

# Report on the third Nepal Geological Congress, 2001

by  
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## Abstract

The Geology of Himalayan Region is very complex and mysterious as well as interesting. Many geo-scientists around the world are doing research to study its complexity.

Nepal Geological society, one of the leading professional groups of geo-scientists of Nepal has organized a congress. More than 250 Geo-scientists and civil engineers from 15 countries have taken part in this three days long congress. 50 oral papers were presented in 6 different topics : Regional geology and tectonics, Hydrogeology, Environmental geology and natural disaster, Economic geology, Engineering geology and oil and natural gas.

This paper is the brief report of that congress.

*Keywords : Himalayan Region, Natural disaster, Engineering geology, Hydrogeology*

## 1. Introduction

Nepal is a well known research place for many geo-scientists all over the world. The geology of Himalayan region is very interesting as well as mysterious which inspires many geo-scientists for further research. Keeping in mind the exchanging scientific knowledge and research findings of various geo-scientists working in the Hindukush-Himalayan-Tibet region, Nepal Geological society founded in 1979, as a professional organization of group of geo-scientists, with the support from the Federal Institute for Geosciences and Natural Resources (BGR), Germany ; Kaligandaki, Impregilo SPA, Lalitpur, Nepal ; and United Nation Development Program/Nepal, organized the third Nepal Geological congress in Kathmandu from 26 to 28 September, 2001. The venue of the congress was Nepal Administrative Staff Collage near the historical city of Patan. The first congress was organized on August 1995 and the second congress was on November 1997. The Third congress, organized after four years, was an important gathering of prominent geo-scientists and civil engineers. Over 250 geo-scientists and civil engineers from 15 countries have taken part in this congress and have presented their research findings.

## 2. Theme of the Congress

The Congress had given specific emphasis on Hindukush-Himalayan-Tibet region. There were 6 main themes of the congress : 1) Regional Geology and Tectonics, 2) Hydrogeology, 3) Environmental Geology and Natural Disaster, 4) Economic Geology, 5) Engineering Geology and 6) Oil and Natural Gas.

There were about 50 full papers, 4 invited papers (keynote lectures), and 3 posters

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presented in various sessions of 3 days long congress.

The proceedings of the congress have been prepared in two volumes. Volume-24, a hard copy consists of all extended abstracts of the congress and volume-25, a hard copy, which contains all keynotes lectures and full papers.

### 3. Technical Sessions of the Congress

The congress was started with the opening ceremony on 26th September. Mrs. C. Yadav, the deputy speaker of house of representative, Nepal, was the chief guest at the occasion. She inaugurated the congress in a traditional Nepalese style by lighting the Panas. On her inaugural speech she expressed the opinion that the outcomes of congress will be fruitful towards the sustainable infrastructure development of this region. The president of Nepal geological society, Mr. P.S. Tater welcomed the participants and explained the activities of the society. Mr. R. Pokharel, the convener of the congress highlighted the objectives of the congress (Photo 1).



Photo 1 : Opening Ceremony of the Third Nepal Geological Congress.

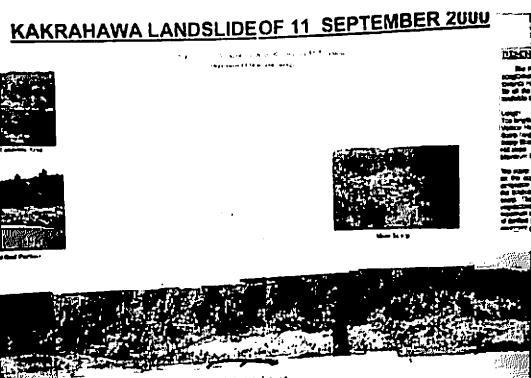


Photo 2 : A Poster of Kakrahawa Landslide, Western Nepal, Presented during Poster session.

#### 3.1 Regional Geology and Tectonics and Economic Geology

After the short opening ceremony, the technical session started. Mr. M. R. Pandey, the senior seismologist of Department of Mines and Geology, Nepal, delivered the keynote lecture on "Seismotectonic setting of the Nepal Himalaya." In his lecture he pointed out the clustering of seismic events in an east-west belt along the front of the Higher Himalaya and following the trace of the Main Central Thrust (MCT). Most of the seismic events were clustered at a shallow depth of about 5-20 kilometers in the vicinity of the midcrustal ramp beneath the higher Himalayas, he explained. Himalayas were formed by the collision of two continental plates, the Asian and the Indian. The Indian plate is constantly moving towards north even at present and converging below Tibetan plate by 2 centimeters annually. Since the mountain building process is still in progress, the Himalayan and the surrounding region is seismically one of the most active parts on earth, he described (Photo 2).

