

# Glaciers – Objects of Law and International Treaties

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## *Introduction*

### **Legal aspects concerning Swiss glaciers**

In terms of natural science glaciers are characterised by the formation of ice masses from snow accumulation, mass balance, ice movement and transport of debris<sup>1</sup>. In the Swiss Civil Code glaciers are classified as objects which have no owner, as soil unsuitable for cultivation and as public property in common use. Public glaciers are ruled by the law of the canton in which they are situated. The cantons can have the territorial sovereignty or claim public or private property on glacier areas or delegate such rights to their communities. If there is sufficient evidence, glaciers can, as an exception, be of private ownership. Even in such cases mountaineers have the right of free access without motorized vehicles as long as they do not cause any damage. Famous examples are the Rhone glacier and the Aare glaciers. The family Seiler, whose members were tourist pioneers, erected a hotel near ice caves in the Rhone glacier and so attracted a huge number of foreign tourists. Due to those activities and in correspondence with old cantonal law the Seilers occupied the Rhone glacier according to a decision of the Federal Supreme Court in the year 1936. Today it is not possible anymore to acquire the property of a glacier area in such a way according to the law in force<sup>2</sup>.

When the authorities survey the alpine zones for the land register they have to draw the line between soil suitable for cultivation on one hand and rock and glacier areas on the other. Some of the owners of alpine pastures do not agree with this drawing up of borders, especially if they have old written sale contracts with differing descriptions of borders. Until the beginning of the 20th century most of the mountain peaks did not have names and the plots were not yet described in a land register nor with square meters. In earlier centuries it was common to describe the borders of alpine pastures with neighbours, cardinal points or mountain peaks. A typical example could be the formulation «the pasture x stretches towards evening (the northern direction) to the snow summit».

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1 For an overview see Bütler, pp. 7-19, with references to specific literature

2 Bütler, pp. 21-57, especially pp. 36-41.

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The interpretation of centuries-old sale contracts for pastures, especially the description of borders, often is a central but difficult point. A disputed opinion of one expert suggests that before the year 1800 nobody had any interest in glaciated areas. This school of thought was applied by courts in some famous cases and led to a very restricting interpretation of such formulations. As a consequence the proof of private property in glacier regions with old documents can be very difficult<sup>3</sup>. Today it is practically impossible to get an approval of the competent authorities to acquire new private property of such soil. Nowadays building and other activities are often based on legal instruments like the right to build, the permission for increased common use, a concession or lease instead of private property or servitudes which have no time limitation. This makes a lot of sense: glaciers should be in public hands – for public interests and ecological reasons – and not become objects of commercial dealings.

In the last thirty years, many disputes between cantons, municipalities and/or private persons about property in glacier areas have been brought to Swiss courts. The reasons for this can be found in increased economical, social and ecological activities in high alpine regions. Priority is on tourism and energy production. Another famous example besides the above mentioned Rhone glacier case is the conflict between the two coexisting communities of Zermatt (Burger- and Munizipalgemeinde) during nearly thirty years. They fought for property in the skiing area Theodul-Klein Matterhorn and all surrounding mountains and glaciers (Matterhorn inclusive)<sup>4</sup>.

Cantonal and municipal authorities, the responsible persons, clubs and companies for roads, mountain paths, cable cars or ski-regions have to take precautionary measures against glacier hazards like ice avalanches and glacier lake outbursts; rockfall because of glacier retreat and melting permafrost also have to be mentioned here. Crevasses pose a threat to Alpinists and users of glacier ski runs. Depending on the constellation legal duties to maintain safety are based on public or private law. For the authorities the relevant laws are in the fields of police, protection of the population, area planning, forest, water and environment as well as private law for the liability of owners of buildings. Private persons, alpine clubs and companies have the duty to take care of their activities in glacier regions as owners of buildings and other infrastructures or as contractual partners. Examples are transport contracts of cable car companies with their passengers or the mandate of a mountain guide with his guest. For the building up of glacier slopes a special directive aims at reducing the dangers for the users<sup>5</sup>.

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3 Bütler, pp. 138-146.

