (EET / OTE) including the newly introduced NS EET (dedicated to specific themes in the field of Near Surface Geosciences), joint initiatives with other Professional Associations, Education Days Events, EAGE Short Courses (public and in-house) and Distinguished Lecturer Programme (DLP). The effort is so huge that at the Annual Conference in Vienna this Year it will be re-named: "Learning Geoscience".

¹President EAGE – European Association of Geoscientists & Engineers
davide.calcagni@eni.com

Postgraduate and professional training in geology-related fields at the Faculty of Earth Science & Engineering, Miskolc University

by Peter Szucs¹

The Faculty of Earth Science and Engineering was established in Selmecebanya in 1735. So that the University of Miskolc can be regarded as the oldest in the world in the field of technical and mining higher education. The mission of the faculty is to provide engineering solutions in education and scientific research for the sustainable utilization of natural resources from the Earth crust.

Although the Faculty introduced the current B.Sc. and M.Sc. programmes after 2006, there is a long tradition and history involved in the educational and research activity of the Faculty in geology-related fields. Currently the Faculty offers three different B.Sc. and seven M.Sc. programmes for more than 1000 students. The most talented students can achieve a Ph.D. degree at the Mikoviny Sámuel Doctoral School. In order to attract more international students in the future, some of the M.Sc. and Ph.D. programmes run in English.

There is an increasing demand from the industry for postgraduate studies as well as for professional training. Hungary is very rich in mineral, medicinal and thermal water resources. Although the experts should expect special geological and hydrogeological phenomena in the Carpathian Basin, Hungary is among the world leaders (Island, Japan, USA, France, Italy, China and New Zealand) where mineral, medicinal and thermal water resources are concerned. The government initiated the New Széchenyi Development Plan with seven main programmes to boost the economy of Hungary. Two main programmes (Medicinal Hungary, Renewable Hungary) aim to concentrate on the more intensive utilization of the mentioned groundwater resources. This means that special research educational programmes are required in order to train more experts. This is the reason why the Faculty of Earth Science and Engineering introduced postgraduate programmes in geothermal engineering and hydrogeology with great success some years ago. Short courses (groundwater modelling, environmental geotechniques, geological mapping, etc.) in geology-related fields are also becoming more and more attractive.

¹University of Miskolc, Faculty of Earth Science and Engineering
H3515 Miskolc-Egyetemvaros, Hungary
hgszucs@uni-miskolc.hu

Learning outcomes – C1 to C4: the relationship with the European Geologist title

by David Norbury¹

The learning outcomes identified in the EuroAges programme represent quality standards for competencies, skills and knowledge. Graduates of an accredited course at first or second cycle programme level would be expected to have achieved initial levels of ability from their academic training and studies as the basis for starting to practise geology professionally.

Further development of experience and skills is required following graduation through deployment in professional activities. The learning outcome level that would be expected when the student has gained sufficient professional post-graduate experience and is ready to submit their combined training and experience profile for validation by their peers, in other words to apply for the professional title of European Geologist (EurGeol.) or similar in their own country, will be outlined.

¹Chair EFG Registration Authority and Independent Consultant
david@drnorbury.co.uk

AIPG's system of online instruction: a portal to global geoscience

by EurGeol Dr. Robert Font¹ CPG, PG, CG, REM

An online system with accredited geoscience courses is currently in place through the AIPG and the University of Offenburg in Germany. The system is the result of the interaction between the AIPG and EFG, specifically between Dr. Detlev Doherr (Dean and Professor at the University of Offenburg) and Dr. Robert Font (AIPG and GDM).

Currently, five AIPG-accredited and affordable geoscience offerings are available via the system. All course material has been reviewed by the AIPG's Educational Committee and approved for the awarding of continuing education units (CEUs). The following online seminars are presently available:

- "Introduction to Landslides and Mass Wasting"
- "Practical Petroleum Geoscience"
- "Introduction to Well Logs and Log Analysis for New Hires"
- "Geotechnical and Engineering Properties of Certain North-Central Texas Shales"
- "Virtual Field Trip Through the Lower Cretaceous Strata of North-Central Texas".

