NATURAL HAZARDS: INCREASING CHALLENGES FOR TOURISM DESTINATIONS

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ABSTRACT
In the last years, natural extreme events have caused substantial damage to tourism destinations in Switzerland. Apart from inundations, primarily mass movements such as falling rocks, landslides, debris flows or avalanches are of importance in the Swiss Alps. Such events have not only caused substantial direct damage to tourism infrastructures, but also indirectly led to significant decreases of tourists and therefore to considerable deficiencies in receipts. Not least as a result of an expected increase of certain extreme events in relation to climate change, public awareness of the topic has risen significantly.

The enhanced cross-linking of the economy and growing safety requirements have led to a higher vulnerability. From a tourism point of view, its strong exposure and the expansion of tourism infrastructures on the one hand and increasing activities of tourists in hazardous areas on the other hand resulted in a higher risk for accidents and damages to property. Furthermore, extreme events can occur more frequently or more intensely due to the larger energy content in a warmer atmosphere in conjunction with climate change. Altogether, the increase of the loss potential and the accumulation of certain extreme events lead to an augmented risk for tourism in the Alps.

In a three-phased analysis of tourist communes in the alpine region, it was analyzed, how natural hazards are handled and how tourism destinations have been affected by events in the past. Out of this, tourism’s vulnerability to natural hazards was deduced and the central challenges for mountain tourist communes are presented.

Almost two thirds of the polled communes have already been affected by extreme events, which redounded to tourist damage, at least once. Avalanches, and in particular the avalanche winter of 1999, were the most mentioned events followed by inundations. The main effects on tourism were closed or interrupted traffic routes as well as damages to buildings and tourism facilities. Due to the bad accessibility, tourists couldn’t arrive or even had to be evacuated, which entailed turnover losses of tourism enterprises. Apart from landscape damages, also loss of attraction and negative impacts on the image were given as consequences of the event. Despite the high media presence of most events, a vast majority (76%) of the communes is of the opinion that the event did not affect on the degree of popularity of the tourism destination.

The reaction of tourism demand is amongst others depending on the guest segment. Day-trippers usually reacted a little more strongly, but also recovered faster than overnight visitors. Domestic tourism usually decreases less dramatically and more briefly than inbound tourism. Apart from campers, who react particularly sensitively to weather events, the supplementary accommodation tends to be more resistant to disturbances. Regular guests as well remain rather faithful to their destination after the occurrence of an extreme event. Individual tourists come back sooner than group tours. Regarding tour operators, beside the time (season) of an event also the spatial proximity is an important influencing factor. Small events tend to be hardly noticed by large international organizers. However, larger events can lead to falsified pictures and stronger reactions with tour operators far away, while smaller and closer operators usually react more flexibly. Most natural hazards, which occurred in Switzerland in the past, hardly led to declines in tourism. Where effects were noted, they usually had short term character. It was shown that past events normally have fallen into oblivion rather fast, both on part of the tourists and the local authorities.
In summary, the substantial challenges for tourism destinations regarding the risk of natural events in the alpine region can be listed as follows: Climate change including more extreme events, a rising loss potential, more difficult accessibilities due to exposed traffic routes, a limited development potential in some places, the need of adaptation of tourism supply, changing needs of tourism demand as well as rising expenses for safety and increased insurance premiums. Accordingly, tourism is claimed to continuously observe possible changes and constantly adjust to new conditions considering that after all, risks and chances belong inseparably together.

1. INTRODUCTION

In the last years, natural extreme events have caused substantial damage to tourism destinations in Switzerland. Tourism - particularly in the mountain areas - has again and again been affected by natural hazards. The consequences of natural hazards and extreme events for the tourist industry in the Alps are however hardly assessable.

Natural extreme events such as the storm Lothar and the ‘winter of the avalanches’ in the year 1999 or the inundations in summer 2005 provided headlines even in international papers and left behind tracks of devastation in many tourist destinations. Not least as a result of an expected increase of certain extreme events in relation to climate change, public awareness of the topic has risen significantly.

