

# **MOUNTAIN GEOECOLOGY. THE EVOLUTION OF INTELLECTUALLY-BASED SCHOLARSHIP INTO A POLITICAL FORCE FOR SUSTAINABLE MOUNTAIN DEVELOPMENT**

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## **Summary**

The evolution of mountain geocology, from its origins in early 19<sup>th</sup> Century natural science to its flowering in the last four decades, is explained. The term *mountain geocology* was formalized by Carl Troll through the activities of the International Geographical Union (IGU). Troll's initiative led to the establishment of a "Commission on High-Altitude Geocology" by the IGU in 1968, subsequently to become "Mountain Geocology and Sustainable Development". During the early stages, efforts were concentrated on the physical aspects of comparative high-mountain research. Later, reflected in the change of the Commission's name, the human component of the functioning and transformation of mountain ecosystems became central to the development of the sub-discipline. This encouraged a strong move into the applied aspects of mountain studies, including mountain hazards mapping, analysis of landscape change through time, and determination of the causes and downstream effects of environmental degradation. Perhaps one of the most important contributions of this research has been the demonstration that the causes of presumed environmental degradation have often been incorrectly assessed and even that the degree of

environmental damage has often been seriously exaggerated. Another important contribution has been the demonstration of the need to study highland – lowland interactions, including both the physical and socio-economic aspects. This has led into the political arena with a commitment to facilitate a better balance between mountain environments, the development and utilization of resources, and the well-being of mountain peoples.

The applied and political overtones encouraged vigorous involvement in the preparations for the Rio de Janeiro 1992 Earth Summit. This spearheaded the inclusion of a special mountain chapter in AGENDA 21 (Chapter 13 – *managing fragile ecosystems : sustainable mountain development*). After the Earth Summit the political process accelerated with input into the 1997 UN General Assembly set to evaluate progress following the Earth Summit (Rio-Plus-Five) and designation of 2002 as the International Year of Mountains.

For the future, *Mountain Geoecology*, is well-placed to play an effective role in the transdisciplinary global studies that are being focused on world-wide social, economic, and physical changes that will increasingly impact the prospects for sustainable society and environment as the 21<sup>st</sup> Century unfolds.

## **1. Introduction and Definition**

*Mountain Geoecology* is defined as the study of the characteristics and functioning of plants and animals, their interrelationships and the interrelationships between them, the living elements of mountain ecosystems, and the abiotic elements. The living elements include humans and all their activities. *Mountain Geoecology*, therefore, is a comparative geography of three-dimensional landscapes, their functioning, dynamics, and changes through time. In this sense it has strong applied and political overtones.

Mountains occupy about twenty-five percent of the world's land area and provide the life-support base for approximately ten percent of the human population. In terms of resources, especially water, mountains are vital to the survival of more than half of humankind. Collectively, they represent the most complex environments on earth and harbour an outstanding proportion of its biodiversity and cultural diversity. Yet many mountain regions are populated by the poorest of the poor, often ethnic minorities with little political influence. Thus they are vulnerable to economic exploitation and many of the available resources have been developed for the benefit of lowland central authorities, lowland populations, and industry, to the detriment of the indigenous mountain peoples and their environment.

Mismanagement of mountain resources, an unfortunate reality, can quickly lead to ecosystem and community destabilization, often with negative effects extending far out into the surrounding densely populated lowlands; this includes flooding, siltation, landslide activity, and demographic disturbance resulting from extensive out-migration of poverty-ridden minorities. The most extreme kind of such disturbance is warfare in all its forms. Of the 27 extant wars, 23 are located in mountain regions thus placing large sections of society at risk, a situation accelerated after 11<sup>th</sup> September 2001.