Courses are designed to reach multiple audiences. Critical concepts are covered in main chapters while more rigorous discussions and mathematical derivations are saved in strategically-placed appendices. For less technical

audiences, only the main chapters are covered, whereas both chapters and appendices can be made compulsory for more scientifically-trained groups.

AIPG actively encourages contributions to the system and authors of new coursework. Specifically, we seek participation from our colleagues from the EFG and CCPG. The opportunity exists for us to provide a portal to global geoscience via the vehicle which is now in place and through the synergy that we can achieve by combining our goals and efforts.

¹Past National President – American Institute of Professional Geologists (AIPG)
President – Geoscience Data Management, Inc (GDM)

Public Level

Earth system science education in the United States: challenges and opportunities

by Ann E. Benbow¹, P. Patrick Leahy² and G. Warfield Hobbs³

The American Geological Institute (AGI), an association of 49 member societies, represents over 120,000 geoscientists and geoscience educators. As such, part of its mission is to strengthen geoscience education, both in the U.S. and in the wider global community. To this end, AGI creates print and online instructional materials for all educational levels, provides professional development programmes for teachers; develops and implements outreach programmes for the general public and conducts educational research. AGI also brings together members of the geoscience education community to discuss issues of concern and develop procedures for addressing those issues. For example, in 2010, AGI hosted the first K-12 Earth System Science Education Summit. As a result of this meeting, working groups were formed to address such areas as the: *Perception of Earth Science Courses by School Districts and Colleges*; *Preparation of Earth Science Teachers*; *Challenges to Earth Science Education by the Creationist and Intelligent Design Movements*; and *Inclusion of the Earth Science Literacy Principles in New National Science Education Standards*. These working groups are currently in a data collection phase and will be reporting on their progress to the wider geoscience education community by Summer 2011.

¹Director of Education and Outreach, American Geological Institute
aeb@agiweb.org
²Executive Director, American Geological Institute
pleahy@agiweb.org
³President, American Geological Institute
skip.hobbs@gmail.com

IGEO: achievements and future prospects

by Roberto Greco¹

The International Geoscience Education Organization (IGEO) (<http://www.geoscied.org/>) was founded in 2000 during the GeoSciEd III conference in Australia. The aims of IGEO are:

- to promote geoscience education internationally at all levels
- to work for the enhancement of the quality of geoscience education internationally
- to encourage developments raising public awareness of geoscience, particularly amongst younger people.

To reach these goals, the IGEO monitors international geoscience education worldwide and fosters communication between geoscience educators. The organization strives to create a network with international and national bodies concerned with geoscience education, with international professional geoscience bodies, such as the International Union of Geological Sciences (of which it is an affiliate) and with international bodies concerned with science education.

IGEO is led by a Council formed from one member from each interested country and a deputy member. Council meetings are held biannually as part of the programme for the International Geoscience Congress (IGC) and the GeoSciEd conferences. At the moment, 34 countries are represented with council members.

IGEO runs an International Conference approximately every four years, alternating with a representation at the International Geological Congress, which also takes place at four-year intervals. GeoSciEd VI took place in South Africa in 2010, with the next one being hosted in India in 2014.

The IGEO promotes the International Earth Science Olympiad – IESO (<http://www.ieso2011.unimore.it>) that took place for the first time in 2007 and is keen to support Earth Science education in developing countries.

¹Italian Ministry of Education
roberto.greco@unimore.it

The role of the national geological services in public education and civil protection

by Nieves Sánchez¹

Our society is actually going through a new stage because globalization has produced many changes in different issues, especially communications. Social perception of catastrophic events is changing because now everyone can experience a disaster that occurs very far away, like something which we ourselves are suffering. Natural disasters produce much damage and the world is acting like a spectator, gathering information, and explanations about the role of the people in each case.

