The 'Environmental Catastrophes and Recoveries in the Holocene' conference held here at Brunel on 28 August–2 September closed to great acclaim. According to the Secretary General of the international research organization that sponsored the event (INQUA), "... the meeting at Brunel was excellent, and among the best meetings I have ever attended". This view has been echoed in the post-conference responses from senior scientists and younger scientists alike.

So why the great success? What was so special about the conference? Well, although organized by the Department of Geography & Earth Sciences, the 150 participants from 27 countries represented a startling range of disciplines and spoke on a breathtaking myriad of topics. The majority of the delegates were geographers, geologists, archaeologists and anthropologists, but amongst them mingled historians, astrophysicists, ecologists and health experts. Topics ranged from linkages between major volcanic eruptions recorded in the Greenland ice core and a plague in Ancient Rome, between civilization collapse in the Middle East and rainforest retraction in equatorial Africa 4000 years ago, and between recent climatic downturns and the incidence of modern droughts such as that of Dustbowl America in the 1920s. Such topics ensured great media interest, with Nature, Science and New Scientist being amongst those picking up on conference highlights, such as the controversial reappraisal of the 1908 Tunguska cometary impact in Siberia, new ideas on a comet-induced mega-tsunami that devastated eastern Australia several thousand years ago, and the politics of an earthquake fault and lies below Salt Lake City’s recently constructed Olympic Stadium.

Bringing together such a rich diversity of researchers was one of the main objectives of the conveners, Professor Suzanne Leroy and Dr Iain Stewart. Breaking down the usual barriers between scientific communities to forge a new mix of people was a real challenge, but one that seems to have been at the heart of the meeting’s success. The broad sweep of the conference was about abrupt environmental changes that had affected the planet in the last 10,000 years, whether these changes reflected natural or human actions and the evaluation of their impact on our past and future societies. This immediate implication of such analyses is to put in a wider time perspective the events that occur at the moment (floods, fires, hurricanes, earthquakes, epidemics, extinctions) and be ready (if possible) for the extreme ones.

At the same time some nine thousands kilometers away, those attending the Johannesburg Earth Summit were hearing how humans are imposing environmental havoc on an otherwise balanced and passive Earth. The Brunel conference instead heard about a naturally variable and frequently harmful environment in which humans were often incidental.

So what of the future? The conference will spawn a number of special journal issues in international science and Leroy and Stewart will convene a follow-up conference in Reno (USA) next July. However the main legacy of the Brunel meeting will be a new INQUA-sponsored research initiative that will build on the energies and synergies generated by the London meeting. That initiative aims to galvanise a new interdisciplinary research community to engage more closely with policy makers in disentangling the natural and human influences on environmental change, and in acknowledging the ‘dark side of nature’.

Some words now on the structure of the conferences. A programme of carefully selected keynote speakers was organized for the 5 mornings around the 5 key themes of the conference: geological catastrophes, ecological catastrophes, climatic catastrophes, health catastrophes and cultural catastrophes.
wrapped up by a last plenary session: either
a more philosophical approach, or a social
one. A representative of a series of insurance
companies gave his own analysis of risk.
Owing to our academic sponsors
(PAGES, INQUA, The British Academy,
the IUGS Geosignators Initiative, IUGS-
SOTSPI), a programme of 35 posters could
also be set up for our younger scientists or
scientists who were not fluent enough in
English. Enough time was allowed in the
programme for detailed discussions of these
results. Our social programme allowed also
the scientists to meet informally around an
ice breaker at the Beldam Art Gallery
(Brunel), a sumptuous conference dinner at
the Royal Institution (Central London) and a
boat trip on the Grand Union canal (near the
campus).

More on our web site:
http://www.brunel.ac.uk/depts/geo/Cata-
strophes/
Abstracts available on website:
http://atlas-conferences.com/c/a/i/q/0.1htm

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**IGCP-408/2002: Rocks and Minerals at Great Depth and on the Surface**
Zapolyarny, Russia, September 9–14, 2002

