Australian Institute of Alpine Studies

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2229 or 2228?

If anyone is wondering whether the Snowy Mountains are still rising (the new 1:25 000 map has the height of Mt Kosciuszko at 2229m compare to 2228 on the old maps), the following response to a query by NPWS District Manager Andrew Harrigan might be of interest.

The height of 2229 metres (rounded off to the nearest metre) on the new edition map refers to the height of the stainless steel plate on top of the concrete pillar. The stainless steel plate is 1.518 m above the original trig plug (now destroyed), which was to the best of my knowledge at ground level. Therefore the stainless steel plate is 2229.48 m, the height difference stainless steel plate to the original trig plug is 1.518 m, by subtraction the height of the original trig plug is 2227.962 m (2229.48 - 1.518 = 2227.962) and when rounded to the nearest metre = 2228 m.

I unfortunately cannot confirm the specifications used for the previous edition map but am reliably informed that the height shown referred to the ground mark of the trig station, ie:- 2228 m.

On the new edition map the height shown refers to the stainless steel plate on the concrete pillar which is the new trig mark, ie:- 2229 m.

I do hope this clarifies the height for you and no, “Mt Kosci” has not grown.

Colin R Mitford

Manager
Spatial Information Services
Information Sourcing Division

Abstracts

Assessment of the effect of cattle exclusion on the condition and recovery of sub-alpine streams

Lisa Simpson, University of Canberra (CRC Freshwater Ecology). Abstract of Honours Thesis.

Grazing impacts on aquatic ecosystems have been poorly studied, despite considerable evidence of the impact of grazing on soil, vegetation cover and diversity. The benefits of cattle exclusion on soil stability and plant diversity have been well established. The terrestrial environment has a clear influence on the structure and functioning of aquatic ecosystems. This study investigates the impact of current cattle grazing on the condition of Australian sub-alpine aquatic ecosystems, and examines how these systems recover following the exclusion grazing from catchments following periods of 10-20 and 20-40 years. Recovery of terrestrial ecosystem components has been shown to improve with time following removal of grazing, and it is hypothesized in this study that longer periods of exclusion result in continued improvement to aquatic ecosystem condition.

This study examined four aspects of the aquatic environment to assess the impact of cattle grazing, and their recovery following grazing exclusion. Features used to assess condition included: stream morphology (e.g. channel form), small-scale channel features (e.g. substrate), water quality (e.g. nutrients and suspended sediment) and the aquatic biota (macroinvertebrate community). For channel morphology, only minor differences were observed between grazing treatments (currently grazed, 10-20 years since grazing removal and 20-40 years since grazing removal), with the exception of channel depth. This characteristic was greatest in sites where grazing had been excluded for 20-40 years within granite catchments. The study concluded that channel morphology is likely to take longer than 40 years after the removal of grazing to show change, and this not may be in the direction of pre-disturbance conditions.

Small-scale channel features (e.g. bank stability and substrate embeddedness) indicated that streams from ungrazed catchments were in better condition compared to currently grazed areas. Catchments in which grazing had been removed had greater stream bank stability and lower substrate embeddedness. Areas with a continuing exposure to grazing had the poorest channel substrate condition, with best condition found in streams from catchments ungrazed for 20 to 40 years. Catchments ungrazed for 10-20 years were intermediate in channel condition, thereby demonstrating a long-term trend in recovery.

Water quality in streams from currently grazed catchments had elevated nutrient levels compared to ungrazed catchments, which was also associated with an abundant algal standing crop. Water quality also had a strong relationship with geology, such that grazed basaltic catchments had the highest nutrient concentration.

Macroinvertebrate communities were significantly different between the grazing treatments, in both community structure and condition. Streams from currently grazed catchments had higher proportions of pollution tolerant taxa (Oligochaeta), having between 15-45% less taxa than expected from the Australian Alps AUSRIVAS predictive model. Currently grazed catchments had poorest macroinvertebrate assemblages and those with grazing removed for 20-40 years the best. The findings indicated that long-term recovery in the macroinvertebrate fauna is concomitant with improvements in small-scale channel features and water quality.