Civic education is a very important question in a possible emergency scenario. Geological services will have to adapt their goals to this new requirement and they should play an active role for all phases in the management of emergencies and inside the civil protection system.

¹Vicepresident of European Federation of Geologists

The role of geoparks in education: the Novohrad-Nógrád Geopark

by Imre Szarvas¹

There is a new phenomenon in the new millennium, the geopark initiative. A geopark is an established territory with rich geological heritage, where locals -- as geotourism stakeholders -- are actively involved in the preservation of the rare natural and cultural heritage of their own area. Since its birth in 2000 the European Geoparks Network (EGN) has taken a leading role in raising the public's awareness of geoheritage issues. The transborder Novohrad – Nógrád Geopark has been a member of the network since 2010. (The geopark comprises the administrative area of 63 settlements in Hungary and 28 habitations in Slovakia. The area is recognized as an important centre for the Palóc ethnic group's folk art and living traditions.)

The Bükk National Park Directorate is one of the main partners of the geopark management, an expert in interpreting geoheritage at Ipolytarnoc Fossils Nature Conservation Area (<http://osmaradvanyok.hu>), which is the main gateway to the geopark.

To ensure a common appearance in both countries, geosite educational materials follow the uniform geopark design. The emphasis is on the phrase: *less is more*. Usage of scientific jargon is minimal, explanatory figures dominate the on-site panels to accommodate non-professionals. The geopark management considers as a high priority, that knowledge of local geoheritage should find its way into local schools, as well as to the general public. Outreach to NGOs, teachers and students at different levels is essential in order to fulfill the geopark's mission goals.

¹Bükk National Park Directorate, Ipolytarnoc Fossils
imreszarvas@hotmail.com

Posters

Geology at the kindergarten

by Dóra Bihari¹ and Ilona Bihariné Krekó²

Children in the kindergarten become acquainted with things in the surrounding world, which adults make possible for them. Because of this, teachers in the kindergarten have to carefully help them experience their environment.

Children below six have usually no abstract thinking, so they need to experience things directly by their sense organs. Thus, beside books, looking at pictures, it is important to walk with them in the natural or in the built environment.

Museums can play an important role in their thinking about geology, because after looking at pictures about volcanoes in books, they can observe the rocks, which were produced by the volcanoes, or they can see creatures from the geological past.

Buildings, statues and their mother's jewellery bring the rocks and minerals closer, and brings nature to life

They can experience the constructive work and the erosion of water in the garden of the nursery school. In the garden a path can also be built from pebbles and if children walk on them they will recognize the differences in the rock material and the shape of the pebbles. It also makes their feet stronger if they walk on the pebbles in bare feet.

We can encourage them to collect pebbles at the riverbank and group them by size or colour.

We can also show them lots of interesting shapes of drip-stones in the caves.

Parents can also help their children to know more about nature, including rocks and minerals by excursions and walking in the natural environment and childrens' knowledge will be deeper if they hear about these things not only in the kindergarten but at home as well.

¹Almáskert Óvoda Apple-garden Nursery School, Budapest
biharidori@gmail.com

²Eötvös Loránd University, Budapest
ikreko@gmail.com

GeoExpo 2010

by Janos Haas¹ and Agnes Krivanne Horvath¹

Transmission of the new results of the Earth Sciences to the public is one of the prominent tasks of the Hungarian Geological Society. In the last couple of years a number of new results having definite social impacts were born in the domestic workshops of the Earth Sciences. The exhibition and multiple programme of GeoExpo 2010 wanted to serve this aim; it offered opportunity for a common and novel introduction of the academic Earth Science institutes, university departments, museums, companies, and national parks. The four-day programme was held in the great vaulted hall of the Hungarian Natural History Museum, Budapest, from 1 - 3 October 2010. Along with the presentation of recent interesting and spectacular results from geology and geophysics, the introduction of the most prominent, internationally appreciated sites of the geological heritage of our country was also among the highlights of the programme. The exhibitors occupied 16 booths. In addition to displaying posters, equipment and audio-visual presentations, the representatives of the companies and scientific institutions made personal contact with the visitors. There were about 2800 visitors; 25 non-conventional geographic lectures were held with 767 participants from various elementary and high schools.