While inundations or hail damage frequently arise in the midlands, primarily mass movements such as falling rocks, landslides, debris flows or avalanches are of importance in the alpine region. Tourism in the Alps is directly affected by natural hazards over and over again. Because of its exposure in often steep terrain, the mountain communes must well adjust to the threat of natural hazards and seize appropriate measures of precaution. The limited usable land in the Alps leads to the fact that there are hardly any opportunities of evasion for tourist use. In addition, the constant threat necessitates extensive preventive measures. Past events have not only caused substantial direct damage to tourism infrastructures, but also indirectly led to significant decreases of tourist arrivals and therefore to considerable deficiencies in tourism revenue.

Tourism plays an important role in the Swiss Alps. The five largest tourist regions (Graubunden, Bernese Oberland, Central Switzerland, Ticino and Valais) generate about 60% of the overall overnight stays in hotels. The mountain resorts provide over about 35% of the hotel beds and generate altogether approximately 40% of the overnight stays in Switzerland (BfS 2005). In addition, the majority of the supplementary accommodation, which constitutes more than half of the total overnight stays, is situated in the alpine region. In many places, tourism is the most important economic sector and chief employer. The strong economic dependence on tourism in combination with the natural conditions represents a special challenge for tourism resorts in the Alps.

The damage caused by natural hazards has risen significantly in the last years. If there will be changes in character and frequency of natural extreme events as a consequence of climate change (q.v. OcCC 2003), this could result in serious implications for tourism.

The questions about the consequences of an event for tourism, the effects on the degree of popularity of the tourism destination as well as about the long term effects are of great importance for mountain communes. Both the natural hazard management as well as the impact of natural hazards represent big challenges for tourism resorts in the Alps.
2. METHODICAL APPROACH

The character of this study is explorative to a large extent. Explorative data analyses aim to the discovery of new phenomena, supply impulses to develop new hypotheses and theories and aren’t subjected to strict methodological rules. (Uhl 1999:3) With the proceeding selected, the discovery of new phenomena during the scientific process has priority to the comparability of results.

**Fig. 1: Overview of the research process**

The theoretical concept is based on the Grounded Theory (Glaser/Strauss 1998). So beside analytical research methods like the data and literature analysis, also quantitative methods like surveys as well as qualitative-ones like interviews with experts were made use of.

By means of secondary research containing analysis of statistics, literature and articles, the theoretical background of natural hazards and tourism was compiled. The effects of past events to tourism demand were evaluated from a statistical analysis of overnight stays in affected communes. The results were supplemented by a multi-level procedure on a communal level with different deepening degrees. The subject was gradually deepened in the following steps:

1. Written survey of communes in the German-speaking Alps
2. Deepened written survey of interested communes
3. Analysis of case studies by means of qualitative interviews

Altogether 210 communes in the German-speaking Alps had been questioned. Due to the gradual concentration, a broad cover could be achieved in the first step with reaching an evaluable return of 78.6%. In the second step, interested communes were asked to answer some more detailed questions in a more comprehensive questionnaire. An evaluable return of 85.2% resulted.
Tab. 1: Response rate

<table>
<thead>
<tr>
<th></th>
<th>Number of communes</th>
<th>returned</th>
<th>in %</th>
<th>evaluable</th>
<th>in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Survey</td>
<td>210</td>
<td>172</td>
<td>81.9</td>
<td>165</td>
<td>78.6</td>
</tr>
<tr>
<td>2. Survey</td>
<td>81</td>
<td>73</td>
<td>90.1</td>
<td>69</td>
<td>85.2</td>
</tr>
</tbody>
</table>

Source: FIF survey of communes

After the evaluation of the two-stage survey of communes, deepened questions were derived, so that in the third step, some specific communes were analyzed on the basis of theme-focused interviews. The case studies as well as the examination of further examples by means of secondary research helped to specify and supplement qualitatively the results of the questionings.

3. INCREASING DAMAGE RISK

3.1 Increased risk of damage by natural hazards

The world-wide loss potential threatened by natural hazards is immense. Both the number of the large natural catastrophes as well as the damage resulting have substantially increased in the last decades. The frequency of large natural catastrophes more than doubled from 1950 to 2005. The largest damages are generated by “earthquakes/volcanic eruptions”, “storms” and “inundations”.