The present study demonstrated that exclusion of cattle has positive benefits for aquatic ecosystems. However, recovery of aquatic ecosystem features may vary in both the extent, and rate of recovery. Improvements in small-scale features such as the macroinvertebrate community can occur over 10-20 years, with water quality impacts and channel features likely to recover over an even shorter period following the removal of grazing. Large-scale features such as channel morphology may require long

periods for recovery to be evident, with little variation in morphology between currently grazed sites, and those excluded from grazing for up to 40 years. Thus, removal of grazing from sub-alpine catchments may realize short-term benefits to some features of the aquatic ecosystem, with continued improvement up to 40 years as shown in this study. However, large-scale features such as channel morphology may take much longer for the benefits of grazing exclusion to be realized. Thus, once degraded, the legacy of grazing effects on aquatic ecosystems in the Australian alps persists for many decades.

Managing Mountain Ecotourism at Kosciuszko National Park, Australia

Graeme L. Worboys[1] and Catherine M. Pickering [2], 1 Jagumba Consulting Pty Ltd, 3 Rischbieth Crescent, Gilmore, ACT, Australia 2905. 2 School of Environmental and Applied Sciences, Griffith University, PMB 50 GCMC, Qld 9726, Australia

Abstract from 4th Conference on Protected Areas in East Asia and working session, International Union for the Conservation of Nature-World Commission on Protected Areas, Taipai, Taiwan, March 18-23, 2002.

The Mt Kosciuszko alpine area is of high scenic, scientific, education and nature conservation significance. The preservation of this area has required leadership, active management, effective planning, and sheer perseverance. Land use battles have been fought and eventually won by generations of scientists, conservation activists and managers over grazing rights, soil conservation, hydro-electric engineering developments and tourism developments. As a result in 2002, the Mt Kosciuszko alpine area is a major ecotourism destination, especially for summer day walkers climbing the highest peak on the Australian continent. The popularity of this natural heritage not only vindicates the historical vision for its conservation but has also created a new conservation management imperative. Managing tourism in this very confined area is placing pressure on both infrastructure and the heritage values of the region. Annual numbers of tourists in non-snow month have increased from 20,000 in the late 1970's to around 64,000 people in 2000. Around 21,000 of these visitors undertake the day walk to the summit. Tourism is forecast to continue to grow. It is a critical industry for the local economy and is actively promoted. Within this operating environment, the New South Wales National Parks and Wildlife Service the agency that is responsible for conserving the region has undertaken management planning and is implementing works to help conserve the alpine area. This paper reviews the historical conservation setting, tourism to the alpine area in 2002, the types of negative environmental impacts that are occurring, management responses, and evaluates future management challenges.

Regulation of Summer Tourism in Australian Mountain Conservation Reserves

Wendy Hill and Catherine M. Pickering, Griffith University, School of Environmental and Applied Sciences, PMB 50 Gold Coast Mail Centre, 9726 QLD, Australia.

This report examines the way regulatory systems are used to manage summer tourism in Australian alpine and subalpine national parks. Management priorities for parks agencies are to conserve natural and cultural values while still providing appropriate recreational opportunities: objectives that can often be in conflict. Summer tourism to the Australian Alps national parks and the mountain parks in Tasmania has increased substantially in the last 20 years. Summer visitors participate in a range of activities over a wide area, not just in ski resorts. Since visitor management is fundamentally linked to the sustainability of protected

areas, it is vital that managers develop appropriate regulatory processes.

A diverse range of summer tourism activities occur in Australian alpine and subalpine parks including; car-touring, bushwalking, horse riding, fishing, backcountry camping, caving, rock climbing and hang-gliding. To manage high impact activities such as horse riding, extensive use is made of zonation, and to a lesser extent, regulations. These strategies function to restrict use by limiting areas and/or numbers. Limited use is made of licenses and concessions. When park entry fees are applied they function to raise revenue, some of which is then used to provide tourist facilities and ameliorate tourism impacts within the parks.

Inconsistencies in the application of rules due to political boundaries and differing attitudes between the managers of the contiguous Australian Alps national parks may be contributing to ineffective management. Park agencies rely on education such as minimum impact codes advocating sustainable behaviour. However, these codes may not be effectively reaching target audiences. More extensive use of permit systems could extend knowledge of codes. However, long-term sustainable management also depends upon determining carrying capacities and thresholds for rapid environmental degradation for areas. At present carrying capacities are not well known for specific areas and visitor monitoring is haphazard.

Therefore key recommendations for Australian managers are: to develop more effective visitor monitoring programs; to determine thresholds to degradation for specific activities in given areas; and through the application of a permit system to restrict use to within these thresholds. Finally, the development of more effective methods for disseminating minimum impact codes to target audiences would enhance the effectiveness of regulatory management.