**Introduction**
Reconstruction of the Earth’s early history
becomes one of the most topical problems of
modern geology, and the main points of the
problem are what the primary earth crust was
and what its formation conditions were.
Investigation of ancient shields provides the
necessary material. In this respect, the north-
eastern part of the Baltic shield, or, to be
more exact, its Pechenga geoblock is a con-
venient polygon. It is composed of Archean
amphibolite-gneiss complexes and Protero-
zoic sedimentary-volcanogenic rocks that
have been intersected by the world’s deepest
Kola superdeep borehole (KSDB-3). The
geoblock includes large sulfide copper-
nickel deposits being exploited at present. It
is rather well exposed and has been studied
by geological-geophysical methods.
The Kola superdeep borehole drilling
was carried out within the framework of the
program for investigation of the continental
crust by scientific drilling in Russia. For this
purpose, a sinking complex has been con-
structed and a drilling technology and geo-
physical equipment to measure physical
field parameters under high temperatures
and pressures have been developed. The
KSDB-3 drilling started in May 1970, and
stopped in early 1995. The well has reached
12,261 m in depth. It has crossed Proterozoic
and Archean rocks, which are included in
the crustal granite-metamorphic layer. The
Archean complex (gneisses, granitoids,
amphibolites) forms a sial basement, which
is overlain by sedimentary-volcanogenic
formations of the Proterozoic Pechenga
structure, which has originated as a result of
intraplatform rifting, and developed without
forming the oceanic crust.

A new wave of intensive investigation
started in 1998, in connection with a new
Project "Comparison of Composition, Struc-
ture and Physical Properties of Rocks and
Minerals in the Kola Superdeep Borehole
(KSDB-3) and Their Homologues on the
Surface". This Project was carried out from
1998 to 2002 within the framework of the
International Geological Correlation Pro-
gram IGCP-408 approved by UNESCO
Division of Earth Sciences. Some advanced
results in the mineralogy, petrology and
physical fields and those relating to proper-
ties of deep and surface rocks have been
received since 1998.

Among the revealed parameters, char-
acteristics, properties and phenomena, those
which are determined by physical fields and
the properties changing with depth and influ-
encing interpretation results for seismic
work deserve particular attention. One such
characteristic is elastic and structural
anisotropy of crystalline rocks, suites, strata,
rock masses and the Earth’s crust as a whole.

**Scope of the meeting**
The plenary closing meeting of IGCP-
UNESCO Project No. 408 "Rocks and Minerals
at Great Depth and on the Surface" was
held in Zapolyarny, Russia, September
9–14, 2002. It was attended by 23 scientists
from Russia, two from the Czech Republic,
two from Slovakia, three from Germany, one from the Netherlands, one from France, one from Norway, one from Finland and one from Great Britain. The meeting was attended by the President of International Union of Geological Sciences Prof. Eduardo de Mulder.

Achievements of the meeting

The participants presented 27 papers covering all trends of thematic research groups: geological and geophysical, borehole measurements and heat flow measurements. In the presentations, it was noted that deep horizons of the earth crust intersected by the Kola Superdeep Borehole (KSDB-3) are composed of anisotropic rocks fractured to different degrees. The practical importance of the discovery lies in the fact that it may be used for interpretation of physical fields, prediction of deep and superdeep boreholes deviation, establishing new methods for studying rock structural features and evaluation of geospace prospects to construct underground storage facilities. The previously existing model of linear increase in the substance density and plasticity with depth has been disproved.

A great deal of research conducted in the KSDB-3 geospace on the continental crust evolution in the geochronological interval of 0–3.0 Ga allows to assess the formation velocities of stratigraphic subdivisions, and volcanic and sedimentary-tuffaceous rocks in the section of KSDB-3. A higher accumulation velocity of volcanic rocks relative to sedimentary rocks and a substantial increase in sedimentation in the process of crust evolution have been established.

The Archean granite-gneiss section of the KSDB-3 representing the Pechenga structure basement down to a depth of 12261 m is rich in mafic and ultramafic rocks, composing a total of 1381 m—25.5% of its vertical thickness. Metabasites forming 182 geological bodies of 1240 m total thickness dominate among them. Based on petrographic, mineralogical and geochemical analyses as well as on the study of rare earth element (REE) distribution pattern two genetic groups have been distinguished—metamorphic (having no protolith relics) and metamorphosed magmatic rocks correlating with the corresponding formations in the KSDB-3 site area.

It has been found that the basement of the Early Proterozoic Pechenga palaeorift is formed by Late Archean granite-greenstone rocks and is penetrated by KSDB-3 at a depth of 6842–1226 m. Unlike the analogous rocks in the Pechenga framing, the rocks from the borehole Archean complex have been greatly altered during palaeorift formation. Among the most conspicuous Proterozoic processes are the following: intrusion of numerous bodies of basic and ultrabasic composition, retrograde metamorphism under conditions of medium-low-temperature amphibolite and epidote-amphibolite facies, coeval rock granitization and injection of intrusive bodies of postfolded granites.

The structure of geological sections of the Majarvi and Orshojarvi-Pirttijarvi Formations (OP-formation) has been refined for KSDB-3 and the near-surface zone. The OP-formation section in KSDB-3 has been divided into two subformations—the upper bimodal subalkaline basalt-trachydacite (Orshojarvi Formation) and lower extended subalkaline picrobasalt-basalt-mugearite-trachyandesite-trachydacite (proper Pirttijarvi Formation) bringing the section in agreement with the previous data for the Pechenga structure surface.