4 Details about cases of property conflicts in the Swiss Alps: Bütler, pp. 93-138

5 Details in Bütler, pp. 149-221.

Catastrophes and accidents related to the mentioned glacier phenomena have caused many deaths and often have been followed by legal proceedings. Famous is the catastrophe of Mattmark (canton Wallis) in August 1965, when the tongue of the Allalin glacier suddenly broke off and fell directly on a building site which caused the immediate death of 88 workers. After a long legal procedure all accused were acquitted<sup>6</sup>. For alpinists on glacier tours priority is on the question about when and how to use the rope. The basic rule, confirmed by the jurisdiction, is to rope up if the planned route of a team leads through glacier passages that are partly or fully covered by snow; combined with a good routefinding and rope handling technique the risk of a sudden crevasse fall can be substantially reduced<sup>7</sup>.

### Glaciers – objects of international treaties

The most important international treaties to protect glaciers are the Antarctic Treaty System, the UN Framework Convention on Climate Change and its Kyoto-Protocol. Antarctica is the continent of ice and glaciers; only two percent of its surface are ice-free. It is encircled by floating barriers of ice. The Antarctic Treaty was signed in the year 1959 by twelve states in order to establish a peaceful scientific cooperation and to set aside territorial claims by any party. All military activities have been prohibited from then on. In the meantime many agreements followed; they form the so called Antarctic Treaty System<sup>8</sup>.

The Protocol on Environmental Protection to the Antarctic Treaty, which was agreed in the year 1991, deserves special mentioning. It aims at a comprehensive protection of the Antarctic environment and its ecosystems; its wilderness, aesthetic values and the conduct of research are especially emphasized. Activities in the Antarctic area should avoid any adverse impact on climate or weather patterns or significant changes in the glacial environment (Art. 3). The exploitation of mineral resources is prohibited. Waste disposal is strictly regulated: prohibited in ice-free areas and limited as much as possible for sea ice, ice shelves and the grounded ice sheet. Examples for major glacial ecosystems, outstanding geological and glaciological features can be part of specially protected areas (Art. 3 of Annex V)<sup>9</sup>.

The fluctuations of glaciers and climate change are closely connected. The ongoing climate warming is an existential threat for the alpine glaciers in temperate zones. The Arctic ice shelf and – in the medium term – the inland ice of Greenland are endangered too; their substantial melting could have huge and irreversible effects on ocean currents, sea level and

6 Bütler, pp. 154-155 and 253-262.

7 See Bütler, pp. 223-252 (alpine duties) and 263-288 (judgments on cases with glacier accidents).

8 See [http://www.antarctica.ac.uk/About\\_Antarctica/Treaty/index.html](http://www.antarctica.ac.uk/About_Antarctica/Treaty/index.html); Sands, pp. 710-713.

9 Sands, pp. 721-726.

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on global climate<sup>10</sup>. In order to undertake steps against a rapid climate change caused by human activities, the UN established a regime to reduce the amount of released greenhouse gases. The UN Framework Convention on Climate Change of the year 1992 and its famous Kyoto Protocol of 1997 are the legal basis<sup>11</sup>. The ultimate objective of the convention is to stabilize the greenhouse gas concentrations of the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Glaciers, sea ice, ice shelves and ice sheets are not mentioned directly but they are a key factor in the discussion on the effects of climate warming. This is because of their role as an indicator for climate change, their value as water resource and attractive landscape factor and their influence on climate, oceanic circulation and on the sea level.

In the Kyoto Protocol industrialized countries commit themselves to reduce their overall anthropogenic emissions of carbon dioxide by at least five percent below the 1990 levels in the commitment period between the years 2008 and 2012. The parties are obliged to fulfil their emission reductions mainly with domestic actions; but flexible instruments can be employed in a supplementary way to allow efficient and cheap measures abroad. These instruments are the so-called Joint Fulfilment, Joint Implementation, Clean Development Mechanisms and International Emissions Trading<sup>12</sup>. There is widespread consensus among scientists that the current climate protection measures are completely insufficient. Furthermore, no international legal regime has been defined until now for the period after the year 2012. The total of global anthropogenic greenhouse gas emissions should be reduced by about three thirds compared to the 1990 levels in the next few decades. Not even such drastic steps can give a guarantee to slow the ongoing climate warming process effectively and in time<sup>13</sup>.