In terms of conservation objectives and provision of recreational opportunities, overseas park services have similar legislative responsibilities as those in Australia. However, the extent to which regulatory strategies are applied can differ substantially. At one end of the regulatory spectrum lies Denali National Park, Alaska. Although visitation to Denali is increasing, recreational opportunities are restricted and a stringent permit system rations use. In addition, mandatory regulations are enforced. Mount Kenya National Park lies at the opposite end of the spectrum. Although extensive use is made of entry fees, raising revenue is the goal, rather than limiting numbers. Excessive numbers on popular hiking tracks, together with inadequate tourism infrastructure has led to severe environmental degradation. Rules pertain to issues such as use of registered guides and visitor safety with more regulations needed to encourage sustainable behaviour. Regulation of tourism in Mount Cook National Park, New Zealand more closely resembles the Australian situation, although more extensive use is made of fees, permits and licenses.

When the regulatory situation in Australia is compared with overseas countries it is clear that in the Australian Alps national parks and Tasmanian high country parks there is very limited use of regulations to restrict use and minimise impacts. Since summer visitors engage in activities over a wide area and thus have the potential to spread impacts widely, it is vital that planners and managers develop more effective regulatory strategies.

The report is structured into four sections. Chapter one provides an overview of summer tourism in Australia's alpine and subalpine national parks. In the second section (Chapter two) information derived from a 1999 survey of Australian alpine and subalpine national park services and published reports and literature have been used to determine: (i) the range of tourism activities conducted during the snow free period; (ii) the types of regulatory systems used and the extent to which they are applied; and (iii) regulatory inconsistencies between parks, particularly the contiguous Australian Alps national parks.

In the third and fourth sections an overview of regulatory management of three overseas alpine and subalpine national parks is provided to place Australia in context. The three parks employing different management approaches are: Denali National Park, Alaska; Mount Kenya National Park, Kenya; and Mount Cook National Park, New Zealand.

Principles of ecosystem function and sustainability in alpine ecosystems: studies in the tall alpine herbfield community in the Kosciuszko alpine area of NSW, Australia

Johnston, S.W.[1], Greene, R.[1], Banks, J.C.G.[2] and Good, R.B.[3], 1 Department of Geography and Human Ecology. Australian National University Acton, ACT 0200, Australia. 2 Department of Forestry. Australian National University, Acton, ACT 0200, Australia. 3 NSW National Parks and Wildlife Service, PO Box 2115, Queanbeyan NSW 2620, Australia.

The tall alpine herbfield community in the alpine area of Kosciuszko National Park NSW, is a limited and biologically significant climatic climax ecosystem. However, past grazing practices and the current impacts of tourism, exacerbated by the harsh climate, have resulted in extensive vegetation degradation and subsequent soil erosion of the alpine humus soils. These phenomena have occurred over large areas of the tall alpine herbfields. These disturbances have also produced ecosystem states different from that of the natural climax state. Observations have shown that where the impact of degradation of the ecosystem has been less severe, the ecosystem retains the capacity to slowly return to its climax state. However, if the disturbance and subsequent degradation are more severe, the ecosystem will not recover but will reach a different stable state. In this paper the state-and-transition model is applied to describe the alternative states, and the transitions between states, of the tall alpine herbfield ecosystem. The implications for management for the tall alpine herbfields are also outlined.

Climate Change – Impacts on the Australian Alpine Region

Jo Mummery, Executive Manager, Greenhouse Policy Group, Environment Australia

The Intergovernmental Panel on Climate Change identified a number of potential impacts of climate change on Australian natural and managed systems. The alpine region of Australia is considered by the IPCC to be highly vulnerable to climate change. The Australian Greenhouse Office is developing a climate change impacts and adaptation work plan which, among other actions, identifies priorities for research and climate change impacts assessments.

The alpine region is identified in the work plan as a priority area for climate change impacts assessments. To assist in determining what studies could be initiated and what existing work could contribute to these studies, the AGO is compiling a database of existing research in alpine regions– environmental, socio-economic etc. The AGO would be very pleased if Institute members could assist in this exercise and advise, through Ken Green, of any published and unpublished material relating to the Australian alpine region. The AGO is aware of the research compiled in the publication "Snow A Natural History; an uncertain Future" (Alps Liaison Committee 1998).