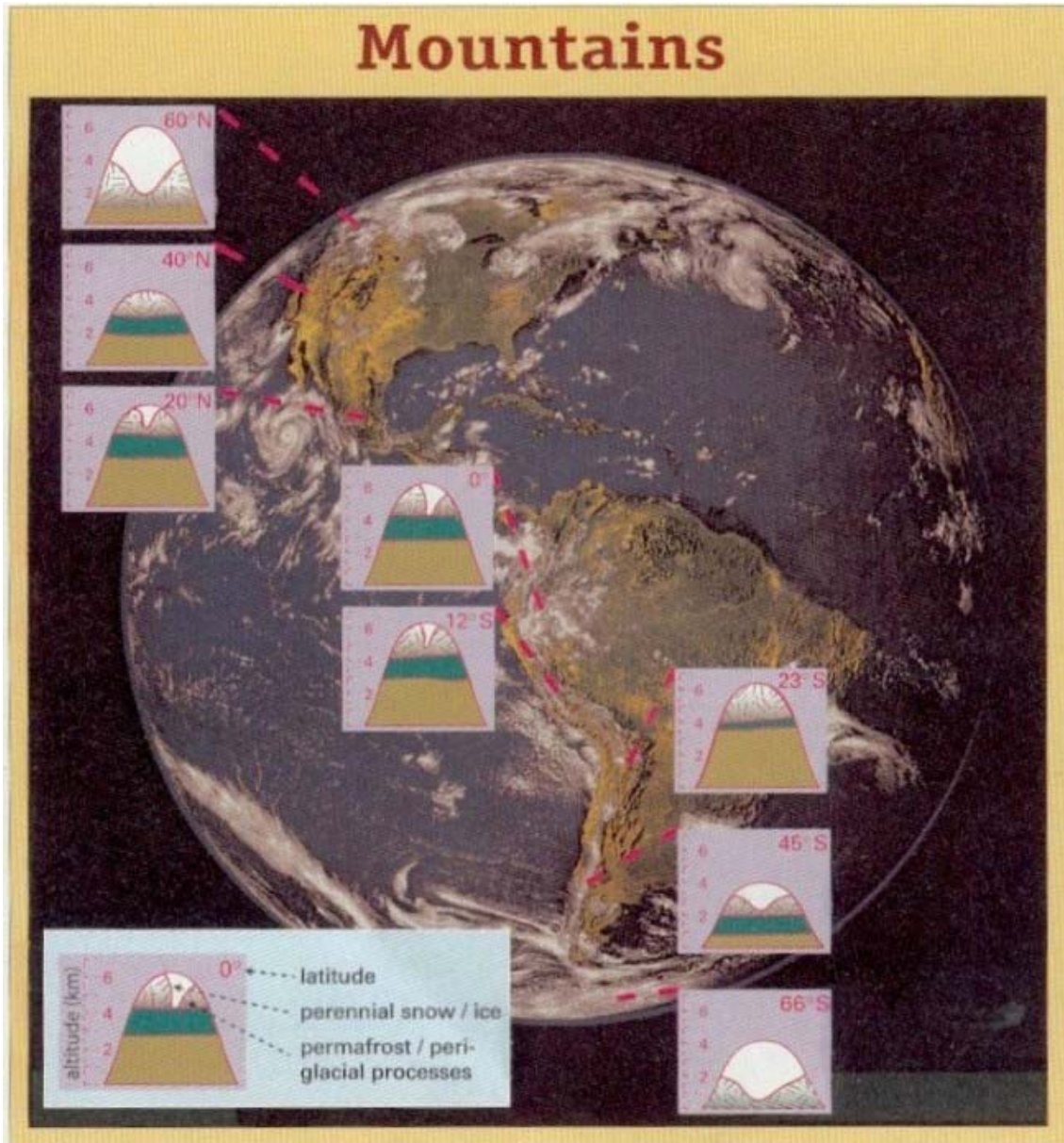


Figure 1: Colour Satellite Photo.

The origins of *Mountain Geocology* are traced to Alexander von Humboldt and the evolution of the natural sciences during the 19<sup>th</sup> Century. After the middle of the 20<sup>th</sup> Century, Professor Carl Troll, drawing on the earlier work of von Humboldt, Passarge, Tansley, Clements, Sukachev, and other natural scientists, propounded *High-Altitude Geocology* as an intellectual pursuit worthy of special attention. This was formalized in 1968 when the International Geographical Union established the Commission on High-Altitude Geocology with Troll as Chairman.

The subsequent activities of an initially small international research group are traced from 1968 onward. Sustained efforts were made to embrace the human sciences and to adapt the contemporary development of ecosystem modelling into the wider study of the geocology of the essentially three-dimensional mountain landscapes. These efforts led

to the quest for popular and political support for an applied mountain geocology. The 1992 Rio de Janeiro Earth Summit witnessed the full flowering of this commitment with inclusion in AGENDA 21 of Chapter 13 – *managing fragile ecosystems: sustainable mountain development*, and the United Nations designation of 2002 as the International Year of Mountains.