### *Protection of the glaciers in the Alps*

#### **Endangering of glacier regions through human activities**

Since the 19th century the Alps have been increasingly conquered and developed for tourism and for industrial purposes. Already in the beginning of alpine tourism the then

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10 Overview about glaciers and climate in: Bütler, pp. 411-441; detailed retreat-scenarios for Swiss glaciers in: Maisch Max/Wipf Andreas/Denneler Bernhard/Battaglia Julius/Benz Christoph, Die Gletscher der Schweizer Alpen, Gletscherhochstand 1850, Aktuelle Vergletscherung, Gletscherschwundsenarien, 2. Aufl. Zürich 2000, pp. 273-320.

11 See <http://unfccc.int>.

12 For an overview about international climate law: Sands, pp. 357-381; Bütler, pp. 443-469.

13 See for example ProClim, p. 88; World Meteorological Organization, p. 216; Bütler, pp. 432-433.

much bigger glaciers were one of the main attractions for foreign visitors, poets and painters. In the period between 1850 and 1920, when refrigerators did not yet exist, ice exploitation was performed to a great extent on many Swiss glaciers. Huge ice lumps were transported to several major cities of Switzerland, France and Italy. Beginning of the 20<sup>th</sup> century famous mountain railways leading to glaciated areas such as Jungfrauoch or Gornergrat (Switzerland) were constructed. After World War II, the booming skisport and mass tourism were accompanied by the construction of cable cars, ski lifts, ski slopes, restaurants, roads and other infrastructure, in several cases in high alpine glacier areas. Of current interest are glacier coverings, snow farming and artificial snow production<sup>14</sup>.

The rising consumption of electricity in the last century required the construction of huge water reservoirs. In the Swiss Alps a large part of the glacier water is abstracted and collected in mains and huge dams. This entire infrastructure has severely disfigured and changed the sensitive high alpine landscapes<sup>15</sup>. Also activities and events like pop concerts, theatre-performances, rides with snowmobiles and ski races (Rettenbachferner/Austria) take place on certain glaciers. On the Klein Matterhorn near Zermatt (Switzerland), which measures 3883 meters above sea level, a second cable car, a restaurant with 400 places, a tower with the height of 117 meters and an observation platform as well as a hotel with artificial overpressure are planned<sup>16</sup>. Efforts have to be made that this absurd and megalomaniac project will be refused.

Other negative effects are caused by alpine air traffic and military shooting exercises. Supply flights for alpine huts and for rescue purposes are widely accepted and appreciated. More problematic are fun flights and heliskiing which lead to a lot of noise, disturb animals and devalue alpine routes in the open country for mountaineers and skiers. Presently Switzerland has 43 official mountain landing places, about half of them in glacier zones up to an altitude of 4100 meters. In neighbouring countries like France, Germany, Liechtenstein, Austria or Italy, heliskiing is either forbidden or more restricted by law. Art. 12 of the Protocol «Traffic» of the Alpine Convention demands from the parties to try hard to limit or prohibit landings of aircrafts outside of airfields or airports. Switzerland has several alpine ranges with shooting sectors aiming at glacier regions. Tons of used ammunition lie scattered on certain glaciers, even in protected areas; examples are the Fiescher and the Aare glaciers in the cantons of Wallis and Bern. Since some years now, the army has begun – as a reaction to criticism – to collect some of the used ammunition, but the problem of pollution with heavy metals is by far not yet solved<sup>17</sup>.

14 Bütler, pp. 294-297 (endangering of glacier regions), 311-319 (snow farming, snow production and glacier covering); Elsasser/Bürki, pp. 16-23.