Organic pollutants (POPs) in high mountain regions.
From Elizabeth Byers, The Mountain Institute

Recent studies have shown unusually high concentrations of persistent organic pollutants (POPs) in the Canadian Rockies and other high mountain regions. The higher the altitude, the greater the deposition of organochlorine compounds appears to be. Deposition levels of these toxins can rise more than 10 times as researchers measure up the mountainside, and some chemicals increase by as much as 100 times.

The occurrence of organic pollutants in remote and sometimes pristine mountain areas can be explained by a combination of precipitation and condensation. POPs evaporate from warm regions or are exhausted to the atmosphere by industrial activity. They move with air currents, and precipitate out of the atmosphere when cloud masses are blocked by mountains, or when atmospheric moisture cools and condenses as it rises up a mountainside. The process and be repeated many times, resulting in a concentration of POPs in high mountains (and also in cold polar regions).

Mount Kenya and its Finite Natural Resources
From KAHUTHU@AVU.org

Mount Kenya has offered a livelihood to the millions of people inhabiting its slopes for the many thousands of years passed. The ability of the Mountain to continue doing this is however not infinite. There is a limit to how much we can use its natural resources and judging from the current mode of our use of its forests and water resources, we are not far from exhausting this mountain. Because natural resources like water, air and forests occur freely, we tend to take them for granted and use them unsustainably. Related to this is the important issue of how to establish the value of a natural resource. What is the monetary value of one litre of air for example? How much should an elephant cost at the market place? Is our pricing for a cedar tree reflective of its real value? The establishment of the value of natural resources will help us make an appropriate use of the same.

Production systems in a third world country like Kenya assume the form of primary industries like farming and lumbering. More developed economies have concentrated on the better paying secondary and tertiary production like industry and of late the service industry. When five million people who are reliant on farming live around an area like Mount Kenya, it is inevitable that there will result a conflict between the human community and nature. The most clear of such a conflict is land. Farming and forestry are two land use patterns that need extensive tracts of land. Which of these should we invest our land in?

There are no simple answers to such questions as the land question posed above. There is however, a great need to come up with an answer that while considering the long term sustainability of the natural resources like forests, takes into account the economic realities and needs of the people. Take for example lumbering. The population in Kenya like in many parts of the world is growing meaning an increased demand for timber and fuelwood. Seven out of ten Kenyans for example, will use wood to fix a meal and as long as they live, they will have to cook. Institutions and individuals on the other hand will need timber now and in the future. Sometimes it amuses me to visit the organisations advocating a complete and a nonnegotiable ban in lumbering. Their own offices are furnished with the best of indigenous hardwoods and valuable softwoods like camphor,

Meru oak and Red cedar. Talk of preaching water and taking wine.

Natural resource management has to be realistic to work for the good of the people and the environment. A resource is a resource because it can be used to satisfy a certain human need whether that need be economic, social, aesthetic, ecological or any other. If it cannot then that it is not a resource and it is hard to justify investing in its existence. Since November 1999 up to the present 2002, the forest plantations in Mount Kenya and most parts of Kenya have been closed to harvesting meaning no saw miller can be allowed to cut down even a mature exotic softwood. The net effect is that the tree poacher sneaks in the forest at night with his truck and steals as many logs as his truck can shoulder. He then goes and supplies the awaiting market. The forest officer on the other hand cannot sell the mature trees by the receipt book because of the ban and more to that he cannot clear a mature tree plantation to feed this market and replace the harvested plantation with another tree crop. There are many conservation organisations that hold the idea that anybody who cuts a tree is doing the greatest harm to the environment. Quite unlike it, the investment of our land, time and money in forests will be justified by the returns such resources pay back not necessarily in monetary value but in all other aspects.

Forests are a hotbed when discussing ecosystems like Mount Kenya but there are other equally hot areas if not hotter. Water is a resource whose continued supply is closely related to the issue of a well-maintained vegetation cover. Mount Kenya is actually the most important water catchment area in Kenya with many HEP dams on the Eastern slopes relying on River Tana that drains from the mountain. River Tana and Ewaso Nyiro draw their waters from this mountain and cross the length of the country on the way sustaining many economies and ecosystems in places as far as the Kenyan Coast.

During the dry season, the water flowing in these rivers is actually molten ice from the Mountain. The veteran mountaineers who scale the heights of this extinct volcano on the Equator say that the snow deposits are receding. One veteran technical climber pointed to me the twenty metres drop of one of the biggest glacier called the Lewis Glacier on the South East face of the Mountain. He told me that as recently as ten years ago, the ground had a more pronounced snow cover than it does today. People think that we have experienced water shortages but ' they ain't seen nothing yet'.