¹Hungarian Geological Society (HGS)

SAXA LUQUUNTUR Geology education programme (GEP) in NN GEOPARK

by Ádám Hajas¹ and Katalin Juhász¹

A geographical formation, consisting of epiclastics and volcanic sediments, lies within the area of Novohrad-Nógrád Geopark, between Nógrádszakál and Litke villages on the Hungarian-Slovak border marked by the Ipoly river. The formation was created in a river delta that existed about 15 million years ago during the Central-Paratethys period. The area is the continuation of the so-called Etes trench (*Etesi árok*) zone.

The bed of the seasonal Páris stream cuts through various layers of sand and pebble stone sediment. Multiple cross-layers of marl and tuff can be observed in the stream's canyon. The river sediment also contains huge andesite and granite blocks and cemented stone conglomerates separate themselves from above the steep canyon wall, the height of which can reach 20 - 25 m. The canyon wall is also marked by tiny caves created by remains of small pieces of wood originally trapped in the river sediment. The area is perfect to demonstrate and analyse geographical processes which require student involvement and cooperation in teaching. Besides explaining complex geographical information, developing cognitive skills (e.g. creative, memory, observing, thinking and problem

solving) is equally important. We summarize our GE Programme in the chart below.

Project title	Geographical Area	Short description
Treasure hunt	Geographical history, palaeontology, geology, petrology	Finding and analysing stones and fossils
Anybody home?	General geology, petrology	Description and definition of caves created by wood remains and their formation.
What is in the water?	Structural geology, mineralogy, geochemistry	Analysis of waters containing CO ₂ and CH ₄ from fountains within and around the Etes trench.
Use your mobile	Geoinformatics, informatics	Device use, orientation, project presentation.

¹Nógrád Geopark Association
adam.hajas@gmail.com
zagyvai.katalin@freemail.hu

Vásárhelyi Pál technical high school and hostel, Békéscsaba: the only institution teaching geology at this level

by Méhi Gabriella¹ and Lisztes Tibor¹

"IF YOU COME WITH US, YOU WILL REACH YOUR GOAL!"

The Vásárhelyi Pál Technical High School and Hostel (VÍZMŰ) is situated in the city of Békéscsaba in south-eastern Hungary. The institution works on the improvement of architecture competencies. During the last six decades, education has been organized around the following professional groups: high building architecture, transportation architecture, water board, landsurvey-GIS and, in the last ten years, the geological technician. It is the only school in Hungary with medium level daily tuition for geological technicians. Based on the local geology (deep, not very old basins with settlements) we prepare our students to research into carbon dioxide and water as well as analyzing rocks, stressing the importance of rock samples from the drilling process. We also cover changes in the law which have influenced the field of geology.

Students study the basic elements of the profession from grade 10-12. After the final exam, they learn those competencies which are necessary for starting their profession and for progressing to a higher level. The study groups of 10-20 students work together, under the supervision of three geology teachers. Tuition involves teaching theory and practice. During the practical work, the students work with modern and good quality equipment. The building with rock examining microscopes is worth mentioning (polarization and stereo microscopes), the three-part equipment for producing thin sections, the

twenty-four-channel seismic and geo-electric measuring systems plus many different types of apparatus. Another part of our tuition is field work. Among our programmes are mine visits [opencast and deep cast], collecting minerals and rocks, visits to museums, institutions and tourist's paths. This field work experience is used in the summer for work placements in companies whose work involves geological research. These companies such as the MOL Nyrt. (Hungarian Oil Company) is one of the financial supporters of our school.