15 Bütler, pp. 367-371.

16 See the publicity under: <http://www.zermatt.ch/d/latest/Projekt-Klein-Matterhorn.html>.

17 For more details about military exercises and alpine air traffic see Bütler, pp. 371-379.

## Legal protection of glaciers in Switzerland

In Switzerland huge glacier regions are situated within protected areas which have been defined either by the federal state, by the cantons or communities. Basically the protection of landscapes is the duty of the cantons, an outflow of the still strong federalism in Switzerland<sup>18</sup>. Since the year 2001 the high alpine region Jungfrau-Aletsch-Bietschhorn (cantons of Wallis and Bern), including Aletsch glacier, is on the list of the Unesco World Heritage. Many beautiful alpine landscapes are listed in the so called Inventory of Landscapes of National Importance. While fulfilling its tasks, the federal state has the obligation to preserve such areas in an undiminished way; existing activities and minor interferences with the protection objects are tolerated. Unfortunately the description of the objects and the goals of protection are not precise enough. The cantons must take this inventory into account, but still have too much latitude in the handling. One problem is that a lot of activities in the touristic, energetic and military sector already existed when the inventory came into force. Nevertheless, one can say that the inventory has had a positive effect when new cable cars, water dams and other constructions were planned in protected areas. Several glacier forefields are protected in the Inventory of Meadows of National Importance<sup>19</sup>.

Switzerland has thirteen glacier ski-regions and many other railways leading to high alpine terrain. The construction of cable cars for skiing areas requires a concession and a planning permission based on an environmental impact assessment. In 1998 the Swiss government confessed to the principle of a reserved concession policy concerning especially high alpine regions. In protected areas no new permissions should be given.

Art. 7 of the decree about concessions for mountain railways and cable cars is important. This provision says that glaciers can only be developed with cable cars if they lie near major tourist villages. Furthermore, glaciers have to be particularly suitable for prolongation of the skiing season and for summer skiing. In several cases this provision was handled in a reasonable way. But in the newest case, Hockenhorn, it was totally misinterpreted in a decision made by the Swiss government in the year 2000. Below the Hockenhorn-peak a cable car leading over the small Milibach glacier was permitted although the village Wiler in the Lötschental Valley cannot be assessed as a «greater tourist center». The authorities argued that combined with another village, called Kandersteg, which is connected to Wiler only by a tunnel the requirements would be met. The government ignored the existing regulations in a legally unacceptable way for economic interests of local tourism in a valley with emigration-problems. Would this decision become standard, practically any Swiss glacier

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18 Bütler, pp. 323-328.

19 Bütler, pp. 328-339 (inventories of national importance), 351-353 (Unesco World Heritage).

could be developed with new cable cars. But the Swiss government admitted that it was a borderline case without prejudice for similar projects.

In Switzerland a new law and a decree about cable cars are being discussed and will come into force in the near future. The law states that the construction of cable cars can only be permitted if they are technically safe and environmentally compatible. Unfortunately, ecological standards, especially for the development of glacier areas, are lacking completely in the draft until now. For final decisions about concessions for cable cars competence will lie with the Federal Supreme Court, no longer with the Swiss government, which is quite an improvement. Nevertheless, glacier protection in Switzerland is not strong enough and not really satisfying<sup>20</sup>.

In several federal states of Austria which has eight glacier skiing areas the strict protection of glacier regions is regulated more explicitly. Examples are the states of Vorarlberg, Kärnten and Salzburg. In Tirol legal protection of glaciers has been weakened by the last revision<sup>21</sup>.

## **EU Framework Directive on Water Policy**

The EU Framework Directive on Water Policy is applicable in the whole area of the EU, but not in alpine countries like Switzerland and Liechtenstein, which are not members of the EU. For the water pollution control and for sea water protection it is a useful and necessary instrument<sup>22</sup>. Although the Directive includes the alpine regions of EU countries (see Art. 1 and Annex VI, Map A), it does not take into account the special geographical and hydrological circumstances of the Alps. This becomes obvious by the fact that snow, firn, glaciers and permafrost are not mentioned; neither are alpine water systems as a landscape factor (minimal rest water amounts) nor activities like artificial snow production, snow farming and glacier covering. In the Directive no regulations concerning preventive and reactive measures against alpine hazards like glacier lake outbursts, snow, ice and debris avalanches and rockfall can be found. Floods are mentioned in the Directive, but only in connection with the standards of water pollution control. At least alpine EU-States have the possibility to point out special alpine problems within the scope of their reporting duties according to the Directive (see Art. 15).

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20 Details about cable cars in Swiss glacier regions, Bütler, pp. 354-367; case «Hockenhorn»: pp. 400-410.