We are operating with dry riverbeds in the dry season and flooded river valleys in the rainy season. Thanks to our diligence in removing the vegetation cover on the slopes which act as a sieve in the water cycle and ensures a gradual and consistent river flow in both the dry and wet season. Tanzanians can help us with a leaf of knowledge on what has befallen their Great Ruaha River. Even on Mount Kilimanjaro a recent research established that the glacier deposits had receded by more than 85% between 1912 and the close of the 20th century. Whatever fate lies ahead for humanity. I think we should blaze ourselves for a time when we will have to buy cooking and drinking water from the Iceland.

That Mount Kenya has caught the attention of UNESCO and won a 1997 designation as a World Heritage Site (WHS), it should be the responsibility of the entire world to contribute towards its sustainable management in ideas and finances. By virtue of Geography, Mount Kenya is ours and we should have the locals to benefit from it. However, by virtue of its global importance, it belongs to the entire world and we will all be the poorer if anything happens to these three -million years old volcano.

Into Thin Air: Climate Change On The Roof Of The World

By Pushpa Adhikary

This article is taken from the book 'Tough Terrain: Media Reports on Mountain Issues' produced jointly by Asia Pacific Mountain Network and Panos Institute South Asia.

The Tibetan plateau is the headwater of rivers that flow down to half of humanity. The Yellow River and the Yangtse start in northeastern Tibet and flow across China, the Mekong originates in eastern Tibet as do the Irrawady and Salween that traverse down to Burma. The Tsang Po starts near Lake Manasarovar and travels eastwards for nearly 2,000 km before cutting through the Himalaya to become the Brahmaputra and empty into the Bay of Bengal. Most of the major rivers in Nepal originate in the Tibetan plateau and cut deep gorges to flow down to the Ganga. And there is the Indus and its tributaries which also start near Lake Manasarovar and flow westwards into Pakistan and empty in the Arabian Sea.

What happens to the water towers of the Tibetan plateau has a bearing on about three billion people in China, Southeast Asia, and South Asia. It is the snows melting on the Tibetan plateau in summer in the dry season that keeps these rivers flowing. There is also growing evidence that the Tibetan Plateau has a bearing on world climate. The elevation of the plateau cuts the jet stream in half during the northern winter, and it is the northward movement of the jet stream in spring that allows the monsoon rains to gradually push itself into the South Asian subcontinent.

Apart from the South polar ozone hole and evidence of depletion of stratospheric ozone over the Arctic Circle, Chinese scientists have recently also found evidence of ozone depletion over the Tibetan plateau. It is not yet certain what is causing this depletion at a point where the thickness of the atmosphere is reduced because of the plateau's elevation.

Professor Ying Xuexiang from Chinese Academy of Social Sciences has been researching changes in the global climate and says that the same breakdown of ozone molecules by solar high-energy particles that takes place over the poles could be happening in the stratosphere above Tibet.

Atmospheric ozone depletion takes place mainly because of the release of artificial CFC (chloro-fluoro-carbons) chemicals used in the computer and refrigeration industries.

More alarming is the fact that glaciers across the Himalaya and Hindu Kush mountains as well as the Tibetan plateau are receding. Glacier snouts are higher up the mountains, and large lakes have formed from snowmelt dammed up by terminal moraines from the slopes of Kanchenjunga to K-2.

What is unclear is what is causing this - is it global warming, or is it the cyclical warming up of the earth?

Evidence

Consider other evidence:

- Before emptying into the Yellow Sea, the 5,464-km long Yellow River runs from northeastern Tibet through nine provinces and autonomous regions. Since the early seventies, the mighty river has failed to reach the sea for progressively longer periods. During 1997 it was dry for 226 days.

- Recent surveys show that the water level in Eling and Zhaling lakes, the main source of Yellow River in northern Tibet, was one meter below the 4,268 meter level in 1993. The flow rate has also

fallen drastically from 7.8 cubic meters per second to 2.7 cubic meters per second.

- Madoi County in China which covers an area of 25,000 sq km, once had 4,077 lakes measuring more than one sq km each. Today, over 2,000 smaller lakes that used to dot the grasslands and river valleys no longer exist.