Fig. 2: Damage by large natural catastrophes

Also in Switzerland, damage caused by natural events has considerably increased in the last years. The rise of the loss amount is however not only to be referred to an increase of natural extreme events. Several reasons lead to an augmented damage risk. Damage risk can be regarded as a function of the “probability of occurrence” and the “extent of damage”.

\[ r (\text{risk}) = f (\text{frequency}) \times d (\text{damage}) \]
The frequency and intensity of natural hazards are only partial factors of the risk. In addition, important factors are the exposure of persons and the vulnerability of the social, economic and ecological values. The vulnerability and the level of the exposed values determine the potential extent of damage. (CIPRA 2001) Researchers bargain for a significant rise of future disaster risk. Particularly the alpine region will be confronted with increased damage caused by natural hazards.

**Fig. 3: Risk factors**

![Risk factors diagram](image)

Source: FIF 2007

The following reasons lead to the observed increase of damage world-wide:

- Damage potential: increase and spatial expansion
- Social change: Changes in readiness to assume risk and risk requirements
- Increase in natural hazards

The fact that much more events were registered in the last years and decades than at the beginning of the century is also a result of the development of measurement techniques. The observational network concentrated, technical possibilities have improved and information is spread much faster all over the world. Therefore, the often quoted increase in natural hazards is to be regarded in consideration of these aspects. The factors, which contribute significantly to changed conditions concerning the risk of natural hazards, are discussed in more detail in the following sections.

### 3.2 Damage potential

The concentration of residential areas, traffic routes and other areas of human activity, which overlaps with hazard zones in some places, can lead to substantial damage (q.v. Burby/Dalton 1994). Extreme climatic conditions in combination with the slope of the terrain provide for a rather distinctive dynamic of natural processes. Traffic routes are particularly vulnerable, but there are also residential areas in danger zones. Tourism is playing an important role in decentralized settlement.

Infrastructural as well as non-infrastructural development elements shape the Alps (Tab. 2). Further aspects like the growing mobility and the increase of day-trippers contribute to the intensified use of the alpine region.
Tab. 2: Development elements in the Alps

<table>
<thead>
<tr>
<th>Infrastructural development elements</th>
<th>Railway, roads, tunnels, bridges, trails, artificial lakes, power lines, telephone lines, reservoirs, military facilities, airports, helicopter airfields, protection devices amongst others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development elements for public mains supply</td>
<td>Cable cars, ski lifts, ski slopes, snowmaking machines, huts, fixed rope routes, hiking trails, fixed ropes etc.</td>
</tr>
<tr>
<td>Tourism development elements</td>
<td>Mountain airfields, ski routes, alpine routes, climbing routes amongst others</td>
</tr>
<tr>
<td>Non-infrastructural development elements</td>
<td></td>
</tr>
<tr>
<td>Tourism development elements</td>
<td></td>
</tr>
</tbody>
</table>

Source: SAC 2005 (unpublished)

Tourism plays an important role in the use of the scarce space in the Swiss mountains. Even if the boom of construction activity of the mountain railways abated in the 80's, there are still many projects of investments in the pipeline. In particular, the snowmaking systems have become important factors of investment in the last years. Moreover from a tourism point of view, the booming of second homes is one of the main factors in the ‘claiming’ of the Alps.

While accommodating capacities in the hotel sector and in supplementary accommodation haven’t changed a lot in the last twenty years, there was a notable increase in second homes. Today, the number of beds in second homes is estimated to exceed 1 million. In tourism cantons the share of second homes amounts to over 30%, in some communes in the Upper Engadine it achieves almost 80%.

Apart from the spatial expansion into exposed areas, also the higher sensitivity of values is important in relation to external effects. The rise of damage susceptibility of buildings and infrastructures in connection with the high degree of industrialisation augmented damage potential in many places.

