

**A GLOBAL OVERVIEW OF MOUNTAIN PROTECTED AREAS ON THE WORLD  
HERITAGE LIST**

A Contribution to the Global Theme Study of World Heritage Natural Sites

Working Paper 6

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## EXECUTIVE SUMMARY

This is the sixth in IUCN's series of Working Papers which provide global overviews of natural World Heritage sites in the major biomes on earth. The theme of this Working Paper 6 is mountains, a theme chosen to coincide with the designation by the UN as the International Year of the Mountains.

The objectives of this Working Paper are to: (1) identify and analyze the existing natural and mixed sites on the World Heritage List and, (2) suggest other mountain areas that may merit consideration for nomination to the List by the relevant State Party. As per previous global overview studies this paper relied on site data sheets compiled by the World Conservation Monitoring Centre (WCMC) as well as a number of other published references and suggestions generated by members of the World Commission on Protected Areas mountain theme programme.

After defining what criteria an area would meet to be considered a World Heritage mountain, the Overview presents a list of 55 natural and mixed sites. This amounts to one-third of the total of all natural and mixed sites on the List (as of 2002). Along with sites in the terrestrial wetlands biome and in marine and coastal sites, mountains are among the three most "represented" biomes in the World Heritage List.

The Working Paper proceeds to analyze various attributes of the 55 mountain sites. These are: criterion for inscription, biogeographic realm distribution, size, occurrence of transboundary sites, and human use – both by resident populations and numbers of visitors.

In identifying which additional sites in mountains may contain "outstanding Universal values", the Overview notes four mountain sites where a deferral decision was made by the World Heritage Committee. Also noted are three nominations under or soon to be evaluated for inscription. The working paper then notes boundary extensions to 19 existing mountain sites where current boundaries are considered sub-optimal.

Finally, the paper puts forward 28 mountain areas in 25 countries that appear to merit consideration by the relevant State Party for possible nomination in future. Nine of these are from Central Asia, the world's most mountainous region which currently contains only one natural site and seven are from the arctic region where no sites exist.



## **A GLOBAL OVERVIEW OF MOUNTAIN PROTECTED AREAS ON THE WORLD HERITAGE LIST**

*“A mountain becomes great, as a human personality does, by extending its influence over the thoughts, words and actions of mankind.” R.L.G.Irving, 1940*

### **1. Background to IUCN’s Global Strategy Theme Studies**

In 1996, IUCN initiated a project to prepare a global strategy for natural World Heritage (WH) sites. It was foreseen to prepare global overviews on World Heritage sites in the various biomes of the world (e.g. forests, wetlands, mountains, grasslands, etc.) and an overview of the evolving “system” of World Heritage sites. The project involves close co-operation with the World Conservation Monitoring Centre (WCMC) where the world’s major biodiversity and protected area database is located. Support for the conduct of these theme studies was generously provided by the World Heritage Committee.

The first in this series of working papers was the global theme study on “Earth’s Geological History - A Contextual Framework for Assessments of World Heritage Fossil Site Nominations” was made available to the World Heritage Committee in December, 1996. It provides a temporal view of where fossil records best display the record of life on earth (natural heritage criteria i) and was carried out cooperation with Flinders University in Australia.

The second in the series was “A Global Overview of Wetland and Marine Protected Areas on the World Heritage List” prepared by IUCN’s Natural Heritage program in September, 1997. This paper reviews 77 World Heritage sites with significant wetland and marine values and describes 41 wetland and marine areas which may merit consideration for future nomination on the World Heritage List. Many of these potential sites are located in areas with minimal World Heritage protection at the current time. A follow-up experts meeting to further examine potential sites in tropical island, marine and coastal settings was held in Vietnam in February, 2002.

The third working paper in the series focused on forest protected areas on the World Heritage List. This overview was initiated at the “International Conference on World Heritage Forests,” held in Queensland in September, 1996. The subsequent working paper, “A Global Overview of Forest Protected Areas on the World Heritage List”, served as background to the workshop on the “World

Heritage Convention as an International Instrument for Biodiversity Conservation in Tropical Rainforests”, held in Berastagi, Northern Sumatra, Indonesia in December, 1999. A summary output of this was published in *AMBIO* (2000, 29(6), Sept.)

Working Paper 4 in the global overview series addressed the topic: “Human Use of World Heritage Natural Sites” which was also published in the *Journal of Tourism Research*, (2001, Vol.26 No. 1). Finally, in 2000, WCMC compiled the fifth working paper: *A Global Overview of Protected Areas on the World Heritage List of Particular Importance for Biodiversity*” which reviews the application of biodiversity criterion iv to sites on the List. A draft of the next in the Global Overview series on geological sites has also been a source of information to this review and it is expected to be completed by the end of 2002.

## **2. Objectives of this Working Paper**

The purpose of this working paper is twofold: first, to inventory mountain protected areas on the World Heritage List which provides an overview of the current “coverage;” and second, to locate potential mountain protected areas from various regions that might meet one or more natural criterion for eventual nomination to the World Heritage List. This overview identifies 55 mountain protected areas on the World Heritage List and describes 29 others which may merit consideration for future nomination. This overview will assist IUCN in making comparative evaluations and provide the World Heritage Committee with a firmer scientific basis for making decisions. It will also be of interest to State Parties as it will provide them with a global perspective which is useful when identifying potential World Heritage mountains in their territories.

It is particularly fitting that this product appears in 2002 which the United Nations has designated as the International Year of the Mountains. (IYM) The IYM is a significant milestone in a process which began in 1992 when, at the Earth Summit on Environment and Development in Rio de Janeiro, the nations of the world, without dissent, approved a mountains chapter (13) in Agenda 21. Since then, there have been a series of activities throughout the world that are gradually placing mountains in the consciousness of the public and governments. This process, called Mountain Agenda, will continue beyond the IYM, guided by an Interagency Group of international agencies and NGO’s under the leadership of FAO. Both IUCN and UNESCO are active in the Interagency Group. The World Heritage Convention has a significant role to play in the ongoing IYM process and beyond as it provides recognition that certain mountains are of “outstanding universal value” and adds a further layer and support to existing protection measures.

### **3. What is a World Heritage Mountain?**

In undertaking this assessment it was necessary to establish a definition and some criteria for what constitutes a World Heritage Mountain. Although several definitions are possible, the previous IUCN mountain protected area criterion (Thorsell and Harrison, 1992) were applied. These are:

- A minimum of 1500m of relative relief had to be present inside the protected area;
- Minimum size had to be 10,000ha; and
- IUCN protected area category I-IV would be applicable.

Such an arbitrary definition precludes consideration of many areas that may locally be considered mountains (as per the less restrictive definition of mountains used by the WCMC) such as the Morne Trois Pitons National Park in Dominica and the Laponian area in Sweden which do not have the minimum relative relief within their borders. In order to recognise “mountainous” areas that do not meet our full set of criteria, a separate list of 15 additional sites is included in Annex 3.