As mountains have come to be recognized as the *water towers of the world* and as mountain geocology has begun to play a significant role in many transdisciplinary global scientific investigations, an important future for mountain geocology seems assured. Nevertheless, additional and more accurate appraisal of the complexities of mountain environments and communities is needed. This is, in part, to provide an increasingly more effective base for sound policy development and, in part, to redress the tendency to over-simplify mountain issues by treating them as mere adjuncts to lowland development strategies. This, unfortunately, is widely reflected in the persistent over-dramatization and over-simplification of issues in the news media.

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In addition: all issues of *Mountain Research and Development*, 1981 to present.

## Biographical Sketches

### Bruno Messerli

- Born 1931, married, 4 children, school and studies in Bern, Switzerland.
- 1962 PhD, 1968 Full Professor, 1978 Director Geographical Institute, 1986 Rector University of Bern, 1996 Prof. Emeritus.

#### Research Activities

- 1958-1976 Fieldwork in the mountains of the Mediterranean Region and in Africa: Geomorphology, Paleoecology, Natural Resources.
- 1977 – 1986: Director UNESCO-MAB National Research Programme in the Swiss Alps: Cooperation of natural and social sciences..
- 1979-1996: Coordinator UNU-Mountain programme with fieldwork in the Himalaya and Bangladesh: Mountain Ecology, Water Resources, Land Degradation and Natural Hazards.
- 1987-1996: Fieldwork in the High Andes of the Atacama region: Environmental and Climate Change and Natural Resources.

#### Special Nominations and Awards

- 1976-82 Vice President and 1997 Honorary member of the Swiss Academy of Sciences
- 1986 – 1993 President of the first commission on environmental sciences of the Swiss University Conference and first president of the Priority Programme “Environment” of the Swiss National Science Foundation. 1989 –1993 Member of the Research Council.
- 1995-2001 Director IGBP-PAGES-Office (Past Global Change Program)
- 1996-2000 President International Geographical Union
- 2000-2004 Chairman Board of Trustees of IFS (International Foundation for Science, Stockholm)
- Honorary member of the Geographical Societies of France, Russia, Italy and member of 4 European Academies
- 1988 Global 500 Honour Roll of UN-Environment Program
- 1991 Marcel Benoist Prize of the Swiss Government for Scientific Achievements
- 1998 Dr. h.c.rer.nat. Free University of Berlin
- 2002 Founder’s Medal of the Royal Geographical Society, London

#### Special Mountain Activities

- 1986 and 1991 Founding member of the African and Andean Mountain Association
- 1992 Contribution and participation Rio Conference: Mountain Chapter of Agenda 21
- 1997 Contribution and participation to UN General Assembly Rio+5, New York.
- 2001 Official Launch of the International Year of Mountains, UN New York
- 2002 Contribution to the International Year of Mountains

### Jack D. Ives

Jack D. Ives was born in Grimsby, Lincolnshire, England on 15<sup>th</sup> October, 1931. He studied Geography and Geology as an undergraduate at the University of Nottingham

(B. A. honours, 1<sup>st</sup> Class, 1953). During this time he organised and led three glaciological expeditions to South East Iceland. He married Pauline Angela Cordingly on 11<sup>th</sup> September 1954 and they immediately emigrated to Canada, becoming Canadian citizens in 1959. Ives completed his Ph. D. at McGill

University, Montreal in 1956. During 13 years in Canada he undertook research in Labrador and Baffin Island, serving as Field Director of the McGill Subarctic Research Laboratory (1957-1960) and Assistant Director and Director of the Geographical Branch of the federal government in Ottawa (1960-1967). In 1967 he moved to Boulder, Colorado, as Director of the University's Institute of Arctic and Alpine Research (1967-1979) and Professor of Mountain Geoecology (1979-1989). He founded and served as Editor-in-Chief of the quarterly journal *Arctic and Alpine Research* (1968-1980), directed research projects in alpine ecology, avalanche prediction, and mountain hazards mapping. For 1976/77 he was awarded a John Simon Guggenheim Memorial Fellowship which he held as Guest Professor in the Institute of Geography, University of Berne, Switzerland. In 1989 he moved to the University of California, Davis, retiring to Ottawa, Canada, as Honorary Research Professor with Carleton University, in 1997.

Internationally, he served as Chairman of the International Working Group for UNESCO MAB Programme, Project 6; Mountain Research Coordinator for United Nations University (1977-2000); Chair, IGU Commission on Mountain Geoecology (1972-1980; 1988-1996); President, International Mountain Society (1980-2000):

Founder and Editor-in-Chief of the quarterly journal *Mountain Research and Development* (1981-2000). He is currently Senior Advisor on Mountain Ecology and Sustainable Development for UNU.