Beside infrastructures and real values, also human activities contribute to the damage potential. Due to increasing leisure and tourism activities, nowadays much more people linger in the alpine region than 50 years ago. (CIPRA 2001) The higher demand for leisure and tourism activities in hazardous areas increased the risk of accidents and damage.

3.3 Social change and social requirements

Social changes have a significant influence on the perception of natural hazards and the handling of corresponding risks. On the one hand, the stronger cross-linking in many areas of life leads to a higher vulnerability and thus to new risk dispositions; on the other hand, safety requirements of the people change. While the loss potential increases in industrialized countries, individual life risks decrease and the standards of living rise. (Renn 2005) Due to the strong cross-linkings in economy, disturbances in production or in the distribution of goods as well as interruptions in communication lead to extended consequential damages after disasters. (PLANAT 2004) With the growth of technology, the requirements of the society concerning mobility, supply or communication rose. The vulnerability of the economy grew with globalization.

Also the high density of insurances plays an important role for the raise of insured damage. Paradoxically, the collective call for guaranteed national safety opposes the increasing willingness to take risks of the individual. High-risk leisure activities such as canyoning or free climbing enjoy great popularity (q.v. Perry 2003, Cater 2006).
3.4 Increase in natural hazards

Changes in the probability of occurrence of natural hazards considerably determine the risk. Changes in the dispositions as well as in the trigger elements can lead to an increase in natural hazards.

The dispositions constantly change in natural processes. But also anthropogenic interferences in land use, protection forests or riverine ecosystems can favour landslides or inundations. Therefore, steady care and maintenance of protection forests are of great importance.

Also triggering elements of natural hazards are mainly natural phenomenons. Therefore, a possible increase in natural extreme events is often brought in connection with climate change. Many authors assume that the number of extreme events such as dry periods or strong precipitation will increase in future (q.v. Breiling 1996, CIPRA 2001:98 amongst others). The sensitive alpine region is notably affected by climate change.

Fig. 4: Number of natural catastrophes between 1900 and 2004

![Graph showing number of natural catastrophes between 1900 and 2004](image)

Source: EMDAT 2007

Beside the amount of loss, also the registered events increased drastically. Fig. 4 shows the development of the number of natural catastrophes for different types of events in the last century. Even if a part of the dramatic increase is probably a result of improved and systematized data collection as well as of an increasing population, a significant rise of natural catastrophes in the last decades is obvious. The important role of the greenhouse effect is also shown by the comparatively stable development of geological events such as earthquakes or volcanic eruptions in comparison to the atmospheric events.

4. EFFECTS OF NATURAL HAZARDS ON TOURISM

Tourism has again and again been directly affected by the enormous damage caused by natural hazards. Similar to small islands, alpine tourism often is geographically isolated and small structured, which increases its susceptibility to disturbances. (Méheux/Parker 2006) Mountain regions are particularly sensitive, because they unite several climatic regions and a large destructive potential on a small area (Schädler 2000:204). Perry (2003: 1) emphasizes that tourism is often “concentrated in high energy environments such as coasts and mountains where changes in the frequency and magnitude of
extreme events could have the greatest implications for the safety and enjoyment of tourists.” He states that “it is often the high risk components of the landscape that are the most attractive from the tourist point of view.” In addition, tourists tend to be more vulnerable than locals, since they are less familiar with the local situation and less independent far from home.

In reference to the effects of natural hazards on tourism, several scopes can be differentiated (Pechlaner/Glaesser 2005:24). In addition to tourism supply, also tourism demand, competitors, public authorities or investors can be affected by natural extreme events. In the following, effects on tourism supply (infrastructure and activities) as well as indirect effects on tourism demand are of interest. Tab. 3 shows the damage potential of tourism.