### **4. Method, Data Sources and a Caveat**

This working paper primarily relies on existing information extracted from the protected area and world heritage database held at the World Conservation Monitoring Centre (WCMC) in Cambridge, U.K. As a desk study, additional sources of data from other published sources have been consulted (see References) as well as impressions from our own field knowledge of mountains around the world. We have also canvassed the views of over 300 colleagues in the World Commission on Protected Areas mountain theme programme through the vehicle of the newsletter: *Mountain Update*. Finally, we have been able to provide token honorariums to selected experts in various regions of the world in turn for providing us with a digest of their views on potential sites in their areas. A list of contributors is given in the Acknowledgements section.

As with other working papers in this series, this overview is meant as a first attempt and it will evolve with time to a future edition. IUCN thus welcomes comments and additional data to be incorporated in a revision to be undertaken in 3-4 year's time.

The caveat to be underlined relates to the notion of “representativeness” which has led to some misinterpretation of the aims of the WH Convention. Like any natural resource, natural WH sites are not evenly distributed around the globe. Unlike the aim of UNESCO's biosphere reserve programme, it is not the intention of the WH Convention to have complete “coverage” of all samples of the earth's natural heritage on the WH List. As noted in a document provided to the April, 2002 session of the WH Bureau by the WH Centre:

*“One of the objectives of the MAB programme is to create a representative list of sites corresponding to the biogeographical provinces of the world but this is not the objective of the WH Convention. The Convention deals with sites of outstanding universal value and there are many biogeographical provinces that do not contain sites of this calibre.”*

It follows that this study does not attempt to define the “most representative” site from each mountain region of the world with the aim of having “coverage” of all of them. Indeed, many mountain ranges may be significant at the national and regional level but not at the international level. Rather, our aim is to identify those geographic areas in mountain regions that have or appear to have “outstanding universal value” as required under the Convention.

## **5. Format of the Overview**

This Overview is divided into two sections. The first part provides an overview of the existing mountain areas on the WH List including their distribution around the globe, their sizes, the natural criteria for inscription and those that are transboundary sites. The second part conducts a review of what other mountain areas have features of potential universal value and suggests additional sites that appear to merit consideration for nomination by the relevant State Party.

## **6. Analysis of Mountain Protected Areas on the World Heritage List**

### **6.1 Current number of mountain World Heritage sites**

At present, there are 55 natural and “mixed” cultural and natural mountain sites that have been inscribed on the WH List according to the definition given in point 3 above. This amounts to 33% of the total of all natural and mixed sites (167). According to IUCN’s global overview theme studies, mountain WH sites are among the three most common biomes on the WH List along with terrestrial wetlands (60) and marine and coastal sites (56). Using Udvardy’s classification of 14 global biomes (which does not include the marine world), “mixed mountain systems” have the highest number of sites on the List (30). Summary descriptions of all existing 55 mountain sites are given in Annex 1.

Although there is some overlap in the different classifications of WH sites (for example, Lorentz National Park on Irian Jaya is not only a mountain site, but also a wetland, marine and tropical forest area), it is clear that a substantial portion of the current number of natural WH sites are mountains.

Along with the WH List there is also the List of WH in Danger which currently totals 31, 18 of which are natural sites. The following 8 of these are mountains sites: Mount Nimba, Virunga, Kahuzi-Biega, Simen, Air and Tenere, Rwenzori, Sangay and Yellowstone. The first 6 on these are considered in danger from civil disturbance and related difficulties. For Sangay the reason is inadequate management infrastructure and damaging road construction while for Yellowstone it is regarded as in danger from regional management issues including tourism and invasive species. Proportionally, mountain WH sites also have slightly more than their share of sites on the Danger List.

## 6.2 Criteria used for mountain World Heritage site inscriptions

Natural criteria used for inscription of the 55 mountain sites have been:

- (i) geology 19
- (ii) ecological processes 38
- (iii) scenery 42
- (iv) biodiversity 32

These numbers indicate the wide range of natural features under which mountains can qualify and partially explains the “popularity” of WH mountain sites.

Further analysis of the inscription criteria also yield some interesting findings:

- 10 of the total of 55 mountain sites were also inscribed under cultural criteria and are thus regarded as “mixed” sites. These are: Tasmanian Wilderness, Huangshan, Wuyishan, Emeishan, Pyrenees/Mont Perdu, Mount Athos, Tongariro, Machu Picchu, Rio Abiseo, and the Drakensberg. There are only 23 “mixed” sites and mountains thus constitute a high proportion of the total.
- 11 of the mountain sites met all 4 natural criteria: Tasmanian Wilderness, Talamanca-La Amistad, Galapagos, Gunung Mulu, Te Wahipounamu, Volcanoes of Kamchatka, Lake Baikal, Yellowstone, Grand Canyon, Great Smoky Mountains and Canaima. More than any other biome, mountain sites tend to meet a higher number of natural criteria.
- On the other hand, 11 mountain sites were inscribed under only one criterion: Juizhaigou, Huanglong, Emeishan, Kahuzi-Biega, Shirakami-Sanchi, Sagarmatha, Golden Mountains of Altai, Sikote-Alin, Kilimanjaro and Hawaii Volcanoes. Many of these deserve scrutiny and perhaps re-nomination under additional criteria in order to fully reflect their values at the global level.

**6.3 Global distribution of mountain World Heritage sites**

The distribution of sites by biogeographic realm is indicated on Figure 1. This map demonstrates a relatively balanced spread of mountain sites among the earth’s realms with the obvious exception of Oceania where there are few mountains and Antarctica where legalities relating to sovereignty prevent the nomination of sites. Biogeographically, the distribution is:

- Nearctic 9
- Neotropical 12
- Palearctic 16
- Afrotropical 8
- Australasia 4
- Indomalaya 4
- Oceanian 1
- Antarctica 1
- TOTAL 55

A closer look at the location map of existing sites (Annex 2), however, indicates that two major mountain areas of the world, the polar regions and central Asia, have few sites. Central Asia contains the highest and most extensive mountain areas on earth and most of the ranges (Karakoram, Kun Lun, Hindu Kush, Pamirs, and Tien Shan ) have, as yet, no natural WH sites. In section 7.4 below some potentials from both these regions are suggested.

**6.4 Size of mountain World Heritage sites**

As would be expected, there is a range in size of sites with single mountains being smaller in size than sites that are part of mountain ranges. The two smallest sites (both are 15,400 ha) are Huangshan and Emeishan in China. The largest is the “St. Elias mountain park complex” in Canada/USA at 9.84 million ha followed by Lake Baikal in Russia with 8.8 mil. ha and the Air Tenere in Niger at 7.7 mil. ha. In general mountain WH sites are large with the median size being 285,000 ha.