After this keynote lecture, 9 oral papers and 3 posters were presented. Each presenter had given 15 minutes for presentation and 5 minutes for discussion. In the last session, 4 papers were presented on the theme "Economic Geology". Author had also presented the paper on that theme. The title of the paper was "Geo-environmental problems to snow avalanche defensive structures at mudstone zones in Niigata Prefecture, Japan". The reason

of failure of snow defensive structures at some parts of Niigata prefecture, its effects and preventive measures were explained on the paper. Although mudstone exhibits a high strength while it is dry and fresh, it becomes quite unstable after weathering. When it comes in contact with water and atmosphere repeatedly, it starts slaking. In addition, the repeating action of freezing and thawing accelerates the disintegration process of mudstone. Also during construction, the deep excavation of foundation disturbs the natural environment and the embedded mudstone comes in contact with the atmosphere and gradually slakes. Consequently shear strength is reduced and the structure fails to resist the upcoming shear stresses and moments and ultimately malfunctions.

The paper has described mainly the investigation of foundation of snow avalanche defensive structures in mudstone areas and has tried to find the mechanism of foundation weakening. It has explained the simulation of slaking activities in the laboratory and has compared the slaking activities of mudstone of various areas and its impact on various soil properties by soil tests.

In the evening, there was a banquet at Hotel Himalaya, where authors have got a chance to meet several geo-scientists and civil engineers from various parts of the world. Authors shared their experiences with them. They were highly interested about the paper. Authors answered their queries also.

### **3.2 Environmental Geology and Natural Disaster and Engineering Geology**

The second day (27th September) of the congress began with the keynote lecture of Mr. B. M. Jnawali on "Geo-environmental problems and challenges". He explained the Geo-environmental problems during the construction of Highways in Nepal, especially in the mountainous areas. The mountainous terrain presents great challenge for the construction and maintenance of highways throughout Nepal. He explained, tunneling is not feasible in the mountainous areas of Nepal during Highway construction. Nepal has not succeeded to generate sufficient power supply so far and cannot provide the electricity inside the tunnel 24 hours. So Nepalese are forced to construct the valley roads along the bank of river, which are very vulnerable to landslides, bank erosion and bridge washout problems. Hence, maintenance costs of these highways are very high, sometimes over than the construction cost, he explained.

Then 4 papers were presented by different geo-scientists on the theme "Environmental geology and natural Disaster" in the morning session. All the papers were very interesting and fruitful. In the paper, "Assessment of barrier potential of sediments for selection of waste disposal sites in the Kathmandu Valley", the author showed the dumping site problem of Kathmandu valley and suggested the appropriate solution for the decision makers. The Kathmandu valley with the population of 1.5 million is facing rapid urban growth, unplanned development and environmental degradation, leading to increased pollution. Consequently, the valley is confronted with major problem of safe disposal of urban waste produced at a scale of 500 tons per day. This is due to the lack of awareness and realization at the decision making level. The author has tried to solve the waste disposal problem by preparing a geo-scientific map showing the potential areas for proper landfill sites based on the assessment of subsurface sediments in combination with other relevant aspects related to waste disposal. But he completely ignored the use of geo membrane in the landfill sites. During discussion, when asked about the importance of geo membrane in the landfill sites, he agreed but showed the problem of funding. The other serious problem is the separation of garbage, which is not practiced in Nepal yet. Then, before the lunch break, 4 papers based on the theme "Engineering

geology" were presented. Among them, the paper "geomorphology, sedimentology and hazard assessment of the Koshi alluvial fan in Eastern Nepal" was very interesting. The presenter said the river has exceptionally high sediment carrying capacity as well as channel shifting nature. At present it has shifted about 112km towards west in 246 years. The Koshi watershed, which covers a vast area of geomorphic regions, extends from the Tibetan Plateau (in the north) to the Indo Gangetic Plain (In the south). He explained the texture of sediment and the causes of excessive bank erosion of this river, located in eastern Nepal. After lunch Prof. M. R. Dhital gave keynote lecture on "Natural Hazards in Nepal". In his lecture he talked about the various physiographic and tectonic regions of Nepal. He divided Nepal into eight physiographic units and five tectonic zones and discussed their effect on the natural hazards. Then 8 more papers were presented, 4 on each theme "Engineering Geology" and "environmental Geology and natural Disaster".