21 Hasslacher, pp. 7-14; see also Bütler, pp. 379-381.

22 Short summary about the Directive in: Sands, pp. 769-771.

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The European Commission has made a draft for a new Flood Directive which is based on the Directive on Water Policy and responds to the rising flood risk to people, property and environment with a cross-border approach. The Flood Directive would oblige the EU Countries to make flood risk management plans and to establish flood risk maps. In the draft mountainous flash floods which are especially destructive when combined with land- or mudslides are mentioned. But other alpine hazards like snow and ice avalanches or rock-fall due to melting permafrost are not included in the drafted Flood Directive<sup>23</sup>.

### Alpine Convention and its Protocols

The Alpine Convention, agreed in the year 1991, «was the first international legal instrument to address the environmental issues of mountain regions.»<sup>24</sup> In the Alpine Convention and its Protocols snow, glaciers and permafrost are not mentioned either. But the Protocol «Soil Conservation» deals with development for tourist and energetic purposes, water systems and alpine hazards. It urges the parties to draw cadasters of past events and maps showing the danger zones for debris and snow avalanches as well as floods. In the Protocol «Energy» the protection of alpine river basins against destruction for the purpose of water power is regulated. The Protocol «Conservation of Nature and Countryside» aims at the protection of mountain landscapes. In its preamble it states that glaciers, lakes and rivers have outstanding importance for the Alps as a living space for a diversified fauna and flora. Art. 14 paragraph 2 of the Protocol «Tourism» gives the parties the possibility to permit the artificial production of snow during local cold periods, especially to secure exposed zones, if the hydrological, climatic and ecological conditions allow it.

To a certain degree the aims of the above mentioned Protocols overlap with the drafted Water Protocol, but water, snow and ice are clearly not in the foreground. Because of the existential and central role of water there is an evident legitimation for a Water Protocol. Nevertheless, in my opinion the different fields could have been regulated in a shorter and more efficient way rather than in the various existing Protocols of the Alpine Convention. There is a slight tendency for overregulation.

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23 <http://ec.europa.eu/environment/water/>.

24 Sands, p. 535; for the text of the Convention and its Protocols see: <http://www.conventionalpine.org>; short overview in: Bütler, pp. 347-351.

## Glaciers in the drafted Water Protocol

On the occasion of the UNO-Year of Water in 2003 the International Commission for the Protection of the Alps (CIPRA) proposed a Water Protocol to amend the Alpine Convention<sup>25</sup>. In the preamble of the drafted Water Protocol, the role of the Alps as the «water towers» of Europe is stated as well as the concern about the effects of climate change. Art. 1 and 3 emphasize that the protocol includes water in all its physical conditions and names snow, ice, firn, glaciers and permafrost explicitly. Art. 7 obliges the parties to collect information about glaciers and to store and publish it in a common database. In the field of area planning the parties are required to show the hydrological danger zones and the erosion-endangered areas in their plans. Development has to be prohibited in zones that are put at risk by high waters and floods which can also be caused by glacier incidents. Art. 13 obliges the parties to undertake adequate measures of prevention to reduce the risks of high waters.

Art. 11 paragraph 4 is the core provision for glaciers, in the German version it says: «Die Vertragsparteien verpflichten sich, den Schutz der Gletscher zu gewährleisten und jegliche Nutzung von Gletschern zu untersagen, welche zur Beeinträchtigung der Gletscher oder zu ihrer Veränderung beiträgt. Sie erlauben keine weiteren Erschliessungen von Gletschern mit Infrastrukturen zu touristischen Zwecken.» This regulation would oblige the parties to ensure the protection of their glaciers and to avoid any use that could have a negative or changing effect on them. No new development with cable cars and other infrastructure for tourist purposes could be permitted in glaciated areas. Art. 11 is under the title «protected areas», this provision obviously is intended to provide best possible protection for all glaciers; but some points have to be discussed:

The text demands that no use of glaciers should be tolerated that could interfere with or change them. But it is clear that in already developed glacier ski-regions some interference with and change of glacier surfaces are inevitable for the proper preparation of the slopes or ice caves. The cable car companies have to fulfil security and legal obligations which need to be carefully distinguished from always remaining personal responsibility of each passenger. The companies have to protect their guests on prepared, secured and marked slopes from great or hidden alpine dangers like crevasses, snow and ice avalanches or rockfall.

