



**United Nations  
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## **Many Ski Resorts Heading Downhill as a Result of Global Warming**

**Turin/Nairobi** - Many low altitude ski resorts face economic hardship and even ruin as a result of global warming, a new study launched today by the United Nations Environment Programme (UNEP) concludes.

Experts at the University of Zurich say that the levels of snow falling in lower lying mountain areas will become increasingly unpredictable and unreliable over the coming decades.

Currently an estimated 15 per cent of Switzerland's ski resorts are deemed to have unreliable levels of snowfall.

In the future, between 37 percent and 56 per cent could have such low levels of snow that many, including the Swiss resorts of Wildhaus and Unterwasser, will be facing acute difficulties in attracting overseas tourists and local winter sports enthusiasts.

“The impacts of climate change on winter tourism may be even more severe in countries such as Germany or Austria due to the lower altitudes of their ski resorts,” say the researchers.

The internationally celebrated winter sports town of Kitzbuehl, popular among the rich and famous, faces extinction as a top ski resort. Kitzbuehl is an example of a resort lying at the low altitude of 760 metres, a height that will make it acutely vulnerable to declining and less frequent snow.

The study says that ski resorts in North America and Australia will be impacted too. Indeed, none of Australia's ski resorts will be economically viable by 2070 under a worst case scenario.

The findings have come from Rolf Burki and colleagues at the University of Zurich. They are being presented today at the V World Conference on Sport and the Environment taking place in Turin, Italy, which is the host city for the 2006 Winter Games.

The conference has been organized by the International Olympic Committee in cooperation with the Organizing Committee for the winter games in Turin and UNEP.

The news also comes as nations meet in nearby Milan for the latest round of climate change talks known as the 9th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change.

Klaus Toepfer, UNEP's Executive Director, said: “Winter sports and tourism are big business in many of the world's mountain areas. They offer important sources of revenue and employment for sometimes remote communities as well as healthy, pleasurable recreation for millions. In many communities, downhill and cross-country skiing, tobogganing, snow boarding and other winter sports are also important cultural and family activities.”

“Climate change in the form of extreme weather events such as hurricanes, floods and droughts, is the greatest challenge facing the world. Clearly it is the poorest of the poor on continents like Africa, Asia and Latin America who are at the greatest risk, who are the most vulnerable. The United Nations Millennium Development Goals, covering such issues as water and sanitation, are all going to be harder to deliver, if global warming is not tackled. But this study on winter sports shows that it is not just the developing world that will suffer. Even rich nations are facing potentially massive upheavals with significant economic, social and cultural implications,” he said.

Dr Burki, who is Lecturer and Senior Research Associate at the University of Higher Education, St Gallen, as well as Lecturer at the International School of Tourism Management, Zurich, said: “Climate change will have the effect of pushing more and more winter sports, higher and higher up mountains, concentrating impacts in ever decreasing, high altitude, areas. As ski resorts in lower altitudes face bankruptcy, so the pressure in highly, environmentally sensitive, upper altitude areas rises along with the pressures to build new ski lifts and other infrastructure.”

“The extent to which countries, regions and communities can adapt will depend on how the costs and technology of snow making equipment develops, how the economics of building extra, higher altitude infrastructure such as cable cars develops, and the location of existing resorts,” he added.

“However, it appears clear that many resorts particularly in the traditional, lower altitude resorts of Europe will be either unable to operate as a result of lack of snow or will face additional costs, including artificial snow making, that may render them uneconomic,” said Dr Burki, whose research has been carried out in collaboration with Hans Elsasser, professor for Economic Geography at the University of Zurich, and Dr Bruno Abegg, a travel journalist.

Indeed, the team suggests that warmer temperatures will make artificial snow making increasingly inefficient and expensive, if not impossible.

The research has used temperature forecasts produced by the Intergovernmental Panel on Climate Change (IPCC), a body of some 2,000 scientists. The IPCC was established by UNEP and the World Meteorological Organization to model the impact of rising levels of carbon dioxide and other greenhouse gases in the atmosphere and to offer advice to governments on how to deal with the threats.

The IPCC estimates that temperatures will rise by between 1.4 degrees C and 5.8 degrees C by 2100 unless action is taken to significantly reduce emissions from sources such as vehicles, industry, offices and homes.

Global warming is expected to be stronger on land areas in the northern hemisphere during the winter months, making mountain-based winter tourism acutely vulnerable.

Austria, Italy and Germany

In Austria, the present snow line is likely to rise 200 to 300 metres higher over the next 30 to 50 years. “Many mountain villages, above all in the central and eastern parts of Austria, will lose their winter industry because of climate change,” says the study.

In Italy, half of the winter sport villages are below 1,300 metres. “Some of these are already facing major problems with snow cover. In future, there will only be a few winters with a winter atmosphere -- that means snow -- in these ski resorts,” it says.