MAP

By category, the size breakdown is as follows:

|                       |    |
|-----------------------|----|
| • less than 100,000ha | 21 |
| • 100-300,000 ha      | 8  |
| • 300-500,000 ha      | 9  |
| • 500- 1 mil. ha      | 6  |
| • 1 – 3mil. ha        | 6  |
| • 3 mil. ha plus      | 6  |
| TOTAL                 | 55 |

### **6.5 Transfrontier World Heritage sites in mountains**

As mountain ranges often are used to delineate the borders between nations, it is not surprising that 5 of 8 transboundary natural sites on the WH List occur in mountains. These are: Mont Nimba (Guinea/Cote D'Ivoire), Talamanca-La Amistad (Costa Rica/Panama), Waterton/Glacier (Canada/USA), St. Elias mountain park complex (Canada/USA) and Pyrenees-Mont Perdu (France/Spain). As WH sites aim to be models of “best practice”, the WH Committee has encouraged such nominations and a further 9 mountain transfrontier site potentials are suggested in section 7.

### **6.6 Human use of World Heritage sites in mountains**

Data contained in a previous (Sept. 1997) IUCN global theme study, “Human Use of World Heritage Natural Sites” and from WCMC site data sheets provide useful information on resident human populations within WH sites and tourism numbers. Without repeating the full data set in this report, and updating it to include site additions since 1997, the key findings are:

- 30 of the 55 mountain world heritage sites have no resident human population (except for staff).
- 25 mountain WH sites have human residents living within the site ranging in size from 50,000 in Lake Baikal (Russia) to 50 in Huangshan (China). A total estimate of 200,000 people reside in these 25 sites.
- Activities of residents with sites include commercial fishing, subsistence hunting and gathering, pastoralism and visitor service communities.
- Of an estimated total of 68 million visitors to all natural WH sites, 47 million visit mountain WH sites. Indeed, 8 out the top 10 most visited WH sites are mountain sites with the Great Smokies NP and the Canadian Rocky Mountain Parks heading the list at over 9 million annual visitors.

- 7 WH mountain sites record fewer than 100 visitors due to civil unrest in 3 (Mont Nimba, Air Tenere, Kahuzi Biega), difficulty of access in 2 (Heard and McDonald Islands, and Rio Abiseo), and a government ban on tourism in two (Nanda Devi and Lorentz).

It is clear from these data that few mountain WH sites are pristine wilderness areas without human influence. Almost half of all sites have permanent residents engaging in various forms of commercial or subsistence activity. Additionally, over half (30) of all natural sites have visitation levels exceeding 100,000 per year with 11 sites recording more than one million visitors annually. Mountain WH sites attract more visitors than any other biome type accounting for approximately 72% of all visitors to natural WH sites worldwide.

## **7. Suggestions for additional mountain protected area nominations to the World Heritage List**

### **7.1 Sites deferred by the Committee which may merit re-nomination**

Over the years the WH Committee has deferred decisions on four mountain sites that required further information and revisions. These four sites all appear to merit re-submission by the relevant State Party:

- Bale Mts. NP, Ethiopia (confirm legal status)
- Central Karakorum , Pakistan (re-formulate and consider including adjacent Siachen area in India and protected zone on Chinese side)
- Western Ghats, India (expand Silent Valley to include cluster of sites as identified at WH forests meeting in Berastagi, 1998.)
- Sierra de los Minas, Guatemala (re-definition of boundaries and clarification of criteria now that inholding problems are resolved)

### **7.2 Mountain sites nominated and currently under evaluation for future World Heritage Committee meetings**

Three mountain sites are currently in the evaluation process and will be presented to the WH Committee over the next few years. Without pre-judging the decision these are:

- Three Parallel Rivers NP, China
- Cape Peninsula Nature Reserves, South Africa
- Torres del Paine NP, Chile (nomination anticipated in 2003)

### **7.3 Existing Mountain World Heritage sites where boundary extensions should and are being considered**

There are substantial conservation benefits to be gained by making boundary modifications to existing mountain WH sites. The following 19 suggestions are either already under consideration by the State Party or have been encouraged by IUCN and others:

#### Nearctic Realm:

- Nahanni NP in Canada to include adjacent areas of the Nahanni karst and the Ram Plateau
- Waterton/Glacier Intl. Peace Park in Canada/USA to add Flathead valley extension
- Canadian Rocky Mt. Parks to add 5 adjacent Provincial Parks: Elk Lakes, Height of the Rockies, Peter Lougheed, Ghost River and Whitegoat Wilderness
- Great Smoky Mountains NP in the USA to incorporate portions of adjacent protected lands within National Forest wilderness and roadless areas.

#### Palaearctic Realm:

- Juizhaigou/Huanglong, China to merge with additional area of Minshan
- Sagarmatha in Nepal to add adjoining Makalu Barun NP and Chinese side of Mt. Everest (Zhu Feng (Qomolangma) Nature Reserve)
- Jungfrau/Aletsch/Beitschorn in Switzerland to extend site to incorporate adjoining natural areas in Cantons of Lauterbrunnen, Grindewald and Kandersteg
- Golden Mts of the Altai in Russia to become transfrontier site with adjacent areas in Khazakstan, China and Mongolia.
- Lapponia in Sweden to become transfrontier site by addition of adjoining Tysfjord/Hellemo fiord landscape in Norway (thus adding marine connection and significant lower elevation features)

#### Afrotropical Realm

- Simen NP in Ethiopia to excise villages and add adjacent ibex habitat in Mesareya Wildlife Reserve
- Drakensberg (oKhahlamba) in South Africa to add adjacent Maloti Nature Reserve in Lesotho
- Virunga NP in DRC to modify boundaries and extend as transfrontier site incorporating Volcans NP in Rwanda and Mgahinga NP in Uganda
- Mt. Kenya NP to include adjacent natural forest recently added to the park

#### Indomalayan Realm

- Gunung Mulu NP in Malaysia to add adjacent karst landscape, particularly Budu caves
- Royal Manas NP, Bhutan as contiguous habitat with Manas NP, India

## Neotropical Realm

- Machuu Picchu in Peru to add important cloudforest and watershed values in adjacent Vilacambamba and Vilancota mountains.
- Canaima NP in Venezuela to include Pico Neblina NP in Brasil and portion of the Roraima tepui which extends into Brasil and disputed territory with Guyana
- Los Glacieres NP in Argentina to become transfrontier site with Torres del Paine NP and Bernardo O'Higgins NP in Chile

## Australasian Region

- Te Wahipounamu in southwest New Zealand. Addition of the marine component in the fiords.

## **7.4 Additional mountain protected areas that have been suggested for consideration for nomination to the World Heritage List**

Recognising that mountain sites already constitute a significant number of existing WH sites and fully aware that it is a State Party decision on which further ones may merit nomination, there are a number of significant additional areas that appear to have significance at the international level. Some of these have been recommended during the consultative phase of preparing this document while others have been identified in various technical reports (see Reference section). Some are taken from formal Tentative Lists of sites that State Parties intend to nominate in future. The suggestions below are not exhaustive and many may not be feasible. Others may not meet the “Conditions of Integrity” as required under the Convention’s Operational Guidelines. We also did not include sites in intensively settled mountain regions (for example, the Alps of Europe and Japan and the Atlas mountains) which may be more suitable under criteria relating to cultural landscapes or as Biosphere Reserves. Several other sites for which we did not have sufficient information were also omitted as their values were as yet undetermined.