### 3.3 Hydrogeology, Regional geology and Tectonics

On the third day, Dr D. R. Kansakar gave keynote lecture on "Ground water resources : challenges in their development and management in Nepal." Nepal has enough ground water resources, which is sufficient for both irrigation and water supply. But the problem is financial resource and the proper management, he briefed. As a result more than 70% of land depend on rain fed irrigation in this country, although her economy is totally based on agriculture.

On the final day 13 different papers were presented in three different sessions and in two different themes. The author found the paper "Hydrogeology of the Brahmaputra Basin" more informative. According to the paper, the waterpower resource of the Brahmaputra river is the fourth biggest in the world being  $19.83 \times 10^3 \text{ m}^3/\text{s}$ . The basin is very unstable. Four geotectonic provinces can be delineated in the NE India through which Brahmaputra flows. Hydro geologically, the author has divided the basin into two distinct categories (a) dissected alluvial plain and (b) the inselberg zone, which is characterized by fractured, jointed and weathered ancient crystalline rocks. The author identified two broad groups of



Photo 3 : View of a landslide along the Prithvi Highway (Kathmandu-Noubise Sector), 12.5 kilometer west from Kathmandu.

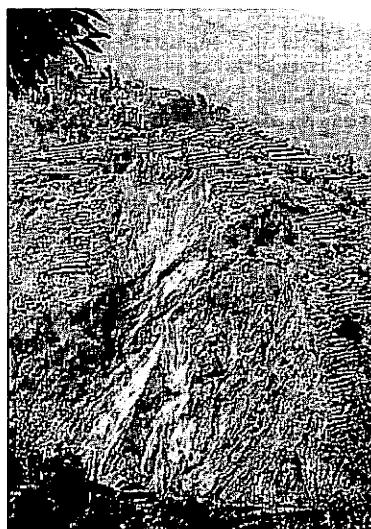


Photo 4 : View of a landslide along the Prithvi Highway (Kathmandu-Noubise sector). Note the Cultivated Land Around the Landslide Area.



Photo 5 : View of Deflection of Road and Pipeline due to Landslide along Kathmandu-Trishuli Road. The Road was Straight before Landslide.

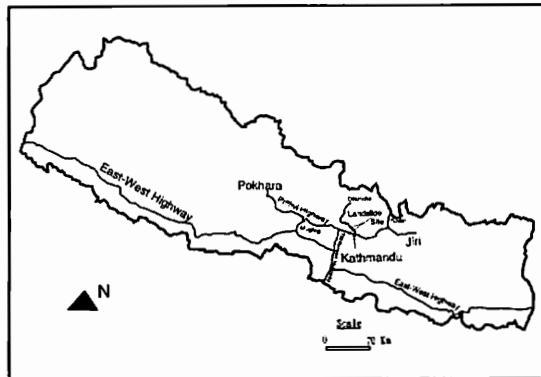


Fig. 1 : Schematic map of Nepal showing major Highways and Inspected landslide sites.

aquifers and has determined the properties of aquifer materials as well as groundwater in his paper.

After the final technical session, closing ceremony began. Participants from India, U. S. A. and Japan were invited to give their views about the congress. On behalf of Japanese participants, the co-author gave the speech. He congratulated the organizer for the successful completion of the congress. He said, we have inspected the different landslide areas along the Prithvi Highway and Kathmandu-Trishuli Road and found the condition of these roads very terrible. We have collected the soil samples from different failure sites of Prithvi highway for geo-technical investigation of the landslides, he briefed. He gave suggestion to prevent the mass movement problems along these highways and told, the civil engineers, geo-technical engineers and geologists should work together to prevent the excessive mass movement problems along the highways in Nepal (Fig. 1) (Photos 3, 4, 5).

#### 4. Impression about the congress

The organization of the congress was very impressive. Many senior civil engineers, geo-technical engineers and geologists from Nepal, India, Bangladesh, Pakistan, Sri Lanka, Japan, France, England, U.S.A. and so on have been gathered there. Authors have got chance to meet them and exchange our ideas. Authors have also met several geo-scientists who have previously graduated from different universities of Japan. In summary, authors found the third Nepal Geological Congress very fruitful.

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Nepal Geological Society (2001) : Proceedings of the third Nepal Geological congress, Vol. 25