The increasingly used techniques of snow farming, partial glacier covering with fleeces and artificial snow production for maintenance of ski-runs deserve particular attention.

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25 German version of the Water Protocol: [http://www.cipra.org/d/alpenkonvention/offizielle\\_texte/Protokollvorschlag\\_d\\_Wasser.pdf](http://www.cipra.org/d/alpenkonvention/offizielle_texte/Protokollvorschlag_d_Wasser.pdf); until now no official English translation of the drafted Water Protocol exists. Information about CIPRA: <http://www.cipra.org>. Arguments for the need of the drafted Water Protocol are listed in: Sohnle, pp. 1-3.

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Snow farming means that huge amounts of snow are collected, transported and spread on slopes with vehicles. In my opinion snow farming should be allowed only to a limited extent and requires a planning permission. The same goes for the booming partial glacier coverings which are quite effective in protecting selected ice zones from solar radiation and excessive melting. White covering fleeces should be allowed only on problematic spots or artificial constructions (half pipes, snow parks) on glacier ski runs with a maximal surface of 20 000 m<sup>2</sup> per skiing area.

Partial glacier covering seems to be an ecologically better alternative compared to architectural measures, snow farming or snow production, which are usually combined. But it disturbs the alpine landscape during the summer months and might – depending on the quality of the fleece – impede the free access to glaciers. Glacier coverings are just a measure in the battle against the symptoms, not against the cause; they can not stop climate change. Covering fleeces should not be allowed on entire ski runs or on glaciers which are not yet exploited for the commercial skisport or which lie in protected zones. Glacier coverings should not be accepted as an ecological measure to shield our ice fields from melting.

In my opinion, snow production on glacier surfaces should be totally prohibited. This technique disturbs precious landscapes, especially delicate are ridges and exposed summit areas. It uses too much water and energy and causes a lot of noise; additives can have problematic effects on water, fauna and flora. Furthermore, it seems to be rather absurd to use this technique on glaciers which should be the most snow-secure regions in the Alps... Art. 14 paragraph 2 of the Protocol «Tourism» of the Alpine Convention addresses legislation for snow production and asks the parties to consider hydrological, climate-related and ecological conditions when they decide if problematic spots may be covered with artificial snow<sup>26</sup>.

On one hand Art. 11 makes clear that no further tourist infrastructure on glaciers can be allowed. In my interpretation this concerns not only so far unspoilt glaciers; it also includes glaciers besides existing skiing areas. This seems to me a little bit too strict. Renovations have to be permitted for security reasons and for renewals of concessions. Small enlargements of already existing skiing areas should not be totally excluded in view of the ongoing climate warming and the economical situation of the mountain regions. But the construction of new glacier slopes should only be allowed in exceptional cases and be restricted to small area chambers which are situated above existing winter sport areas and outside of protected zones.

The economic pressure, the competition between the mountain resorts and the high, sometimes inappropriate demands for comfort of the visitors should not be underestimated

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26 Bütler, pp. 311-319 about snow farming, snow production and glacier covering.

and disregarded. Otherwise mountain regions should receive some financial compensation for strict protection of all their glacier areas. But the tendency to «flee» to higher and higher areas for winter sport purposes in times of hard competition and climate warming should clearly be restricted. It does not make sense to develop any more vanishing glaciers by building cable cars and other installations in a hectic and unreflected way. The scars would stay there for a long time - with or without glaciers.

On the other hand the text of Art. 11 does not mention new infrastructures for energetic, telecommunicative or military purposes which can also interfere heavily with landscape and soil protection. In my understanding, such installations are not ruled out clearly enough by the Water Protocol. This omission remains somewhat in disbalance with the stern attitude towards touristic infrastructures and might lead to misinterpretation. About ten years ago a new gigantic water dam called «Grimsel West» was planned in the Berner Oberland in the Swiss Alps. The filled lake would have buried the tongue of Unteraar glacier at a length of about three kilometers. Fortunately this project failed for economical reasons. Instead, a reduced enlargement project is now under way which would overflow the (protected!) forefield of the Unteraar glacier. It has to be admitted, though, that energy from water power is renewable and makes a lot of sense; in Switzerland a huge part of the glacier water is abstracted and used for energy production, so this infrastructure already exists in a great number. The biggest threat for glacier regions clearly derives from climate change and tourist development plans.