Keeping in mind these qualifications, the following 28 sites emerged as having strong potential for consideration for nomination by the relevant State Party:

## Palaearctic Realm

- Bhutan. Jigme Dorji NP, the largest and richest protected mountain habitat in the eastern Himalaya .Additional cultural values. (from Mackinnon, 1997).
- Nepal. Mustang region (no current protected status). Highest endemism and species richness of western Himalaya. One of world’s deepest gorges and significant cultural features. Possible serial site with Shey Phoksundo NP in Dolpo region

- Nepal/China/India. Kanchanjunga (various spellings). World's third highest peak with variety of life zones from subtropics to alpine. Sacred values and cultural features.
- Mongolia. Gobi Gurvan Saikhan NP. Peaks rising to 2825m surrounded by wide variety of habitat types – lakes, desert dune systems, salt marshes, and steppe. Many rare wildlife species and dinosaur fossils.
- Tajikistan. Pamir NP (proposed). Contains several peaks over 7000m and some of the longest valley glaciers outside the polar regions. Highly distinctive plant and animal communities survive amidst traditional pastoral landuse. High seismic activity. Possible future transboundary area with Afghanistan/China/Kyrgystan and Pakistan.
- Kazakhstan. Aksu-Djabagly Nature Reserve. Contains 14 of 16 habitats found in the Tien Shan mountains. Exceptional biodiversity (72 wild relatives of cultivated plants) and extensive forests. Paleontological values with more than 2000 petroglyphs.
- Kazakhstan. Ili-Alatau Nature Park. Dramatic vegetation gradients within 4000m of relief. Blend of vegetation types from 2 floristic regions and extensive ice age relic forests.
- Russia. Prielbrusky NP (Caucasus mountains). Mount Elbrus at 5633m is highest in Europe. Spectacular glacial landscape with high diversity and endemism. Possible “cluster” site with areas in Georgian and Azerbaidzan.
- Russia. Sakha Republic, Siberia. Momskiy Nature Park. Wide variety of arctic and sub-arctic ecosystems and associated species. Volcanic peaks and glaciers rise to 3150m. Distinctive geological feature of “river glaciers”.
- Russia. Kurile Islands State Nature Reserve. Has mix of volcanoes rising 1800m from the seacoast, dramatic coastal scenery, marine life and migratory birds (from Greenpeace Russia. 2000. Russian Natural Heritage)
- Afghanistan. Band-e-Amir NP as chain of 6 calcium carbonate lakes set in scenic Hindu Kush mts.
- China. Mount Kailas, 6714m. Predominantly for cultural values but also for natural scenery including lakes Mansaarovar and Rakas Tal. (Source: Expert Meeting on Asia-Pacific Sacred Mountains. Japan 2001)
- China. Xinjiang. Arjin Shan Nature Reserve. Large enclosed basin with montane desert and lakes. Muztag peak rises to 7725m in KunLun mountains. Karst and volcanic features as well as significant rare wildlife.
- West Norwegian Fjord Landscape: Geiranger and Naeroy fjords. The 2 classic fjord specimens with narrow steep sided fjords rising to 1800m. Cultural values also present.
- Norway. Svalbard NP. Archipelago of 13 major islands with glaciated peaks rising to 1700m from the sea. High scenic, scientific and wildlife values.

- Iceland. Vantnajokull/Skaftafell NP. Mix of high mountains, volcanic features and coastal landscapes with high scenic and scientific value.
- France/Italy/Switzerland. Mont Blanc. Highest peak in the Alps surrounded by a collection of other mountains of high scenic value. (Source: Potential Natural WH Sites in the Alps. Expert Meeting, Austria. 2000).
- Iran. Mt. Damavand NP. Highest (5671m) and most symmetrical volcano in Alborz Range. Rises from interior desert on one side to Caspian Sea on other. Additional cultural values
- Japanese Alps. Globally outstanding site not yet identified.

#### Nearctic Realm

- Greenland. Jakobshavns Isfjord. High velocity ice flows from the Greenland icecap. (Source: Nordic World Heritage Proposals for WH List. 1996)
- Canada/USA. Ivvavik/Vuntut NPs and Arctic National Wildlife Refuge. The British Mts. And the Brooks Range form the backbone of an arctic tundra landscape rich in wildlife including the Porcupine caribou herd. (Source: Tentative List of the USA and IUCN 1996 General Assembly Resolution)
- Canada. Quttinirpaaq NP. Ellsmere Island. Extends from massive ice shelf over Arctic Ocean to 2600m nunatak 700 km from north pole.
- Canada. Auyuittuq NP. Sheer, crystalline granitic peaks rising 2100m above a spectacular arctic landscape
- Canada. Stikine Provincial Park Complex. Grand Canyon of the Stikine R. connects the Edziza shield volcano with the Skeena coastal mts. In Spatsizi Park
- USA. Wai'aleale Wilderness/NaPali (Hawai'i). Superb cliffs from sea level to alaka'I Swamp to Kawaikini Peak at 1600m. Swamp at 1200m is most botanically pristine site in Hawai'ian Islands and acts as last refuge for many endangered species.

#### Neotropical Realm

- Colombia. Sierra Nevada de Santa Marta. Mountains to the sea peak with high biodiversity and cultural/historic values. (Source Expert meeting on potential WH forests. Berastagi, 1999)
- Argentina. San Juan Province. San Guillermo NP. Spectacular mountain landscape with relative relief of 3000m and extensive puna grassland plateau. Substantial populations of camelids and presence of Inca ruins. Core area of Biosphere Reserve.
- Bolivia/Peru. Madidi and Apolombomba NPs. Suggested as the world's peak area for biodiversity with over 50 vegetation types. Altitude range from 250m (amazonian forest) to 6000m (cloud forest)

#### Antarctic Realm (not including Continent)

- South Georgia Island. UK. Most biologically diverse of all islands in the Southern Ocean. Significant geological, scenic and historical values.

## Afrotropical Realm

- Apart from the 4 additions suggested above and the one now in the evaluation stage (Cape Region), no additional mountain WH prospects are suggested.

## 8. Discussion

This overview paper has demonstrated that the mountain biome is a major component of natural sites on the WH List. Since inscribing the first site in 1978 (which was Nahanni NP, a mountain site), the WH Committee has added another 54 sites in all biogeographic realms on earth. Although selected mountain areas in central Asia and the polar regions have yet to receive international recognition under the Convention, all of the world's major mountain ranges now have sites inscribed on the WH List.

That mountain WH sites are among the three most commonly occurring biomes on the List is partially explained by the high proportion of the earth's surface covered by them (30%) and by the fact that over 40% of the total amount of protected areas in the world have been established in mountains. Mountains display steep environmental gradients and are often the last refuges of wildness amid expanses of human-dominated landscape. They thus usually have high biodiversity and species endemism values. Mountains too, are favored tourist destinations and the strength of their attraction is reflected in the estimate that 72% of all annual visits to natural WH sites occur in them.