Northern Tibet boasts the largest animal husbandry area in China. But recently, natural calamities such as drought, snowstorms, high winds and low temperatures have kept its grass and livestock output unstable.

Outside of the North and South Poles, Tibet is one of the few places on earth that is still predominantly wilderness. The highest mountains, deepest gorges, vast grasslands, many lakes and the uncharted, primeval cloud forests of southeastern Tibet are what give the roof of the world its uniqueness.

There are indications that the plateau climate has gone through successive periods of frost and thaw. The latest warming cycle seems to have begun 8,000 years ago. There are longer, warmer summers and there is more rain. Forest coverage has increased in southeastern Tibet bordering India and Burma. Some of the lakes dried up and grasslands expanded in the west.

Professor Zhang Jiang Hua from the Chinese Academy of Social Sciences in Beijing believes that global buildups in the levels of carbon dioxide and other greenhouse gases are accelerating the current natural warming cycle in Tibet.

"The global warming phenomenon is the main reason for receding snow in the mountains," says professor Zhang. "Tibetans alone cannot control it. For that there should be global initiatives." While a lot of what happens on the plateau is dependent on global atmospheric trends, Zhang believes China can do its share by protecting forests and controlling fossil fuel burning.

Protect Watershed

Prof Ying agrees that it is important to protect the Tibetan watershed since it has such a large impact on regions downstream. He says: "Global warming can lead to adverse consequence either leading to floods because of excessive snow melt or causing droughts due to decrease in precipitation. Neither scenario is encouraging but there is little people in Tibet can do. The only thing they can do is to try to protect what we have."

The plateau is one of the few wilderness areas left in the world besides the poles. Tibet's population density is only two persons per sq km, and although pollution is virtually non-existent, modernisation is fast catching up.

New factories and cement plants have brought smokestacks to the plateau. More worrying is the destruction of forests in the southeast. Since 1976, logging in Bomi district in Eastern Tibet has been intensified and ecologists say it has worsened floods downstream in the Yangtze plains.

In 1992, Tibet promulgated a local decree concerning the protection of wildlife, stipulating legal measures to curb hunting and logging. Nature reserves were introduced and today are a key component of environmental protection in Tibet.

References

Adhikary, P. 1999. INTO THIN AIR: Climate Change on the Roof of the World. In: Dixit, K., Subba, B., John, A. (eds.), Tough Terrain: Media Reports on Mountain Issues. Kathmandu, Nepal: Asia Pacific Mountain Network and PANOS Institute South Asia. pp 113-117.

CALL FOR PAPERS

'Alpine Fungi'

The Australasian Mycologist is publishing a special 'alpine' issue. Covering all aspects of fungi in the alpine environments from their taxonomy, ecology, biogeography, species lists etc. to experimental projects from Australasia. Our definition of alpine is relatively loose, and ranges from the truly alpine areas of New Zealand and New Guinea, to also include the alpine and adjacent subalpine areas of Australia, which may have much less snow cover.

Issue will be published in the first half of 2003, please contact special issue editors Tom May and Sapphire McMullan-Fisher with ideas or papers. Contact details: Tom May, Royal Botanic Gardens Melbourne, e-mail: tmay@rbgmelb.org.au; Sapphire McMullan-Fisher, University of Tasmania, GPO Box 252-78, Hobart, Tasmania 7001, Australia; e-mail: smcmulla@postoffice.utas.edu.au.

Your comments on the content or contributions for future issues are most welcome.

Please contact
Dr Ken Green
PO Box 2228
Jindabyne NSW 2627
tel: 02 64505538
fax: 02 64562240
email: ken.green @npws.nsw.gov.au.

Editor Ken Green
Layout Jo Hooper

Conferences

Ecological and Earth Sciences in Mountain Areas

September 6-10, 2002, The Banff Centre, Banff, Alberta, Canada

Details regarding the conference can be found at:

http://www.banffcentre.ca/mountainculture/mtnconferences/eesma/

Celebrating Mountains

An Australian Alps conference and events 23–28 November 2002, Jindabyne, NSW

Conference details at:

http://www.australianalps.environment.gov.au/

Climate Change, active tectonics and related geomorphic effects in high mountain belts and plateaux

The above symposium will be held in Addis Ababa Ethiopia from 9-10 December with pre- and post-symposium excursions on high mountain and Plateaux sites.

For more information:

http://www.homepage.montana.edu/~ueswl/geomorphlist/ethiopiatrifd.pdf