Equally, heliskiing and other air traffic, rides with snowmobiles as well as military shooting exercises are not mentioned in the Water Protocol; but those activities can be subsumed under the formula of «use with a negative effect». Air traffic and snowmobiles cause noise and air pollution; such activities seem to be unjustified in view of their considerable emissions for the benefit of very few persons only and taking into account the numerous existing cable cars. Also very problematic is the used ammunition waste on glaciers which will eventually pollute melting water and the subjacent soil with heavy metals.

Priority should be given to the complete abstention from building up new infrastructures in big unspoilt and/or already protected glacier areas; exceptions should be allowed for security measures on instable mountain paths and for the renovation of alpine huts. In existing winter sport areas renovations or small enlargements can be permitted based on founded reasons if the environmental impacts are moderate.

### *Conclusion and proposal*

The Water Protocol emphasizes the protection of glaciers in the Alps from new tourist infrastructures. In my opinion, this focus is a little too strict whereas other points such as infrastructures for energetic and military reasons and air traffic are omitted in the regulation. Therefore I propose to slightly modify Art. 11 paragraph 4 as follows:

«Die Parteien verpflichten sich, den Schutz der Gletscher zu gewährleisten und jegliche Nutzung von Gletschern zu untersagen, welche zu ihrer Beeinträchtigung oder Veränderung beiträgt. Sie erlauben keine neuen Erschliessungen von Gletschern mit Infrastrukturen für touristische, energetische, militärische oder andere Zwecke. In erschlossenen Gletschergebieten sind Erneuerungen der Anlagen, eine umweltverträgliche Bewirtschaftung sowie in begründeten Ausnahmefällen ein eingeschränkter Ausbau innerhalb der genutzten Geländekammern zuzulassen.»

Glacier protection touches many fields which are interconnected in a partly very complex way. The climate system, noise and air pollution, interferences with landscape and water systems are to be mentioned. Current protection varies a lot in the alpine countries and is not satisfactory. Therefore the Water Protocol with its high regulation standard is recommendable<sup>27</sup>. The existing EU Framework Directive on Water Policy is not sufficient for glacier protection. To close part of this gap the Directive on Water Policy could be revised or the existing Protocols of the Alpine Convention could be amended. In my opinion, the adoption and ratification of a new Water Protocol by the alpine countries would be a good way to set a clear signal for the Protection of our precious alpine water resources and glaciers.

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<sup>27</sup> See also Sohnle, pp. 1-3.

*References*

- Bütler Michael, Gletscher im Blickfeld des Rechts, Abhandlungen zum Schweizerischen Recht, Nr. 725, Stämpfli, Bern 2006; see: <http://www.bergrecht.ch>.
- Elsasser Hans/Bürki Rolf, Klimawandel und (Gletscher-) Tourismus, in: Oesterreichischer Alpenverein (editor), Bedrohte Alpengletscher, Serie Alpine Raumordnung, Nr. 27, Innsbruck 2005, pp. 16-23.
- Hasslacher Peter, Gletscherschutz – ein wichtiger Baustein der Alpenen Raumordnung, in: Oesterreichischer Alpenverein (editor), Bedrohte Alpengletscher, Serie Alpine Raumordnung, Nr. 27, Innsbruck 2005, pp. 7-15.
- ProClim (editor), Dritter Wissensstandsbericht des IPCC (TAR), Klimaänderung 2001: Zusammenfassung für politische Entscheidungsträger, Bern 2002.
- Sands Philippe, Principles of International Environmental Law, Second Edition, Cambridge 2003.
- Sohnle Jochen, Zur Notwendigkeit eines Protokolls «Wasserhaushalt» (undated and unpublished text for CIPRA).
- World Meteorological Organization, Climate – Into the 21st Century, Edited by William Burroughs, Cambridge 2003.