This paper has also underlined that there is much to be done before the WH "mountain agenda" can be considered "complete". First, there are three sites in process of nomination and four deferrals that merit re-submission. Second, substantial conservation benefits can be achieved in 19 existing sites where boundaries can be extended. Thirdly, 28 potential sites have been suggested as deserving of consideration for nomination by State Parties.

Beyond the identification and inscription process, however, the effectiveness of management of sites becomes the major challenge. This overview does not address this issue but clearly, with eight sites on the List of WH in Danger and with sites facing growing human pressures as discussed in section 6.6, the long term integrity of the world's mountain heritage is not at all assured. Herein is the role that the World Heritage Convention will play in promoting WH mountain sites as models of best practice.

## **9. Acknowledgements**

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## ANNEX 1

### **World Heritage Natural Sites with a “mountainous” character but which do not meet minimum relief or size criteria:**

- Morne Trois Pitons NP, Dominica
- Laponian Area, Sweden
- Wet Tropics of Queensland, Australia
- Greater Blue Mountains, Australia
- Gros Morne NP, Canada
- Aeolian Is., Italy
- Yakushima, Japan
- Tsingy de Bemaraha, Madagascar
- Sub Antarctic Is. of New Zealand
- Laurisilva of Madeira, Portugal
- St. Kilda, UK
- Thung Yai-Hua Kha Kaeng, Thailand
- Alejandro von Humbolt NP, Cuba
- Rio Platano, Honduras
- Gough Island, UK

**ANNEX 2 Location map of existing mountain World Heritage sites  
(keyed to Annex 3 text)**

## **ANNEX 3 Summary site descriptions of existing mountain World Heritage sites**

**(keyed to Annex 2 map)**

### **ARGENTINA**

#### 1) Los Glaciares (N ii, iii/ 1981)

The Los Glaciares National Park is an area of exceptional natural beauty, with rugged, towering mountains and numerous glacial lakes, including Lake Argentino, which is 160 km long. At its farthest end, three glaciers meet to dump their effluvia into the milky grey glacial water, launching massive igloo icebergs into the lake with thunderous splashes.

#### 2) Ischigualasto - Talampaya Natural Parks (N i/ 2000)

These two contiguous parks, extending over 275,300 ha in the desert region on the western border of the Sierra Pampeanas of central Argentina, contain the most complete continental fossil record known from the Triassic Period (245-208 million years ago). Six geological formations in the parks contain fossils of a wide range of ancestors of mammals, dinosaurs and plants revealing the evolution of vertebrates and the nature of palaeo-environments in the Triassic Period.

### **AUSTRALIA**

#### 3) Tasmanian Wilderness (N i, ii, iii, iv / C iii, iv, vi/ 1982,1989)

In a region that has been subjected to severe glaciation, these parks and reserves, with their steep gorges, covering an area of over 1 million ha, constitute one of the last expanses of temperate rainforest in the world. Remains found in limestone caves attest to the human occupation of the area for more than 20,000 years.

#### 4) Heard and McDonald Islands (N i, ii/ 1997)

Heard Island and McDonald Islands are located in the Southern Ocean, approximately 1,700 km from the Antarctic continent and 4,100 km south-west of Perth. As the only volcanically active subantarctic islands they 'open a window into the earth', thus providing the opportunity to observe ongoing geomorphic processes and glacial dynamics. The distinctive conservation value of Heard and McDonald - one of the world's rare pristine island ecosystems - lies in the complete absence of alien plants and animals, as well as human impact.

### **BULGARIA**

#### 5) Pirin National Park (N i, ii, iii/ 1983)

Extending over an area of 27,400 ha and lying at an altitude of 1,008-2,914 m in the Pirin mountains, in south-west Bulgaria, Pirin National Park has a limestone Balkan landscape, with lakes, waterfalls, caves and pine forests. The rugged mountains, with some 70 glacial lakes scattered throughout them, are home to hundreds of endemic and rare species, many of which are representative of the Balkan Pleistocene flora. The mountains also have diverse and unique landscapes of great aesthetic value.

### **CANADA**

#### 6) Nahanni National Park (N ii, iii/ 1978)

Located along the South Nahanni River, one of the most spectacular wild rivers in North America, this park contains deep canyons and huge waterfalls, as well as a unique limestone cave system. The park is also home to animals of the boreal forest, such as wolves, grizzly bears and caribou. Dall's sheep and mountain goats are found in the park's alpine environment.

#### 7) Canadian Rocky Mountain Parks (N i, ii, iii/ 1984, 1990)

The contiguous national parks of Banff, Jasper, Kootenay and Yoho, as well as the Mount Robson, Mount Assiniboine and Hamber provincial parks, studded with mountain peaks, glaciers, lakes,

waterfalls, canyons and limestone caves, form a striking mountain landscape. The Burgess Shale fossil site, well known for its fossil remains of soft-bodied marine animals, is also found there.

## **CANADA and the UNITED STATES OF AMERICA**

### 8) Kluane/Wrangell-St Elias/Glacier

Bay/Tatshenshini-Atsek (N ii, iii, iv/ 1979, 1992, 1994)

These parks comprise an impressive complex of glaciers and high peaks on both sides of the border between Canada (Yukon Territory and British Columbia) and the United States (Alaska). The spectacular natural landscapes are home to many grizzly bears, caribou and Dall's sheep. The site contains the largest non-polar icefield in the world.

### 9) Waterton Glacier International Peace Park (N ii, iii/ 1995)

In 1932 Waterton Lakes National Park (Alberta, Canada) was combined with the Glacier National Park (Montana, United States) to form the world's first International Peace Park. Situated on the border between the two countries and offering outstanding scenery, the park is exceptionally rich in plant and mammal species as well as prairie, forest, and alpine and glacial features.

## **CHINA**

### 10) Mount Huangshan (N iii, iv / C ii/ 1990)

Huangshan, known as 'the loveliest mountain of China', was acclaimed through art and literature during a good part of Chinese history (e.g. the Shanshui 'mountain and water' style of the mid-16th century). Today it holds the same fascination for visitors, poets, painters and photographers who come on pilgrimage to the site, which is renowned for its magnificent scenery made up of many granite peaks and rocks emerging out of a sea of clouds.

### 11) Jiuzhaigou Valley Scenic and Historic Interest Area (N iii/ 1992)

Stretching over 72,000 ha in the northern part of Sichuan Province, the jagged Jiuzhaigou valley reaches a height of more than 4,800 m, thus comprising a series of diverse forest ecosystems. Its superb landscapes are particularly interesting for their series of narrow conic karst land forms and spectacular waterfalls. Some 140 bird species also inhabit the valley, as well as a number of endangered plant and animal species, including the giant panda and the Sichuan takin.

### 12) Huanglong Scenic and Historic Interest Area (N iii/ 1992)

Situated in the north-west of Sichuan Province, the Huanglong valley is made up of snow-capped peaks and the easternmost of all the Chinese glaciers. In addition to its mountain landscape, diverse forest ecosystems can be found, as well as spectacular limestone formations, waterfalls and hot springs. The area also has a population of endangered animals, including the giant panda and the Sichuan golden snub-nosed monkey.