“If the altitude for snow reliability rises to 1,500 metres because of climate change, winter sports would only be possible [in Italy] in the higher zones of the ski areas and many resorts would have no economic viability in the future,” the scientists conclude.

Many of Germany’s ski resorts are also at relatively low altitudes. Resorts in the Black Forest area and in Allgaeu could be severely affected by climate change.

#### Switzerland

The study has focused on Switzerland to assess the likely future impacts of climate change on a typical winter sports country.

The researchers considered a ski resort “snow reliable” if, in seven out of 10 winters, it receives at least 30 to 50 centimetres of snow on at least 100 days between December 1 and April 15.

Currently 85 per cent of Switzerland’s 230 ski resorts are classed as “snow reliable”. These are in areas where the snow line is at 1,200 metres or above.

Under one scenario, snow in ski resorts becomes unreliable at 1,500 metres in 30 to 50 years as a result of global warming.

“The number of snow reliable ski resorts would drop to 63 percent. The Jura, Eastern and Central Switzerland, Ticino and the Alps in the cantons of Vaud and Fribourg will be particularly jeopardized by global warming,” they say.

If snow reliability rises to 1,800 metres, under a more acute warming scenario, only 44 percent of skiing regions would be snow reliable. Even in the higher altitude cantons of Grisons and Valais, an estimated 25 percent of resorts face threats.

The precise economic losses facing a country like Switzerland are uncertain. But some experts have suggested that tourism losses in that country, as a result of climate change, could eventually be as high as \$1.2 to \$1.6 billion annually.

#### Australia and North America

The report suggests that, for nine Australian ski resorts, a rise of 0.3 degrees C would, by 2030, only bring into question the viability of the Mount Baw Baw site. However, if temperatures climb by 0.6 degrees C by the same date, only five resorts are likely to be unaffected.

Under a worst case scenario, in which temperatures climb by 3.4 degrees C by 2070, none of Australia’s existing ski resorts would be operating at a profit.

In the Lakelands areas of Canada the current ski season could, if current snowmaking technology is in use, decline by between seven and 32 per cent by 2050 as a result of global warming.

Resorts may have to make between 48 per cent and 187 percent more artificial snow by the same date.

“The ability of individual ski areas to absorb additional snowmaking costs may be the crucial factor in remaining economically viable,” says the report.

#### Permafrost and Glaciers

The researchers say that impacts are already being felt in mountain areas. Glaciers, used for both winter and summer skiing, have been retreating over the past century and a half. For example

Swiss glaciers have lost more than a quarter of their surface. By 2030, 20 percent to 70 percent of Swiss glaciers may have disappeared the scientists say.

Rising temperatures will also have other economic and safety impacts. Permafrost, essentially frozen soil, is likely to be more vulnerable to melting, increasing the risks of landslides and raising the costs associated with anchoring and bracing cable car stations, lift masts and other structures.

The researchers, who also included precipitation models in their calculations, suggest that avalanches may become more common above 2,000 metres, which may increase risks to skiers and other sports people as well as damage to infrastructure.

The researchers argue that, while winter sports tourism is clearly a potential victim of climate change, it also has a responsibility towards reducing carbon dioxide and the other emissions linked with global warming. These can arise from traffic travelling to the resorts and the energy-intensive equipment used to make artificial snow and ice.

#### Notes to Editors

The World Conference on Sport and the Environment has been organised by the International Olympic Committee in Turin, Italy, on 2 and 3 December 2003, in cooperation with the Organising Committee of the XX Olympic Winter Games (TOROC) and the United Nations Environment Programme (UNEP).

The conference will have the theme "Partnerships for sustainable development." Ways in which the Olympic Movement can better apply its Agenda 21 will be examined during the various sessions. The environment being the third dimension of Olympism, this event is the ideal occasion to gather together the Olympic Movement and its partners and to take concrete measures in this area.

The climax of the conference will be the closing ceremony, when the Conference Chairman, Pál Schmitt will invite the IOC President Jacques Rogge, the TOROC President Valentino Castellani and Italian Olympic Committee President Gianni Petrucci to speak. At this ceremony, the final declaration will be adopted.

Details of the International Olympic Committee's V World Conference on Sport and the Environment in Torino [http://www.olympic.org/uk/news/media\\_centre/full\\_story\\_uk.asp?id=7](http://www.olympic.org/uk/news/media_centre/full_story_uk.asp?id=7)

The report, "Climate Change and Winter Sports: Environmental and Economical Threats", will be available at [www.unep.org](http://www.unep.org) on 2 December.

UNEP has an active sports and environment initiative which has been revitalized by a decision of its Governing Council in February 2003. It is working and collaborating with many groups and organizations including the Global Sports Alliance in Japan.

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