**Tab. 3: Damage potential of tourism**

<table>
<thead>
<tr>
<th>Direct effects</th>
<th>Indirect effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original tourism supply</td>
<td>Derived tourism supply</td>
</tr>
<tr>
<td>General infrastructure</td>
<td>Nature</td>
</tr>
<tr>
<td>Roads, buildings, municipal infrastructure</td>
<td>Landscape, natural attractions etc.</td>
</tr>
<tr>
<td>Tourist destinations, tourism organizations, tourism enterprises, tour operators etc.</td>
<td></td>
</tr>
</tbody>
</table>

Source: FIF 2007

Usually, there are not only destructive but also constructive elements in crisis situations. For example, landscape can become more attractive after an event and therefore attract more tourists. At longer terms, tourism sometimes profits from renewed infrastructures or an increased tourism popularity. It can be differentiated both between direct and indirect as well as between negative and positive effects. Following main effects of natural hazards on tourism are conceivable (fig. 5).

**Fig. 5: Potential effects of natural hazards**

Source: FIF 2007 (following Smith 1996:21)

### 4.1 Effects on tourism supply

Natural hazards represent a threat, where persons or infrastructures are at risk. The survey of the communes shows that ‘roads and trails’ (80%:55) were affected the most, followed by residential areas
Infrastructures outside of residential areas are somewhat less often at risk (28%: 19). Where the flood risk is high, there are often residential areas affected, while avalanches represent the bigger threat for traffic routes.

As expected, tourist activities are more heavily affected (62%: 43) than infrastructures (51%: 35). That’s because many outdoor-activities need no or only little infrastructure and often take place outside of secured areas. Considering infrastructures, particularly decentralized facilities like (winter-) trails (22%: 15), transportation facilities, especially ski lifts (17%: 12), ski slopes (13%: 9) and cross country ski runs (7%: 5) are the most affected.

76% of the communes are of the opinion that the threat of natural hazards has increased in the last years. Apart from climate change, also the lack of means for the maintenance of protection forests and safety measures as well as increased space requirements were mentioned as reasons for the increasing threat.

**Fig. 6: Involvement of the communes in natural hazards**

*Has your commune already been affected by a natural (extreme) event, which (in a direct or indirect way) caused damage to tourism?*

![Pie chart showing involvement of communes in natural hazards](image)

Source: FIF survey of communes I (n=165)

Almost all polled communes have already suffered damage caused by a natural hazard at least once. Nearly two thirds of the polled communes have already been affected once (17%) or several times (48%) by hazards causing damage to tourism.

Avalanches - and in particular the avalanche winter 1999 - were mentioned the most (55), followed by floods and inundations (33). Landslides and debris flows (22) are next on the list before tempests (17) and storms (12). Most events entailed high damages to property. The main effects on tourism were closed traffic routes as well as damage to buildings and facilities, mainly hiking trails.
**Fig. 7: Effects on the tourism**

*Which effects did the event have in relation to tourism? (multiple answers possible)*

![Bar chart showing percentages of effects on tourism](chart.png)

Source: FIF survey of communes II (n=50)

Due to the bad accessibility, sometimes tourists stayed away, could not arrive or even had to be evacuated, which led to turnover losses for tourism enterprises. Apart from landscape damages, also a loss of attraction and negative effects on the image were occasionally mentioned as consequences of the event (fig. 7). While inundations had the most negative impacts on infrastructure, damages to traffic routes and transportation facilities were primarily caused by avalanches.

In several cases, the event occurred in the low season, which significantly reduced the effects on tourism. Some destinations, where neighbour communes were affected more seriously, could even profit from dislocation effects. There were only eight communes indicating that they had suffered from negative image effects.

The mentioned effects were usually having short term character only. The lack of day-trippers is most spectacular in the days straight after the event. Effects on overnight visitors lasted for some weeks at the most. It was shown that past events normally have fallen into oblivion rather fast, both on part of the tourists and the local authorities.

In over 76% (37) of the cases, even interregional media reported on the event. Despite the strong media presence, a vast majority of the communes is of the opinion that the event did not effect on the degree of popularity of the tourism destination.

As is shown in fig. 8, even considering the communes, which had noted an influence, there is no tendency to be recognized whether the effects are rather positive or negative. From the point of view of the communes, the assumption that past natural hazards had negative effects on the degree of popularity is clearly to be disproved.
Fig. 8: Effects on the degree of popularity of tourism destinations

How did the event affect the degree of popularity of the commune?