### 13) Mount Emei Scenic Area, including Leshan Giant Buddha Scenic Area (N iv / C iv, vi/ 1996)

The first Buddhist temple in China was built here in Sichuan Province in the 1st century A.D. in very beautiful surroundings atop Mount Emei. The addition of other temples turned the site into one of Buddhism's main holy places. Over the centuries, the cultural treasures grew in number. The most remarkable was the Giant Buddha of Leshan, carved out of a hillside in the 8th century and looking down on the confluence of three rivers. At 71 m high, it is the largest Buddha in the world. Mount Emei is also notable for its very diverse vegetation, ranging from subtropical to subalpine pine forests. Some of the trees are more than 1,000 years old.

### 14) Mount Wuyi (N iii, iv / C iii, vi/ 1999)

Mount Wuyi is the most outstanding area for biodiversity conservation in south-east China and a refuge for a large number of ancient, relict species, many of them endemic to China. The serene beauty of the dramatic gorges of the Nine Bend River, with its numerous temples and monasteries, many now in ruins, provided the setting for the development and spread of neo-Confucianism, which

has been influential in the cultures of East Asia since the 11th century. In the 1st century B.C. a large administrative capital was built at nearby Chengcun by the Han dynasty rulers. Its massive walls enclose an archaeological site of great significance.

## **COSTA RICA**

### 15) Guanacaste Conservation Area (N (ii) (iv)/ 1999)

The Area de Conservación Guanacaste contains important natural habitats for the conservation of biological diversity, including the best dry forest habitats from Central America to northern Mexico and key habitats for endangered or rare plant and animal species. The site demonstrates significant ecological processes in both its terrestrial and marine-coastal environments.

## **COSTA RICA and PANAMA**

### 16) Talamanca Range-La Amistad Reserves/ La Amistad National Park (N i, ii, iii, iv/ 1983, 1990)

The location of this unique site in Central America, where Quaternary glaciers have left their mark, has allowed the fauna and flora of North and South America to interbreed. Tropical rainforests cover most of the area. Four different Indian tribes inhabit this property, which benefits from close co-operation between Costa Rica and Panama.

## **DEMOCRATIC REPUBLIC of the CONGO**

17) Virunga National Park (N ii, iii, iv/ 1979) Virunga National Park (covering an area of 790,000 ha) comprises an outstanding diversity of habitats, ranging from swamps and steppes to the snowfields of Rwenzori at an altitude of over 5,000 m, and from lava plains to the savannahs on the slopes of volcanoes. Mountain gorillas are found in the park, some 20,000 hippopotamuses live in the rivers and birds from Siberia spend the winter there.

### 18) Kahuzi-Biega National Park (N iv/ 1980)

A vast area of primary tropical forest dominated by two spectacular extinct volcanoes, Kahuzi and Biega, the park has a diverse and abundant fauna. One of the last groups of mountain gorillas (consisting of only some 250 individuals) lives at between 2,100 and 2,400 m above sea-level.

## **ECUADOR**

### 19) Galápagos Islands (N i, ii, iii, iv/ 1978, 2001)

Situated in the Pacific Ocean some 1,000 km from the South American continent, these nineteen islands and the surrounding marine reserve have been called a unique 'living museum and showcase of evolution'. Ongoing seismic activity and volcanism reflect the processes that formed the islands. Located at the confluence of three oceanic currents, the Galápagos is a 'melting pot' of marine species. These processes, together with the extreme isolation of the islands, led to the development of unusual animal life – such as the land iguana, the giant tortoise and the many types of finch – that inspired Charles Darwin's theory of evolution following his visit in 1835.

### 20) Sangay National Park (N ii, iii, iv/ 1983)

With its outstanding natural beauty and two active volcanoes, the park illustrates the entire spectrum of ecosystems, ranging from tropical rainforests to glaciers, with striking contrasts between the snowcapped peaks and the forests of the plains. Its isolation has encouraged the survival of indigenous species such as the mountain tapir and the Andean condor.

## **ETHIOPIA**

### 21) Simen National Park (N iii, iv/ 1978)

Massive erosion over the years on the Ethiopian plateau has created one of the most spectacular landscapes in the world, with jagged mountain peaks, deep valleys and sharp precipices dropping

some 1,500 m. The park is home to some extremely rare animals such as the Gelada baboon, the Simen fox and the Walia ibex, a goat found nowhere else in the world.

## **FRANCE and SPAIN**

22) Pyrénées - Mont Perdu (N i, iii/ C iii, iv, v/ 1997, 1999)

This outstanding mountain landscape, which spans the contemporary national borders of France and Spain, is centred around the peak of Mount Perdu, a calcareous massif that rises to 3,352 m. The site, with a total area of 30,639 ha, includes two of Europe's largest and deepest canyons on the Spanish side and three major cirque walls on the more abrupt northern slopes with

France, classic presentations of these geological landforms. The site is also a pastoral landscape reflecting an agricultural way of life that was once widespread in the upland regions of Europe but now survives only in this part of the Pyrénées. Thus it provides exceptional insights into past European society through its landscape of villages, farms, fields, upland pastures and mountain roads.

## **GREECE**

23) Mount Athos (N iii / C i, ii, iv, v, vi/ 1988)

An Orthodox spiritual centre since 1054, Mount Athos has enjoyed an autonomous statute since Byzantine times. The 'Holy Mountain', which is forbidden to women and children, is also a recognized artistic site. The layout of the monasteries (about 20 of which are presently inhabited by some 1,400 monks) had an influence as far afield as Russia, and its school of painting influenced the history of Orthodox art.

## **INDIA**

24) Nanda Devi National Park (N iii, iv/ 1988)

The Nanda Devi National Park is one of the most spectacular wilderness areas in the Himalayas. It is dominated by the peak of Nanda Devi, which rises to over 7,800 m. No humans live in the park, which has remained more or less intact because of its inaccessibility. It is the habitat of several endangered mammals, especially the snow leopard, Himalayan musk deer and bharal.

## **INDONESIA**

25) Lorentz National Park (N i, ii, iv/ 1999)

Lorentz National Park (2.5 million ha) is the largest protected area in South-East Asia. It is the only protected area in the world to incorporate a continuous, intact transect from snowcap to tropical marine environment, including extensive lowland wetlands. Located at the meeting-point of two colliding continental plates, the area has a complex geology with ongoing mountain formation as well as major sculpting by glaciation. The area also contains fossil sites which provide evidence of the evolution of life on New Guinea, a high level of endemism and the highest level of biodiversity in the region.

## **JAPAN**

26) Shirakami-Sanchi (N ii/ 1993)

Situated in the mountains of northern Honshu, this trackless site includes the last virgin remains of the cool-temperate forest of Siebold's beech trees that once covered the hills and mountain slopes of northern Japan. The black bear, the serow and 87 species of birds can be found in this forest.