Outcome of the meeting

In the discussion and the leaders’ (Prof. H.-J. Kuempel, Prof. F.P. Mitrofanov and Dr. D.M. Guberman) concluding remarks the plenary conference considered the project outcome. It was mentioned that investigations conducted during five years in all directions resulted in obtaining essential findings. Those results were presented at the plenary meetings in Zapolyarny (Russia, 1998), Zapolyarny and Apatity (Russia, 1999), Prague (the Czech Republic, 2000), at the KTB drill site (Windischschachen, Germany, 2001) and in Zapolyarny (Russia, 2002). In addition to the papers published in different journals including international ones, the following monographs and volumes of papers on the relevant topics have been published:

Gorbatshevich F. F., 2002, Acoustostoplariscopy of rock forming minerals and crystalline rocks. Kola Science Centre RAS, Apatity, 140 pp. (In Russian).

Kozlov, N. E., Avedisyian, A. A., Ivanov, A. A. et al., 2001, Material homologues of metamorphic rocks of the lower part of the Kola superdeep borehole (Unit IX in a depth interval of 11411 to 11708 m) in the Zatuloma structure exposures of the Kola-Norwegian domain. (Educational text-book). Murmansk State Technical University, Murmansk, 65 pp. (In Russian and partly in English).

Mitrofanov, F. P. and Gorbatshevich, F. F., eds, 2000, The Results of the Study of the Deep Substance and Physical Processes in the Kola Superdeep Borehole Section Down to a Depth of 12 261 m. Polygraph, Apatity (In English 153 pp., in Russian 170 pp.).

Mitrofanov, F. P. and Gorbatshevich, F. F., eds, 1999, Rocks and Minerals at Great Depth and on the Surface: Subprojects. Polygraph, Apatity, 162 pp. (In English and Russian).

Vetrin, V. R., Turkina, O. M. and Nordgulen, O., 1999, Surface Analogues of "Grey Gneiss" among the Archean Rocks in the Kola Superdeep Borehole, Kola Science Centre RAS, Apatity, 81 pp. (In English and Russian).

Mitrofanov, F. P. and Vetrin, V. R., Eds, 1998, Homologues of Rocks in the Kola Superdeep Borehole (KSDB) and on the Surface. Kola Science Centre RAS, Apatity, 50 pp.

Orlov, V. P. and Laverov, N. P., eds, 1998, Kola Superdeep. Scientific Results and Research Experience. Tekhnonetfgaz, Moscow, 260 pp. (In Russian).

During this period young researchers V. Il’chenko (Russia) and K. Schulze (Germany) working on the Project themes defended their PhD theses.

Website addresses related to the project: [http://icdp.gf-potsdam.de](http://icdp.gf-potsdam.de) or [http://icdp.gf-potsdam.de/html/kola/news.html](http://icdp.gf-potsdam.de/html/kola/news.html)

In the presentations it was also mentioned that the crust investigations in the Kola Superdeep Borehole area have been carried out for more than 20 years and the assurance exists that they will be continued in future. The reason for such a conclusion lies in the uniqueness of the material lifted from the depths below 12 km and in the confidence that the material will remain unique for a long time since at the moment the world geological community has no plans to repeat
new researchers will return to the study of such a deep (down to 12261 m) earth substance.

At the closing meeting it was decided to issue the project’s concluding proceedings report. The tentative title of the report is “Kola Superdeep Borehole and its Surroundings—the IGCP 408 results of investigations, 1998–2002”. The editors of the report are F.P. Mitrofanov, D.M. Guberman and H.J. Kuempel and the editor-in-chief is F.F. Gorbatsevich. The report will be issued in Russian and English. The editor of the English report is Prof. C. Gillen. The report should get internal and external reviews. It is presumed that the editorial staff and reviewers will prepare the layout of the report before January 2004.

On the whole, the meeting participants concluded that the new scientific data obtained on IGCP-UNESCO Project 408 substantially complement the results previously published. Besides, the work of specialists dealing with Project 408 for five years enabled the establishment of an international team united by common scientific interests. It is expected that the team will be able to work fruitfully on future projects related to fundamental problems of investigation of the bowels of the Earth.

The Project leaders F. Mitrofanov, D. Guberman and H.-J. Kuempel have expressed assurance that the Kola Superdeep Borehole and unique core material will allow new discoveries in terms of composition and structure of the continental crust deep zones.

