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- International Karakoram Project
- Pakistan
- 1980

In co-operation with the Ministry of Science and Technology, Islamabad and Academia Sinica, Beijing.

An international, inter-disciplinary expedition using advanced and recently developed technological skills to examine earth science problems in the Karakoram Mountains of Pakistan.

Leader: Professor Keith Miller F R Eng, Department of Mechanical Engineering, University of Sheffield

Field Director: Nigel de N. Winser, Deputy Director, Royal Geographical Society.

Scientific Programme Directors:

Survey: Jonathan Walton, Department of Photogrammetry and Survey, University College London

Geomorphology: Dr Andrew Goudie (Deputy Leader), School of Geography, University of Oxford

Housing: Ian Davies, Department of Architecture, Oxford Polytechnic and Robin Spence, Department of Architecture, University of Cambridge.

Seismology: Dr Geoff King and Dr James Jackson, Department of Geophysics, University of Cambridge

Radio-echo Ice-Sounding: Dr Gordon Oswald, Sensonics Ltd., Chesham, Bucks.

Number of members: 73

Field work: June-September 1980

It is appropriate that the expedition marking the 150th Anniversary of the Royal Geographical Society (with IBG) should have brought together six individual programmes of research in the earth and engineering sciences covering geology, glaciology, geomorphology, survey, seismology, housing and natural hazards to produce a unified geographical study of the world's most chaotic and unstable landscape: the Karakoram Mountains of northern Pakistan. Here where the Indian and Asiatic tectonic plates collide forming high mountains and deep river gorges, the inhabitants regularly witness intensive and extensive earthquakes, floods, glacier surges, mud-flows, and rock-

falls. It proved to be a perfect testing ground for theories about continental drift, mountain building and decay and to study the effect of ever-present hazards on the local population.

The teams included scientists from Britain, Pakistan, and China at a time when the political situation in neighbouring Afghanistan was at its most tense. Nevertheless, Chinese scientists participated in fieldwork outside their own country for the first time in many years, so demonstrating the underlying philosophy of the project, that the Karakoram Mountains of Pakistan should be a laboratory for world science and that inter-disciplinary

groups working together can produce more than the sum of the parts.

Using new V8 Land Rovers along mountain tracks leading from the recently completed Karakoram Highway (KKH) and centred on a campsite at Aliabad in the Hunza valley, the teams managed to cover a wide area during their summer season. Permission was granted to work in previously closed areas northwards along the KKH past the Batura glacier and on towards the Chinese border. The KKH is a remarkable feat of civil engineering, perpetually under repair as it becomes blocked by frequent rock-falls, mud-flows and floods caused by glacier meltwater outwash. Many of these phenomena were investigated by the geomorphological team led by Professor Andrew Goudie, (Deputy Leader), who examined the rates and processes of land destruction. Amongst these glacial fluctuations, rock weathering, and the sediment loads of the Hunza River which are among the greatest anywhere in the world, were of special interest.

The Radio-echo ice-sounding team took the first precise ice surface-and-depth profile in the Karakoram-Himalaya using impulse-radar equipment on the Hispar and Ghulkin glaciers. These huge glaciers are reservoirs of frozen water whose meltwaters are needed to irrigate the desert-like terrain. Their behaviour is of economic importance not only to agriculture but because of their destructive effects on the land surface and lines of communication.

The Karakoram, as a part of the Himalayan system result from the active collision of the Indian and Asiatic plates, approaching each other at a rate of about 6 cm per year. At the surface deformation occurs along faults and folds, and at depth by plastic deformation. Both the motion of major faults, and of joints associated with near-surface folding can cause earthquakes. The

depth at which seismicity occurs gives an indication of the depth at which brittle behaviour gives way to plastic deformation. The first micro-earthquake study of the Karakoram fault and Indus suture zone gave 371 recordings demonstrating these quakes to be of a shallow and intermediate nature, in sharp contrast to deeper recordings taken in China to the north and the Hindu Kush to the West.

At the same time, the surveyors climbed to 15 existing high altitude survey beacons, all of them over 4,000 metres, to re-measure part of the 1913 Indo-Russian triangulation and the accurate surveys of Professor Kenneth Mason over 50 years ago. Using modern electronic instrumentation including microwave EDM to measure distance, geodetic theodolites for angles and portable satellite receiving stations to fix their absolute positions they hoped to calculate the possible location and magnitude of crustal deformation. The results of this extensive investigation carried through at no little risk to the scientists are recorded in Volume 2 of the official proceedings of the expedition; see list of publications below. It was while placing one of these survey beacons that Jim Bishop tragically fell to his death.

The Karakoram is one of the most hostile landscapes on earth. The Housing and Natural Hazards Group investigated the ability of local families to cope with such a hazardous environment, their perception of risk, and their concern to reduce or accept these risks given their own needs, priorities and values. Special attention was given to the construction and siting of various dwellings including the historic Baltit Fort. Despite disasters, there were very few examples of families adapting their homes and living patterns. When questioned, they replied that there were many greater socio-economic worries in their eyes, such as poor health care, lack of education and poor markets for produce. As in many societies,

long-term logical action is frequently overwhelmed by short-term expediency. However with imaginative and sensitive attention it may be possible to reduce some of these risks, for example through the teaching of safe building techniques.

The story of the expedition is recounted in the book “Continents in Collision” by Prof. K.J. Miller, while the methods and results of the Project have been brought together in the proceedings of two major international conferences: one in Pakistan just before the expedition went into the field (opened by the President of Pakistan, General Zia-ul-Haq), the other at the Royal Geographical Society in London a year after its return. Over 70 technical papers are published in these two volumes. Simultaneously a Karakoram Research Cell was set up by the University Grants Commission of Pakistan to co-ordinate future work. Previously closed areas in the northern Karakoram are now open, and is it now a very popular destination for scientific expeditions, trekkers and above all mountaineers.

Baltit Fort won the top UNESCO conservation award in 2004, the Award of Excellence. It was praised for demonstrating that historic structures can be saved, restored and recovered for continued use in the community. The project was noted by judges to exemplify excellence in conservation practice applied to large-scale monuments and is a model for the revitalization of historic structures throughout the northern regions of Pakistan. The fort’s restoration has fostered the local revival of traditional building trades while an associated handicrafts project provides improved livelihood opportunities in the area. In its new use as a cultural centre and museum, the Baltit Fort attracts thousands of visitors to the province and has contributed to reinvigorating the local community’s pride in their heritage.

Major sponsors included:

The Royal Society, British Council, Overseas Development Administration, Natural Environment Research Council, National Geographic Society, George Wimpey Ltd., British Airways, The Science and Engineering Research Council, Land Rover Ltd., Mount Everest Foundation and the Royal Institute of Chartered Surveyors.

Further reading:

- Miller, K.J., **Continents in Collision: the International Karakoram Project**, foreword by Lord Hunt, George Philip & Son, 212 pp., maps, ill., bibliogr., ind. ISBN 0 54001 066 9.
- **The International Karakoram Project Volume 2**. Edited by Miller, K.J. Published by Cambridge University Press, Cambridge (1980), 687 pp., maps, tab., figs., ill., ISBN 0-521 26-3395.

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