## **KENYA**

### 27) Mount Kenya National Park/Natural Forest (N ii, iii/1997)

At 5,199 m, Mount Kenya is the second highest peak in Africa. It is an ancient extinct volcano, during whose period of activity (3.1-2.6 million years ago) it is thought to have risen to 6,500 m. There are 12 remnant glaciers on the mountain, all receding rapidly, and four secondary peaks that sit at the head of the U-shaped glacial valleys. With its rugged glacier-clad summits and forested middle slopes, Mount Kenya is one of the most impressive landscapes in East Africa. The evolution and ecology of its afro-alpine flora also provide an outstanding example of ecological processes.

## **MALAYSIA**

### 28) Kinabalu Park (N ii, iv/ 2000)

Kinabalu Park, in the State of Sabah on the northern end of the island of Borneo, is dominated by Mount Kinabalu (4,095 m), the highest mountain between the Himalayas and New Guinea. It has a very wide range of habitats, from rich tropical lowland and hill rainforest to tropical mountain forest, sub-alpine forest and scrub on the higher elevations. It has been designated as a Centre of Plant Diversity for Southeast Asia and is exceptionally rich in species with examples of flora from the Himalayas, China, Australia, Malaysia, as well as pan-tropical flora.

### 29) Gunung Mulu National Park (N i, ii, iii, iv/ 2000)

Important both for its high biodiversity and for its karst features, Gunung Mulu National Park, on the island of Borneo in the State of Sarawak, is the most studied tropical karst area in the world. The 52,864-ha park contains 17 vegetation zones, exhibiting some 3,500 species of vascular plants. Its palm species are exceptionally rich, with 109 species in 20 genera noted. The park is dominated by Gunung Mulu, a 2,377 m-high sandstone pinnacle. At least 295 km of explored caves provide a spectacular sight and are home to millions of cave swiftlets and bats. The Sarawak Chamber, 600 m by 415 m and 80 m high, is the largest known cave chamber in the world.

## **NEPAL**

### 30) Sagarmatha National Park (N iii/ 1979)

Sagarmatha is an exceptional area with dramatic mountains, glaciers and deep valleys, dominated by Mount Everest, the highest peak in the world (8,848 m). Several rare species, such as the snow leopard and the lesser panda, are found in the park. The presence of the Sherpas, with their unique culture, adds further interest to this site.

## **NEW ZEALAND**

### 31) Te Wahipounamu - South-West New Zealand (N i, ii, iii, iv/ 1990)

The landscape in this park, situated in south-west New Zealand, has been shaped by successive glaciations into fjords, rocky coasts, towering cliffs, lakes and waterfalls. Two-thirds of the park is covered with southern beech and podocarps, some of which are over 800 years old. The kea, the only alpine parrot in the world, lives in the park, as does the rare and endangered takahe, a large flightless bird.

### 32) Tongariro National Park (N ii, iii / C vi/ 1990, 1993)

In 1993 Tongariro became the first property to be inscribed on the World Heritage List under the revised criteria describing cultural landscapes. The mountains at the heart of the park have cultural and religious significance for the Maori people and symbolize the spiritual links between this community and its environment. The park has active and extinct volcanoes, a diverse range of ecosystems and some spectacular landscapes.

## **NIGER**

### 33) Air and Ténéré Natural Reserves (N ii, iii, iv/ 1991)

This is the largest protected area in Africa, covering some 7.7 million ha, though the area considered a protected sanctuary constitutes only one-sixth of the total area. It includes the volcanic rock mass of the Aïr, a small Sahelian pocket, isolated as regards its climate and flora and fauna, and situated in the Saharan desert of Ténéré. The reserves boast an outstanding variety of landscapes, plant species and wild animals.

## **PANAMA**

### 34) Darien National Park (N ii, iii, iv/ 1981)

Forming a bridge between the two continents of the New World, Darien National Park contains an exceptional variety of habitats - sandy beaches, rocky coasts, mangroves, swamps, and lowland and upland tropical forests containing remarkable wildlife. Two Indian tribes live in the park.

## **PERU**

### 35) Historic Sanctuary of Machu Picchu (N ii, iii / C i, iii/ 1983)

Machu Picchu stands 2,430 m above sea-level, in the middle of a tropical mountain forest, in an extraordinarily beautiful setting. It was probably the most amazing urban creation of the Inca Empire at its height; its giant walls, terraces and ramps seem as if they have been cut naturally in the continuous rock escarpments. The natural setting, on the eastern slopes of the Andes, encompasses the upper Amazon basin with its rich diversity of flora and fauna.

### 36) Huascarán National Park (N ii, iii/ 1985)

Situated in the Cordillera Blanca, the world's highest tropical mountain range, Mount Huascarán rises to 6,768 m above sea-level. The deep ravines watered by numerous torrents, the glacial lakes and the variety of the vegetation make it a site of spectacular beauty. It is the home of such species as the spectacled bear and the Andean condor.

### 37) Manu National Park (N ii, iv/ 1987)

This huge 1.5 million-ha park has successive tiers of vegetation rising from 150 to 4,200 m above sea-level. The tropical forest in the lower tiers is home to an unrivalled variety of animal and plant species. Some 850 species of birds have been identified and rare species such as the giant otter and the giant armadillo also find refuge there. Jaguars are often sighted in the park.

### 38) Río Abiseo National Park (N ii, iii, iv / C iii/ 1990, 1992)

The park was created in 1983 to protect the fauna and flora of the rainforests that are characteristic of this region of the Andes. There is a high level of endemism among the fauna and flora found in the park. The yellow-tailed woolly monkey, previously thought extinct, is found only in this area. Research undertaken since 1985 has already uncovered 36 previously unknown archaeological sites at altitudes of between 2,500 and 4,000 m, which give a good picture of pre-Inca society.

## **RUSSIAN FEDERATION**

### 39) Virgin Komi Forests (N ii, iii/ 1995)

The Virgin Komi Forests cover 3.28 million ha of tundra and mountain tundra in the Urals, as well as one of the most extensive areas of virgin boreal forest remaining in Europe. This vast area of conifers, aspens, birches, peat bogs, rivers and natural lakes has been monitored and studied for over 50 years. It provides valuable evidence of the natural processes affecting biodiversity in the taiga.

### 40) Volcanoes of Kamchatka (N i, ii, iii, iv/ 1996, 2001)

This is one of the most outstanding volcanic regions in the world, with a high density of active volcanoes, a variety of types, and a wide range of related volcanic features. The six sites included in

the serial designation group together the majority of volcanic features of the Kamchatka peninsula. The interplay of volcanism with active glaciers forms a dynamic landscape of great beauty. The sites contain high species diversity, including the world's greatest known variety of salmonoid fish and exceptional concentrations of sea otter, brown bear and Stellar's sea eagle.

41) Lake Baikal (N i, ii, iii, iv/ 1996)

Situated in south-east Siberia, the 3.15-million-ha Lake Baikal is the oldest (25 million years) and deepest (1,700 m) lake in the world. It contains 20% of the world's total unfrozen freshwater reserve. Known as the 'Galapagos of Russia', its age and isolation have produced one of the world's richest and most unusual freshwater faunas, which is of exceptional value to evolutionary science.