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Sixth International Congress on Rudists
Rovinj, Croatia, September 29–October 5, 2002

Since their inception in Belgrade in 1988, the international rudist meetings have succeeded in assembling most of the world’s devotees of these engagingly baroque fossil bivalves. This latest meeting, held in the scenic old town of Rovinj in Istria (the peninsula that juts out into the northern end of the Adriatic), was no exception, fully living up to its ‘international’ billing. At least seventeen nations were represented, by just over 50 participants, ranging from Mexico to Japan and from Germany to Saudi Arabia, though, as might be expected, with a preponderance of folk from the Mediterranean countries.

In established tradition, the congress celebrated the memory of the region’s foremost rudistologist. This time it was the turn of Ante Polšak (1930–1990), whose seminal studies of Istrian rudists made a major contribution to rudist biostratigraphy in general, as well as providing the stratigraphical basis for work in the region today.

The 27 oral and 20 poster presentations given at the meeting, together with a few further abstracts submitted by those who were unable to attend, covered a wide diversity of topics. I will treat the contributions under five thematic headings, mentioning just a few highlights to convey a sense of that variety.

Systematics and evolutionary patterns
Modern approaches to the low level taxonomy of rudists are (at last!) beginning to take root, with increasing emphasis on the morphometric discrimination of inherently variable populations. This certainly involves more work per publication than the mere typological naming of every slight variant (a habit that is, alas, not entirely extinct), but it does offer the promise of getting closer to the real biological species, hence the foundations for any serious palaeoecological or evolutionary analysis.

Examples presented at the meeting covered the rudists’ stratigraphical spectrum, from the Upper Jurassic to the Upper Cretaceous. Especially memorable was the report from Dietrich Schumann (Darmstadt) on his haul of spectacular specimens of Torritites from southern Oman—beautifully illustrated, as always. This genus has a curiously disjunct distribution. Besides Arabia, it has also long been known from the Caribbean region, where it has nevertheless only ever been found in small numbers. On account of its strange distribution, as well as an aberrant morphology (even by rudist standards), for many years it enjoyed the accolade usually accorded only to dinosaurs and the like of being the subject of more papers than there were known specimens. However, Schumann has found it to be very abundant at certain horizons in Arabia, allowing him a good insight into its variability, which strongly reflects the constraints of individual growth attitude and accommodation to neighbours. It was also gratifying to see Simon Mitchell (Kingston, Jamaica) tackling the wild jungle of the smaller Upper Cretaceous Jamaican radiolitids, while Tvrtko Korbar and Ivan Gusić (Zagreb) did battle with the Praeradiolites of Brač Island, both using a similar approach. All good, solid, much-needed, taxonomic gardening.

Palaeoecology
Recent critiques of the text-book caricature of rudists as ‘reef-builders’ has left a fruitful proliferation of studies aimed at elucidating what their palaeoecology really was like. The richly illustrated poster of Gabriele Caranante and colleagues from the ‘Neapolitan school’, demonstrated the relationship between various kinds of rudist lithosome in the Upper Cretaceous of southern Italy and their original hydrodynamic setting on unrimmed, channelled shelves. In a more quantitative vein, Jean-Pierre Masse and Muguet Fenceri-Masse (Marseille) combined volumetric estimates of carbonate in Upper Barremian rudist beds in SE France with the time-scales of the Milankovitch
cyclicity considered to have yielded them, to calculate ky-scale rates of carbonate production.

Intriguing results also came from smaller scales of observation. Tvrko Korbar and Vlado Jelaska (Zagreb) documented preferred life orientations in radiolitids that suggest entrainment of the radial bands with respect to ambient currents. Stefan Götz and colleagues from Karlsruhe built up a breathtakingly detailed 3D computer image of individual settlement and growth within a hippuritid cluster, based on closely spaced serial section-grinding. In this instance they found no relationship between available settlement space and juvenile survival, but they did detect a correlation between number of coeval settlers and later survivorship, suggesting a predominant competitive control on eventual cluster density. They also found a strong hint of annual (seasonal) spatiofalls. Meanwhile, Iván Regidor-Higuera and colleagues from Bilbao presented an exquisitely well resolved sclerochronological study of radiolitid shells. Such careful, highly detailed studies of rudist settlement, survivorship and growth promise fascinating insights into their palaeoecology. They will also provide much-needed quantitative data on the contribution of rudists to the sedimentary budget of Cretaceous carbonate platforms.

**Geochemical investigations**

Geochemical analyses of rudist shells, especially of their isotopic compositions—a field in which, incidentally, Ante Pošak was also a pioneer—have provided many valuable new data in recent years. Topics addressed at Rovinj ranged from correlation based on strontium-isotope ratios (Riccardo Cestari, AGIP, Ravenna; Thomas Steuber, Bochum) to diagenetic effects (Regidor-Higuera et al.; Ahmed Mansour, Alexandria), thus proving the value of isotopes from the stratigraphical to the petrographical scales of investigation.