The aim of the school is firstly to be in contact with other institutions in different countries in Europe. Secondly, we would like to organize round table discussions and exchange of technical experiences.

¹Vásárhelyi Pál Szakközépiskola és Kollégium
HUNGARY – 5600 Békéscsaba, Deák u. 6
mehigabi@freemail.hu
liszttest@gmail.com

Foz do Douro geological walk: awareness of geoconservation and its role in education

by *Mónica Sousa¹, S. Aires, V. Ramos, C. Vasconcelos, M. Marques, L. Borges and F. Noronha*

The "Foz do Douro Metamorphic Complex" is an important place to better understand the geotectonical evolution of the NW Iberian Peninsula in pre-Variscan times. Its educational value is also unquestionable as it preserves a diversity of lithologies, structures and geomorphological features.

Aiming to increase public awareness of the geological heritage, the "Foz do Douro Geological Walk" was created in 2005, a scientific path that brought to public knowledge the natural wonders of the Porto shoreline outcrops.

Taking into consideration the different types of background and educational levels of the public and in order to improve their experiences in the realm of geology as well as to promote significant practices, an Interpretative Centre was opened in 2008 and some science education materials developed. The purpose was to complement the field guided visits, thus minimizing the novelty value.

The "Foz do Douro Geological Walk" was rewarded with a Mention of Honour in 2005 and with the Geoconservation Prize 2009 implemented by the European Association for the Conservation of Geological Heritage (ProGeo – Portugal) which distinguishes the best examples of Geological Heritage conservation promoted by municipalities.

¹Departamento de Geociências, Ambiente e Ordenamento do Território, Universidade do porto
Rua do Campo Alegre, 687, 4169 - 007 Porto, Portugal
monica.sousa@fc.up.pt
silvia.aires@fc.up.pt
violetaramos@fc.up.pt
cvascon@fc.up.pt
maarmques@fc.up.pt
luisaborges@cm-porto.pt
fmnoronh@fc.up.pt

Support of geological and geophysical education through a Complex Scientific-Educational Centre at the University of Mining and Geology "St. Ivan Rilski", Sofia, Bulgaria

by *Str. Strashimirov¹, S. Pristavova¹, R. Radichev¹, S. Dimovski¹ and N. Tzankova¹*

Geological and geophysical studies are the basis for exploration and prospecting of mineral and energy resources, evaluation of geological hazards and other important activities, so the need for well-trained specialists is the main target of geological and geophysical education.

The University of Mining and Geology "St. Ivan Rilski" (UMG) is the only Bulgarian university center for engineering education in Earth and mining sciences. The National Scientific Fund of Bulgaria has supported a project (2010

- 2012) developed by UMG to integrate disciplines that study natural geological objects in at least four different fields of the Earth Sciences – petrology, ore mineralogy, gemology and applied geophysics. The basis for the integrated studies is the necessity for student education in solving non traditional tasks related to complex studies of natural resources, prospecting of deep-seated mineral and energy resources, increased requirements in estimation of geological hazards, implementation of interdisciplinary studies in relatively new branches of sciences such as geoarchaeology, archaeogemology, ecomineralogy and others.

The main aim of the project is to create a new Center for complex geological and geophysical studies, which could be used, either in scientific research or in training students in UMG, Bulgaria.

The main educational task of the Center is to improve the training processes with fundamental and interdisciplinary characteristics, modernization of existing and new laboratory base for further development in optical and geophysical studies of minerals, rocks and ores, according to the world tendencies for training of highly qualified specialists with respective competencies and complexity in research work.

Part of the equipment in the University's laboratories for optical and geophysical studies is outdated and the project supports supplementation of new modern equipment. The project is realised by the academic staff from several leading departments at the Faculty of Prospecting Geology at UMG "St. Ivan Rilski".

¹University of Mining and Geology, "St. Ivan Rilski"
sbs@mgu.bg
spristavova@abv.bg
radirad@mgu.bg
dimovski@mgu.bg
niktzankova@abv.bg