42) Golden Mountains of Altai (N iv/ 1998)

The Altai mountains in southern Siberia form the major mountain range in the western Siberia biogeographic region and provide the source of its greatest rivers - the Ob and the Irtysh. Three separate areas are inscribed: Altaisky Zapovednik and a buffer zone around Lake Teletskoye; Katunsky Zapovednik and a buffer zone around Mount Belukha; and the Ukok Quiet Zone on the Ukok plateau. The total area covers 1,611,457 ha. The region represents the most complete sequence of altitudinal vegetation zones in central Siberia, from steppe, forest-steppe, mixed forest, subalpine vegetation to alpine vegetation. The site is also an important habitat for endangered animal species such as the snow leopard.

43) Western Caucasus (N ii, iv/ 1999)

The Western Caucasus, extending over 275,000 ha of the extreme western end of the Caucasus mountains and located 50 km north- east of the Black Sea, is one of the few large mountain areas of Europe that has not experienced significant human impact. Its subalpine and alpine pastures have only been grazed by wild animals, and its extensive tracts of undisturbed mountain forests, extending from the lowlands to the subalpine zone, are unique in Europe. The site has a great diversity of ecosystems, with important endemic plants and wildlife, and is the place of origin and reintroduction of the mountain subspecies of the European bison.

44) Central Sikhote-Alin (N iv/ 2001)

The Sikhote-Alin mountain range contains one the richest and most unusual temperate forests of the world. In this mixed zone between taiga and subtropics, southern species such as the tiger and Himalayan bear cohabit with northern species such as the brown bear and lynx. The site stretches from the peaks of Sikhote-Alin to the Sea of Japan and is important for the survival of many endangered species such as the Amur tiger.

## **SOUTH AFRICA**

45) uKhahlamba / Drakensberg Park (N iii, iv / C i, iii/ 2000)

The uKhahlamba - Drakensberg Park has exceptional natural beauty in its soaring basaltic buttresses, incisive dramatic cutbacks, and golden sandstone ramparts. Rolling high altitude grasslands, the pristine steep-sided river valleys and rocky gorges also contribute to the beauty of the site. The site's diversity of habitats protects a high level of endemic and globally threatened species, especially birds and plants. This spectacular natural also contains many caves and rock-shelters with the largest and most concentrated group of paintings in Africa south of the Sahara, made by the San people over a period of 4,000 years. The rock paintings are outstanding in quality and diversity of subject and in their depiction of animals and human beings. They represent the spiritual life of the San people who no longer live in this region.

## **SWITZERLAND**

46) Jungfrau-Aletsch-Bietschhorn (N i, ii, iii/ 2001)

This is the most glaciated part of the Alps, containing Europe's largest glacier and a range of classic glacial features such as U-shaped valleys, cirques, horn peaks and moraines. It provides an outstanding

geological record of the uplift and compression that formed the High Alps. The diversity of flora and wildlife is represented in a range of Alpine and sub-Alpine habitats and plant colonization in the wake of retreating glaciers provides an outstanding example of plant succession. The impressive vista of the North Wall of the High Alps, centred on the Eiger, Mönch and Jungfrau peaks, has played an important role in European art and literature.

## **UGANDA**

47) Rwenzori Mountains National Park (N iii, iv/ 1994)

Covering nearly 100,000 ha in western Uganda, the park comprises the main part of the Rwenzori mountain chain, which includes Africa's third highest peak (Mount Margherita: 5,109 m). The region's glaciers, waterfalls and lakes make it one of Africa's most beautiful alpine areas. The park has many natural habitats of endangered species and a rich and unusual flora comprising, among other species, the giant heather.

## **UNITED REPUBLIC OF TANZANIA**

48) Kilimanjaro National Park (N iii/ 1987)

At 5,963 m, Kilimanjaro is the highest point in Africa. This volcanic massif stands in splendid isolation above the surrounding plains, with its snowy peak looming over the savannah. The mountain is encircled by mountain forest. Numerous mammals, many of them endangered species, live in the park.

## **UNITED STATES OF AMERICA**

49) Yellowstone (N i, ii, iii, iv/ 1978)

The vast natural forest of Yellowstone National Park covers nearly 9,000 sq. km; 96% of the park lies in Wyoming, 3% in Montana and 1% in Idaho. Yellowstone contains half of all the world's known geothermal features, with more than 10,000 examples. It also has the world's largest concentration of geysers (more than 300 geysers, or 2/3 of all those on the planet). Established in 1872, Yellowstone is equally known for its wildlife, such as grizzly bears, wolves, bison and wapitis.

50) Grand Canyon National Park (N i, ii, iii, iv/ 1979)

Carved out by the Colorado river, the Grand Canyon (nearly 1,500 m deep) is the most spectacular gorge in the world. Located in the state of Arizona, it cuts across the Grand Canyon National Park. Its horizontal strata retrace the geological history of the past 2 billion years. There are also prehistoric traces of human adaptation to a particularly harsh environment.

51) Olympic National Park (N ii, iii/ 1981)

Located in the north-west of Washington State, Olympic National Park is renowned for the diversity of its ecosystems. Glacier-clad peaks interspersed with extensive alpine meadows are surrounded by an extensive old growth forest, among which is the best example of intact and protected temperate rainforest in the Pacific Northwest. Eleven major river systems drain the Olympic mountains, offering some of the best habitat for anadromous fish species in the country. The park also includes 100 km of wilderness coastline, the longest undeveloped coast in the contiguous United States, and is rich in native and endemic animal and plant species, including critical populations of the endangered northern spotted owl, marbled murrelet and bull trout.

52) Great Smoky Mountains National Park (N i, ii, iii, iv/ 1983)

Stretching over more than 200,000 ha, this exceptionally beautiful park is home to more than 3,500 plant species, including almost as many trees (130 natural species) as in all of Europe. Many endangered animal species are also found there, including what is probably the greatest variety of salamanders in the world. Since the park is relatively untouched, it gives an idea of temperate flora before the influence of humankind.

53) Yosemite National Park (N i, ii, iii/ 1984)

Yosemite National Park lies in the heart of California. With its 'hanging' valleys, many waterfalls, cirque lakes, polished domes, moraines and U-shaped valleys, it provides an excellent overview of all kinds of granite relief fashioned by glaciation. At 600- 4,000 m, a great variety of flora and fauna can also be found here.

54) Hawaii Volcanoes National Park (N ii/ 1987)

Two of the most active volcanoes in the world, Mauna Loa (4,170 m high) and Kilauea (1,250 m high), tower over the Pacific Ocean at this site. Volcanic eruptions have created a constantly changing landscape, and the lava flows reveal surprising geological formations. Rare birds and endemic species can be found there, as well as forests of giant ferns.

## **VENEZUELA**

55) Canaima National Park (N i, ii, iii, iv/ 1994)

Canaima National Park is spread over 3 million ha in south- eastern Venezuela along the border between Guyana and Brazil. Roughly 65% of the park is covered by table mountain (tepui) formations. The tepuis constitute a unique biogeological entity and are of great geological interest. The sheer cliffs and waterfalls, including the world's highest (1,000 m), form a spectacular landscape.