**Biostratigraphy and Palaeobiogeography**

Studies of the rudists themselves, as described above, were well balanced by those of their distribution in time and space, and the implications of such patterns. Naturally, it was here that the broad international scope of current rudist research was most evident, with descriptions of faunas from nearly every corner of the rudists’ empire. Besides the chemostatigraphical correlations mentioned above, useful progress is being made in the biostratigraphy of rudist limestones through the integration of different taxa. A notable project in this respect is that of Bob Scott (Cleveland, Oklahoma), who reported on continuing progress with his massive graphic correlation scheme for the Barremian-Turonian, which now integrates 1800 taxa, as well as geochemical event-, magnetochron- and sequence stratigraphical levels. Sacit Özer (BorNova-Izmir) also deserves a medal for his patient retrieval of cryptic stratigraphical information from marbles in the Menderes Massif of SW Turkey, where rocks that were formerly considered Permocarboniferous now turn out to be Upper Cretaceous, based mainly on the identification of hippuritid rudists.

**Miscellaneous**

A few presentations dealt with yet other issues. Ann Molineux (Austin, Texas) explained how modern curatorial methods are being applied at the Texas Memorial Museum of Science and History, where a number of important rudist collections are housed, with on-line access to the data-base and specimen illustrations a major objective. Peter Skelton—lose out to high-profile (and big-appetite!) machine-based science in the funding game. Also in pursuit of maximising data-retrieval, Wyn Hughes, with colleagues from Saudi Aramco, demonstrated how computer tomography and Formation Microscanner Imaging can reveal the distribution and orientations of specimens in unslabbed cores and uncored wells, respectively. These non-destructive methods will make it much easier than before to map out distinct associations (e.g. elevator-, or recumbent-dominated) in the subsurface. Finally, Mileva Sladč-Trifunović (Belgrade) looked back over the preceding international rudist meetings by way of a build-up to announcing the long-awaited publication of the proceedings from the first meeting, in 1988. A few honoured delegates received their copies there and then from the small supply that she had been able to bring with her. The rest of us eagerly await ours.

**Other aspects**

The meeting was conveniently held in the well-appointed hotel where delegates were accommodated, and our Croatian hosts on the organizing committee did an excellent job of ensuring flawless multimedia projection facilities. Delegates also enjoyed several lively social gatherings, the highlight of which was the conference dinner, held in a rustic village setting. There, we were greeted by a display of traditional dances and treated to a wonderful meal of local produce, finishing up with the now also traditional homegrown eisteddfod (for some curious reason, rudist researchers seem to be an unusually musical, even operatic lot!).

Those who were fortunate enough to be able to stay on after the meeting enjoyed a dream field-trip around this virtual paradise of rudist limestones, in superb weather, and guided by the richly informative field-guide edited by (the seemingly ubiquitous) Igor Vlahović and Tvrko Korbar. The highlight was a boat trip that provided us with both spectacular views of clinofoms of rudist debris filling in a Cenomanian intra-platform depression, along the coast of Frasker Island, and a landing on Fenoliga Islet, where we were able to see a trail of dinosaur footprints right across the top of a rudist biostrome! Needless to say, our Croatian hosts also saw to it that we were treated to a variety of local culinary delights along the way.

In all respects, then, the meeting was a great success, for which the Croatian organizing team deserve the congratulations of the rudistological community. The next international rudist meeting is to be held in Austin, Texas, in 2005, convened by Bob Scott (E-mail: rwscott@ix.netcom.com) and Ann Molineux (E-mail: annm@mail.utexas.edu). And of course, in Texas the rudists are, still ... So, if you have the slightest affinity for them, you won’t want to miss it.

Peter Skelton
International Conference on the Role of Natural Resources and Environment in Sustainable Development in South and Southeast Asia (NESDA)

Dhaka, Bangladesh, January 17–21, 2003

A five-day International Conference, titled "The Role of Natural Resources and the Environment in Sustainable Development in South and Southeast Asia (NESDA)" was successfully organized jointly by the Geological Survey of Bangladesh (GSB), Association of Geoscientists for International Development (AGID) and Society of Economic Geologists and Mineral Technologists (SEGMITE) in Dhaka in January 17–21, 2003. The economic growth of any nation is basically dependent on exploration and exploitation of natural resources, their proper conservation and utilization through industrial development and also on maintenance of healthy and hygienic environmental ecosystems. Misuse of natural resources, environmental degradation, the problem of environmental protection and all sorts of pollution control are getting unprecedented attention because without solving these problems sustainable development can not be achieved. The objectives of this event were to gather innovative ideas, information and new technology regarding sustainable management of issues like natural resources, geohazards and environmental protection by international geoscientists, directly or indirectly involved with these disciplines, and also to publish an international standard publication based on geoscientific contributions, opinions and recommendations given by geoscientists from all over the world, 147 scientific papers were received on the following sub-themes:

A. Exploration and Exploitation of Natural Resources
B. Sustainable Development and Management of Natural Resources
C. Industrial Minerals and Small-Scale Mining
D. Water Resource Management, and the Conservation and Protection of Water Quality.
E. Possible Sources of Arsenic Pollution in Ground Water and its Remedy
F. Environmental Degradation and Biodiversity
G. Mitigation of Natural Hazards and Assessment of Environmental Impacts
H. The Role of the Private sector, NGOs and Public Sector in the Sustainable Development of Natural Resources and the Environment

I. Geoscience Education in the Conservation of Natural Resources and Environmental Studies

The conference was held at the Bangladesh National Museum. The Honorable State Minister A. K. M. Mosharraf Hossain, FCA, MP, Energy and Mineral Resources Division (EMRD), Ministry of Energy and Mineral Resources (MEMR), Government of the People's Republic of Bangladesh was present as the Chief Guest at the inaugural session. An address of appreciation on the life of Professor Gerald Cooray of Sri Lanka, a past President of AGID (1984–88), who died on 4th January 2003 was given by his friend and colleague Dr. Deryck Laming, Editor, Journal of AGID Geoscience and Development. Then an Address of Welcome was given by Ms. Afia Akhtar, the Convener of the conference. She mentioned that the world's population is increasing day by day, and in such circumstances it is a must to explore and exploit more and more natural resources to meet the growing demand of the ever-growing population. The proper utilization of these natural resources is also required to ensure the development of industrialization using modern technology. Otherwise, sustainable development cannot be achieved. She also mentioned that at the same time, due to the exploding population, the world is facing a series of serious environmental problems which hamper development activities, and therefore the maintenance of healthy environmental ecosystem is also one of the key factors for the development of a sustainable society. She pointed out that we the human beings are the topmost sensible species in the world as we have unique ability to identify problems and then to invent devices to solve the problems accordingly. Therefore, if we have strong determination to go forward with

Chief Guest A.K.M. Mosharraf Hossain, FCA, MP, the Honorable State Minister, Energy and Mineral Resources Division (EMRD), the Ministry of Energy and Mineral Resources (MEMR), Government of the People's Republic of Bangladesh, addressing at the

International Conference on the Role of Natural Resources and Environment in Sustainable Development in South and Southeast Asia (NESDA)

