Editorial

The International Year of Mountains (IYM), the Mountain Research Initiative (MRI) and PAGES

The special Mountain Chapter in the Agenda 21, "Managing Fragile Ecosystems - Mountain Sustainable Development," was universally accepted in the Rio conference 1992. However, prior to the special UN General Assembly for the evaluation of Agenda 21 in 1997, most of the new initiatives and activities came from NGOs and aid organisations and only after 1997 did the scientific community begin to realize its responsibility. It would be unfortunate if the contribution of science and research in the conference Rio+10 in Johannesburg 2002 and in the various mountain meetings scheduled for IYM 2002 is less than substantial.

A milestone is certainly the foundation of the MRI, which became active on July 1st, 2001. As outlined by this initiative, future progress of Global Change Research in mountain regions will be enhanced by the establishment of linkages between mountain research projects in the different IGBP and IHDP programmes and by cooperation of these programmes with the GTOS special mountain module. Accordingly, the aim of the MRI is to facilitate the creation of initiatives, synergies and interdisciplinary projects that are necessary in order to effectively coordinate and integrate findings for the various aspects of climate change research in mountains, resources and resource management strategies, human impact studies on fragile ecosystems and, in particular, interactions between the natural and human driving forces.

As we pursue these new initiatives, we should not forget that research on mountain ecosystems has a long tradition. Alexander von Humboldt was conducting his initial field work on Chimborazo (6310m) in Ecuador's volcano valley in the year 1802 - exactly 200 years before the IYM 2002! His subsequent studies documented the highly differentiated ecosystems in several other mountain systems of the world. He ultimately compared the glaciation, vegetation and climatic conditions in an extraordinary overview publication "Atlas to Alexander von Humboldt's Kosmos". Figure 1 shows this memorable summary representing all the local, place-based research findings integrated in a global comparison. As exemplified on the cover of this issue and in Fig.1, the fact that mountain areas are, and have been in the geologic past, sensitive indicators of Global Change has long been appreciated by paleo-scientists. In recent decades, mountain regions have been recognized for their important archives of climate variability spanning different spatial and temporal scales. Such records include tree-rings, sedimentary records from high mountain lakes, permafrost, and in particular, evidence from glaciers. Further, the only ecosystem with worldwide distribution, which is comparable over all the different climatic zones of our planet, is the uppermost alpine belt above the treeline. This alpine zone is characterized by glaciers, snow cover, permafrost and periglacial processes, and alpine tundra vegetation. Paleoenviromental records from this zone provide an excellent opportunity to compare records from climatically sensitive sites along a 'real' Pole-Equator-Pole transect such as the Cordillera of the Americas (front cover).

The IGBP has published an outlook to the future research decade in Global Change, which underscores several issues that are important to consider for the IYM. Priorities are given to three topics: the carbon cycle, water resources and food security and it is clear that mountain regions are of central importance to these three issues. Changes in the carbon cycle, particularly those associated with atmospheric CO₂, have a profound impact on sensitive mountain ecosystems. Limited water resources will play a crucial role in the 21st Century. In the arid and semi-arid regions of the tropics and subtropics, more than 80% or 90% of the fresh water supply originates in mountain areas and this may concern more than half of humanity, especially the developing world. Considering that 60-70% of the earth's available fresh water is used for food production, the significance of mountains for the third IGBP priority is absolutely clear. It is therefore crucial that the scientific community assumes responsibility for providing a much better understanding of mountain ecosystem function, conservation and development and the role of paleosciences in this effort will be key: The present without the past has no future!

Fig. 1: Dominant vegetation zones in selected mountain systems. Altitude in feet. ("Atlas zu Alexander von Humboldt Kosmos," hrsg. von Traugott Bromme, Stuttgart 1851). After Troll, 1961, Erdkunde

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