![Diagram showing the degree of popularity:]

- very negative; 1; 2%
- rather negative; 4; 8%
- no effects; 38; 76%
- rather positive; 6; 12%
- very positive; 1; 2%

Source: FIF survey of communes II (n=50)

4.2 Effects on tourism demand

The main indirect effects are financial damages caused by changed travel behaviour. Dislocations in time and space as well as changed tourist requirements can result. Apart from the accessibility and the operability of the infrastructure, also image effects can thereby play a role. The following three phases can be differentiated:

1. Phase: during event (e.g. closed road)
2. Phase: immediately after event (reconstruction, emergency road, limited operability)
3. Phase: long-term effects (image)

The bigger the temporal distance to the event the more difficult the allocation of the effects. The collection of effects on tourism demand is affiliated with several difficulties. The development of tourism arrivals is influenced by many factors, so that effects of natural hazards can be intensified or compensated by other factors. In addition, the statistic data situation often is insufficient.

The effects of natural hazards depend on type and course of the event as well as on the local conditions and reactions. However, direct and indirect costs show different patterns. The study showed that in cases of smaller local events, direct damage to infrastructures normally exceeded indirect effects. The deficiencies in tourism revenue however were particularly high, where the accessibility of a destination wasn’t guaranteed over a longer period as e.g. in the avalanche winter 1999.

Due to the data situation, it is hardly possible to make statements about the tourism turnover losses, but some trends concerning tourist frequencies can be pointed out. Since no statistics about day-tripping are available, the development of overnight stays after an event has been examined for a number of communes. The Austrian commune Galtür, where an avalanche killed 31 people in February 1999, registered the strongest and longest-lasting decreases. Only after three years, numbers of tourist arrivals recovered.
Fig. 9: Development of overnight stays in Galtür

Examples of past events show that tourist streams usually break down notably immediately after an event. But thereafter, tourism normally recovers quite rapidly.

While in a first phase, accessibility and operability of tourism infrastructures are decisive for the extent of decrease; long-term effects heavily depend on the tourists’ perception of the destination. Both the reporting of the media as well as the communication of the commune directly affect the image of the destination. Some tourism managers are of the opinion that strong media presence has rather positive than negative effects - if at all. However, actual image effects are hardly measurable.

Apart the financial situation, social aspects and personal preferences, the media coverage notably influences subjective perception. According to tour operators, reservation and booking business normally restarts as soon as the interest of the media diminishes.

Safety is a fundamental need for travellers, which increases with growing economic and social uncertainties. With the rapidly growing tourism supply and the trend of short term booking, the flexibility of tourism demand rose. Therefore, in case of doubt, tourists switch to another destination for holidays.

The reaction of tourism demand to natural hazards samples out differently depending on guest segments. Following parameters can play a role regarding the extent and the long-term character of the effects:

- Day-trippers, overnight visitors
  Day tourism usually reacted more strongly, but as well recovered relatively rapidly; overnight visitors tend to react retardedly.

- Origin of tourists (residents, foreigners, „affected countries“)
  The decrease of domestic tourism turns out less significant and shorter than the absence of foreigners. The reaction of guests from distant foreign countries tends to be stronger and more undifferentiated. After catastrophic events (e.g. Tsunami 2004), the countries of origin of the victims overreact in comparison to others.
- Types of accommodation (camping, supplementary accommodation)

Apart from camping sites, which react particularly sensitively to weather events, the supplementary accommodation tends to be more resistant to disturbances.

- Travel behaviour (regular guests, risk-takers)

Regular guests are more resistant to negative medium reports and normally abide by their destinations also after the occurrence of a natural hazard. Also adventure tourists get less discouraged by medium reports.

- Types of tourism (high price segment, package tours)

The tourism development after the Tsunami showed that guests of the higher price segment came back faster, whereas this must be seen also in connection with the faster reconstruction of the luxury hotels compared to low-budget places. Individual tourists returned faster than group tours.