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a positive attitude to cope with all sorts of problems, then we hope that one day, we will be able to offer an endurable and sustainable society to our future generations. She stated that the economic growth of any nation, greatly influenced by proper exploration, exploitation and conservation of natural resources together with maintenance of a healthy and hygienic environment ultimately governs the world economy. Nevertheless, most Asian countries lag far behind in this regard, and so, to create awareness, she mentioned that the main theme of the conference was selected. She concluded by expressing heartfelt gratitude to Shell-Bangladesh, UNOCAL-Bangladesh, UNESCO, PGCL, Petrobangla and Nur-Telefilm for their kind financial and logistic support for the conference. Prof. Dr. Vigar Hussain, Convener of SEGMIT, also welcomed the delegates on behalf of his organization. President of AGID Dr. S.D. Limaye highlighted AGID and its geoscientific activities for sustainable development throughout the world, especially in the developing world. He raised some questions: Why is there such concern about sustainability and the environment in the developing countries? Why do we have desertification, soil erosion, loss of forest cover, drying-up of wetlands, devastation by floods, salinization of irrigated farms, uncontrolled urbanization and serious pollution of water and air in most of the developing countries? Why is the urban environment degrading very rapidly, with the same scenario from Buenos Aires to Bangkok, from Delhi to Dhaka, from Johannesburg to Jakarta, from Karachi to Colombo and from Mombasa to Manila? He also suggested some solutions to these problems, which lie in population control, creating on-farm employment opportunities in villages, promoting rural credit facilities through institutions like Grameen Bank of Bangladesh, adopting integrated river basin management and creating awareness of the importance of the prudent use of natural resources. NGOs can play an important role, and that’s why international NGOs like AGID and SEGMIT are involved in this conference. M. Nazrul Islam, Director General, highlighted the contribution of GSB to the development of mineral resources in Bangladesh, and also mentioned some of GSB’s recent activities. Khandaker Shahidul Islam, Secretary of the EMRD, MEMR, Government of the People’s Republic of Bangladesh, mentioned that geoscience plays the role of a mainstream for the industrial and economic development of a country. He said that natural resources development should keep pace with the protection of the environment and ecology, and these days the maintenance of an environmental and ecological balance is very important. The present conference covers a wide spectrum of subjects, he said, and these subjects have a water resources and making water available for drinking, domestic and agricultural uses constitute a challenge for geoscientists all over the world. Energy is another important topic for Asian countries, the consumption of which is increasing day by day together with growing populations. He also expressed his hope that this type of conference would help to share and consolidate our experience, knowledge and vision for our posterity by the proper development and utilization of natural resources. State Minister of the E&MR Division, MEMR, A.K.M. Mosharraf Hossain, FCA, MP, Govt. of the People’s Republic of Bangladesh, said that development is very much related to the evolution of civilization, and through development mankind has achieved its present glorious position. However, we have also destroyed our natural inheritance to some extent in the name of development, which is a threat to us both regionally and globally. He mentioned some major environmental problems such as deforestation, scarcity of safe drinking water, increased population, sanitation and air pollution. He expressed the hope that the results of the conference would provide guidelines for sustainable development of natural resources and the environment in South and Southeast Asia. With these few words, he inaugurated the NESDA International Conference. An abstract volume of 92 pages, containing 139 abstracts, and an attractive souvenir album of the conference have been published by the organizers. During scientific sessions 77 papers were presented, including some poster presentations. Themed scientific sessions were started by a keynote speech. Nusrat K. Siddiqui of Pakistan focused on the worldwide history of oil exploration, the distribution of world oil reserves, and their growth, production trends, and consumption and resulting pollution, as well as the history of oil price fluctuations. M. Badrul Imam stated that several geotectonic units are defined in the Bangladesh Basin, and these are rated differently with respect to the occurrence of geologic conditions required for commercial accumulation of hydrocarbon gas. M. Nurul Hasan mentioned that geophysical exploration supported by geological information and drilling has resulted in the discoveries of coal-bearing Gondwana coal, hard rocks, magnetic bodies and other minerals in northern Bangladesh, and further geophysical exploration is needed to obtain more information about offshore and onshore petroleum. Dr. Mike Katz from Australia.
aquifers in India mainly include non-carbonate, fractured crystalline basement complex and metamorphic rocks, and this type of aquifers get saturation from monsoon rainfall, but the storage suffers depletion due to prolonged dry-period withdrawal from dug-wells. To obtain a sustainable supply throughout the year, any increase in the pumping for irrigation due to new wells in the mini-watershed must be balanced by reduction in the dry season and increasing the dry-season recharge. Other papers dealt with the groundwater demand-and-supply ratio, its fluctuation and future potentiality; water management aspects of drinking water supply; water quality and aquifer analysis in managing salinity problems; oxygen isotopic composition of surface and groundwater; assessment of groundwater salinity using a geoelectrical approach. M. Nazrul Islam and M. Nehal Uddin mentioned that the groundwater in 61 out of 64 districts contains arsenic levels higher than the permissible limit of 0.05 mg/liter, and the exact causes of arsenic poisoning are not yet known. Bharat M. Jnawali of Nepal pointed out that out of the 23 million population of Nepal about 1.9 million and 0.39 million people are using water with arsenic above 10 microgram and 50 microgram per liter, respectively. S.K. Acharyya and B.A. Shah said that arsenic contamination in groundwater is essentially confined to Holocene deltaic sediment, and the possible sources of arsenic are the discrete phases of Fe-Mn-oxhydroxide with absorbed arsenic, derived both from the Himalayas and Peninsular India, entrapped in organic rich deltaic sediments. S. Sengupta described the pattern of distribution of arsenic contaminated groundwater in the delta region of West Bengal and its possible causes. S.C. Goswami & Kalpana D. Kalita of Assam mentioned that “Jhum” or “shifting cultivation” is one of the dominant factors responsible for loss of the forest cover, which again is responsible for environmental degradation. Therefore, necessary steps should be taken to cope with this problem. Juergen Lietz of Germany mainly dealt with waste disposal sites in Thailand and the sources of environmental pollution. Hatice Kurtlik of Turkey said that the Euro-Siberian phyogeographical region covers much of Asia and Europe, whereas the Irano-Turanian region covers vast plateaus in Asia. The Irano-Turanian elements meet and merge into Euro-Siberian and Mediterranean elements within Turkey. Robert Hodgson of the UK mentioned that 85% people of Bangladesh live in non-engineered homes made of mud and bamboo, which are often damaged or destroyed by flooding or strong winds. Considering the local economic conditions, he suggested using cement-stabilized mud to build houses. Other papers focused on a solution of can be used, the no less lengthy problems that lie ahead for geoscience organizations, comprising national surveys, research institutes and universities, in the coming years. He said that the environment is common to everyone’s agenda, but in how many cases does it have a geoscientific aspect? M. Das highlighted the need of updating geoscience curricula in the Indian educational system through reorientation and reorganization. The presentation of M.G. Petterson of the UK dealt with practical examples of the application of sustainable mineral development in the developing and developed world, and focused on issues such as how geoscience can underpin policy and planning, how the geoscientific community can encourage good practices and how to give examples of good and not-so-good mining practices. N.K. Siddiqui’s presentation dealt with the Cave “Ghar-e-Hira”, situated at the top of the hill Jabal Al-Noor, 5 km northeast of the Ka’aba, within Mecca in Saudi Arabia. He mainly discussed the geology of the region, the orientation of the axis of the cave with reference to the Ka’aba and to the sun’s trajectory, being a perfect retreat and safe, fully ventilated and sunny, a rock type which is immune to weathering, etc., in detail.