- Tour operators (size, nearness to event)

Regarding the tour operators, beside the time (season) of an event, also the spatial proximity is an important factor of influence. Small events tend to be hardly noticed by international operators. However, large natural hazards often lead to falsified pictures and to stronger reactions of big international tour operators, while smaller-ones closer to the scene usually react more flexibly.

In relation to possible courses of tourist arrivals after natural disasters, several ideal types can be characterized. Different scenarios – from a complete collapse of tourist arrivals up to positive effects - are conceivable.

Most natural hazards happening in Switzerland in the past hardly led to tourism declines. Where effects were noted, they usually had short term character only. Most events, where decreases in tourism were registered, showed a relatively fast recovery after a short and heavy break-down. Only in some few cases, when bigger areas were affected, the regeneration phase lasted somewhat longer.

5. VULNERABILITY OF TOURISM

As mentioned before, the risk of natural hazards is composed out of the ‘probability of occurrence’ and the ‘potential extent of damage’. If the potential regarding adjustment and reaction is added, the vulnerability of a commune or a destination results. The vulnerability in relation to natural hazards can therefore be determined out of the ‘event factors’, the ‘damage potential’ and the ‘reaction potential’. On the basis of these factors, the tourism’s vulnerability and its possibilities to minimize negative impacts of natural hazards can be pointed out.
5.1 Event factors

The different types of events are not only differently perceived and evaluated, but also have unlike effects on tourism. Natural hazards in the alpine region are primarily of relevance on a local and regional level and therefore have a smaller global impact in comparison to diseases (like SARS) or terrorist attacks. Since natural hazards in the Alps mostly don’t affect human lives and don’t occur as frequent and regularly as for example hurricanes in the Caribbean, the alpine region isn’t considered to be a dangerous area in a world-wide perspective.

The damage caused by a natural hazard, is determined considerably by the type and the extent of the event. Apart from the time (season) and the duration of the event, also the speed and the spatial expansion play an important role. Furthermore, the predictability and the possibilities of reaction depend on the type of event.

The size and expansion of a natural hazard plays an important role for the reporting of the media and the image effects. Spacious events affect more industries, lead to a higher medium presence and make greater demands on the co-ordination of the measures.

The duration of an event or of a dangerous situation is of relevance in particular, when tourists can’t arrive due to closed traffic roads. Small and short events like e.g. a rock fall usually hardly affect the overnight stays, but can have significant impacts on day tourism. Enduring events have a longer presence in the media, which can have impacts on the perception of tourism demand.

Primarily, the following event factors are of importance for the extent of damage:

- Type of event
- Extent, dimension, volume of event
- Time (season)
- Duration
- Speed
- Spatial expansion
5.2 Damage potential

A relevant component of potential damage is the loss potential, which enormously increased in the last years. Apart from natural conditions, the economic structure as well as tourism supply and land use plays a substantial role.

The great importance of tourism for many mountain resorts and the rather small diversification of the economy make tourism particularly susceptible on disturbances.

Tourism supply consists of a service chain, into which several providers are involved; this is another factor increasing susceptibility. As well is the high requirement of tourists on mobility, which leads to a higher risk.

The exposition of persons and/or values determines the extent of damage. Tourism is often seeking for attractive areas, which are often exposed to increased risks. The high density of infrastructures in alpine tourism areas contributes to the large loss potential. From a tourism point of view, decentralized facilities such as vacation homes, huts, traffic routes, hiking trails, cross-country ski-tracks or climbing routes are particularly at risk. Many tourist activities take place faraway from the village and in sometimes hazardous areas.

The absence of tourists after an event depends heavily on to which extent tourism infrastructure had been affected. If tourism supply is impaired and standard benefits cannot longer be guaranteed, the destination loses attractiveness. In particular, the shutdown of tourism transportation facilities can lead to considerable deficiency in receipts.

Important factors, which affect possible damage, are:
- Exposition, natural conditions
- Economic importance of tourism
- Diversification of the economy, linkages
- Spatial concentration
- Multiplicity of the service providers (service chain)
- High mobility
- Density of infrastructures
- Locations at risk
- Decentralized facilities
- Tourist activities in areas at risk
- Structure of tourism demand (foreigners, regular guests etc.)