At the scientific and industrial exhibition, the following organizations took part as exhibitors of their organizational activities, natural resources and the by-products of their respective countries, as well as scientific publications.  
1. Geological Survey of Bangladesh (GSB)  
2. CEGIS Centre for environmental and geographical information services  
3. ITC, the Netherlands  
4. Banbhore Ceramic Industries, Pakistan  
5. Water Resources Planning Organization, WARPO  
6. General Pharmaceuticals Ltd PL Kit  
7. Maddhyapara Hard Rock Mine Project  
8. Barapukuria Coal Mine Project

At the end of the scientific sessions a plenary and discussion session was held and

- The conference recognizes that there remains an urgent requirement to undertake the systematic exploration and development of natural resources with due consideration for the environment.  
- There is a need to formulate pragmatic legal, fiscal and environmental methodologies to ensure the sustainable development of natural resources.  
- Industrial minerals have increased their socio-economic importance, particularly in rapidly developing highly populated regions such as South Asia. The conference recommends that the respective governments provide suitable policies with the objective of encouraging local and foreign government and private investment in the industrial minerals sector. Furthermore, small-scale mining and processing should receive appropriate levels of technical and financial assistance.  
- To move towards a more sustainable approach to natural resources development, the conference recommends that steps be taken to: (a) create mass awareness, and draft and implement necessary legislation to ensure the conservation, recycling and re-use of natural resources; (b) encourage and prioritize the development of alternative resources where possible; and (c) encourage developmental approaches to minimize the consumption of natural resources.  
- The conference recommends that a strategy be developed to encourage a balanced utilization of water resources.  
- The conference recommends that governments encourage detailed surveys and assessments of surface water and groundwater resources to identify toxic elements such as arsenic and fluoride. Remedial methodologies should be developed to the highest scientific standards.  
- The conference recommends that a systematic survey be undertaken to define hazard-prone areas. Disaster mitigation and education programs should be aimed at a range of audiences, particularly at
The Honorable State Minister, A.N.M. Ehsanul Haque, Ministry of Education, Government of the People's Republic of Bangladesh, was present as the Chief Guest at the closing session, and said that undoubtedly, Asian countries enjoy valuable natural resources. Proper technical know-how to explore and exploit natural resources as well as proper management of such resources are expected to play a vital role in the sustainable development of this region. He mentioned that the natural balance of the world is at stake. Extensive use of artificial products made through modification of natural resources, the problem of recycling the wastes of artificial products and the lack of proper management of natural resources like oil, gas, coal and water have caused an imbalance of the natural environment of the earth, our habitat. Socio-economic conditions also play a significant role in this regard. He therefore requested everyone to take care of the environmental balance while working for the sustainable development of natural resources and also to find out the way to reach the goal of national development through the optimum use of natural resources and environment. Ms. Akhtar expressed the hope that the presentations of papers, discussions and recommendations of the conference would help the efforts for the sustainable development of natural resources and the environment in the South and Southeast region and would also help to regenerate cooperation and coordination among the geoscientists of this region as well as other parts of the world.

An excursion to the northwest along the Asia Highway to the Pashchimanchal Gas Company Limited (PGCL) at Nalka, Sirajganj near the Jamuna bridge, about 192 km from Dhaka, was arranged by the Conference Committee. On the way to Nalka, the conference delegates visited the National Monument built up on Pleistocene upland at Savar, one of the best architectural designs in the sub-continent. Delegates enjoyed both urban and rural views, and then crossed the Jamuna Multipurpose Bridge over the Jamuna River. At the PGCL premises, A.K.M Shamsuddin, Managing Director of PGCL, demonstrated the layout of the 30-inch-diameter high-pressure natural gas transmission line along the Jamuna Bridge and the distribution of gas to Sirajgonj Town.

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