5.3 Reaction potential

The ability to react efficiently to natural hazards can substantially limit the vulnerability of a commune or an enterprise and minimize negative impacts. In this regard, crisis management (in particular communication management) is of particular importance.

An efficient crisis management can be a substantial factor to quickly restore damage and turn back to the normal course of life after an event. The handling of the crisis situation plays a crucial role for possible long-term effects. As far as the reconstruction is concerned, the insurance situation as well as external support can be decisive for the height of consequential damages.
Even if risk management is primarily an affair of the public authorities, also tourism enterprises must prepare for possible risks. A comprehensive tourism crisis management plan requires close cooperation with public authorities and includes not only the pre-phase and the acute phase of an event but also the accomplishment of the crisis.

The reaction potential depends on the following factors amongst others:
- Experience and preparation of the enterprise/destination
- Organization and structure of the natural hazard management
- Implemented measures (organizational, technical etc.)
- Existence of danger maps
- Existence and topicality of a disaster plan
- Insurances
- Co-operation with authorities
- Degree of sensitization of the population
- Existence and condition of protection forests
- Event analyses; adaptability and learning aptitude of the responsible persons

Apart from the supply-side aspects, the perception of the guests is a substantial component for the reaction of tourism demand. The spatial, but also the temporal and emotional proximity play an important role. The communication of the communes as well as the reporting of the media has a crucial impact on how an event and its consequences are noticed by tourism demand. While consequences of technical risks tend to be rather overrated, natural risks are often underestimated. Moreover, past events fall into oblivion relatively fast. (Renn 2005)

6. CONCLUSION - NEW CHALLENGES

In summary, regarding the effects of natural hazards on tourism, the following factors can be emphasized:
- Event factors: Extent, dimension and duration of the event
- Loss potential: Vulnerability, exposure of tourism infrastructure and tourism areas
- Reaction potential: Natural hazard management of the commune or enterprise
- Structure of tourism demand: Perception and behaviour of tourists.

Vulnerability of tourism determines the extent of direct and indirect effects from natural disasters, which can have both negative as well as positive character.
While the general threat posed by natural hazards can be the decisive factor in a world-wide comparison, there are probably no alpine destinations generally avoided because of the risk. Even if damages to property have been well insured so far and negative image effects have kept themselves within a limit, the risk of financial and image losses grows with an increase in natural hazards. Several changes lead to an increased damage risk and to new challenges for tourism in the alpine region.

Source: FIF 2007
The substantial challenges for tourism in the Alps regarding the risk of natural hazards, the effects of extreme events and the natural hazard management, are as follows:

Increasing risk
- Climate change: Climate change plays an important role for the increasing risk of certain natural hazards. The influence of climate change must be considered in the analysis of the risk situation. Mitigation as well as adaptation strategies must be developed and implemented.
- Decreased protective function of forests: Many alpine forests are in bad condition and impaired in their protective function. The care and maintenance of protection forests are of great importance in regard to the prevention of natural hazards.
- Increasing damage potential: From a tourism point of view, the tourist site developments, investments in decentralized facilities as well as the enormous land use by second homes contribute to the accumulation of value in partly hazardous areas.

Effects on tourism
- Exposed traffic routes: The accessibility of the destinations is central for tourism. The securing of traffic routes is a difficult and complex venture.
- Limited development potential: With an increase of hazardous areas and an accordingly consistent implementation of land use planning, the tourism development potential of a commune can be limited.
- Expenses for safety and adaptation: The tourism service providers will have to innovatively align their supply to the changed conditions and inform the guests better about possible risks.
- Changes in guest behaviour: Information demand as well as safety requirements of tourists could increase, while at the same time, the willingness to take risks rises.

Natural hazard management
- Expenses for safety and insurance: The increasing risk requires investments into safety and thus augments the financial pressure to the communes.
- Integral risk management: To optimally combine the different types of measures represent big challenges for the communes and for tourism.

In view of these challenges, alpine tourism is demanded to well observe possible changes and constantly adjust to the new conditions – considering that risks and chances belong inseparably together.

REFERENCES


