

THE RISKS OF GLOBAL WARMING TO THE AUSTRIAN WINTER TOURISM INDUSTRY

PH. G. BERKESY

REZUMAT. – **Riscul încălzirii globale asupra industriei turismului de iarnă în Austria.** Evoluția climei în ultima perioadă și în special încălzirea globală influențează în mod negativ o serie de activități printre care o influență vitală o are asupra turismului de iarnă din Austria. Lucrarea de față prezintă riscurile din industria de turism de iarnă din Austria legate de schimbările climatice ce vor avea loc în următorii ani. Conform datelor prognozate, în zonele montane, modificările climatice duc la căderea de: cantități mici de zăpadă, la topirea parțială a ghețarilor și erodarea solurilor. Aceasta va determina reducerea perioadei în care sunt create condiții de desfășurare a sporturilor de iarnă în zonele montane mai joase, necesitatea găsirii de soluții tehnice pentru a asigura condiții artificiale pentru desfășurarea activității de turism în aceste zone și de prelungire a perioadei cu condiții optime în zonele mai înalte. În final vor fi prezentate unele soluții tehnice și practice de menținere a industriei de turism la nivelul celui existent și de dezvoltarea acestuia, în funcție de zona turistică.

1. Introduction

The recent development of the climate and with it the constant growth of global warming, different industries will be more and more affected. Looking at Austria, the weather and climate are vital for the Austrian winter tourism. The winter sport regions are fully dependent on sufficient snow at the right time of the year as well as on attractive weather conditions. The certainty of snow is among the most important factors for winter tourism and almost all related sports incl. skiing, snowboard and cross country skiing. There have to be good weather- and snow conditions especially during the important peak times of the winter tourism season (X-mas, New Year, winter holidays). The Austrian winter tourism is very strong oriented towards the ski sports and its industry.

In February 2001 the third report of the IPCC, a working group of the international committee on climate change was completed. The experts predict a global warming (between 1,4°C and 5,8°C) and a rising of the sea level. There are also results of Austrian GCM-scenarios which show a increase of temperature of about 2°C to 3,5°C until the year 2035, assuming a global warming of 1°C to 2°C. Also recent studies of the OECD show, that especially the Alp region is affected almost 3 times harder by the climatic changes then the world wide average. The

years 1994, 2000, 2003 and 2004 were the warmest ever recorded winters in the last 500 years. Especially the sinking of the snow surface level will harm regions, which are in a lower altitude level.

These changes will have consequences on the ecology. Flora and fauna experience a change in biodiversity. There will be positive and negative aspects of these changes and we can expect a reduction in the biological variety. Further ecological consequences due to climate change are the increase of risks in that regions predicting extreme flooding, increased probability of mudflow like mudslides, landslides or glacier flooding and the melting of most glaciers. But also tourism particularly winter tourism in Austria will be affected by the climatic changes. Official bodies, winter sport related businesses, etc are starting to look at this problem in more detail and develop plans and strategies to minimise the risk factors on the ecological as well as on the economical side.

2. The economical factor winter tourism for Austria

All Austrian winter sport regions will be all affected of the global climatic changes, some earlier, some later. Austria and its economy in relation to the winter tourism is a mayor income source, with a strong link. Almost 4% of the overall GDP in Austria are coming from winter tourism.

According the chamber of commerce, the income of more than 91.500 businesses is related to the Austrian tourism industry, where most of them are also directly involved within the winter industry. Some regions are even exclusively depending on the winter tourism. Skiing and snow based tourism almost entirely coincides with winter tourism if we disregard glacier ski resorts that may run even in summer. As a result, winter tourism contributed 59.2 million guest nights and more than 6.9 billion € of income or 116 € per unit in the season 2004/05.

Looking at the population demographics, it shows, that almost 6 % of the Austrians are living in regions which are above 800 m and so within the winter tourism attractive regions for skiing. Particularly in winter, these areas have a climatic advantage as they are better off than warmer regions in lower areas with snow conditions for the practice of winter sports. Most traditional and prestigious resorts belong to this area, including Sölden, St. Anton, Lech, Obertauern, Saalbach Hinterglemm or Ischgl.

The listed top resorts are all internationally known and tourism, its employees, etc are oriented internationally. The growth of these regions beginning in the 1950th was depending beside a constant increase of facilities, mainly on the certainty of snow.

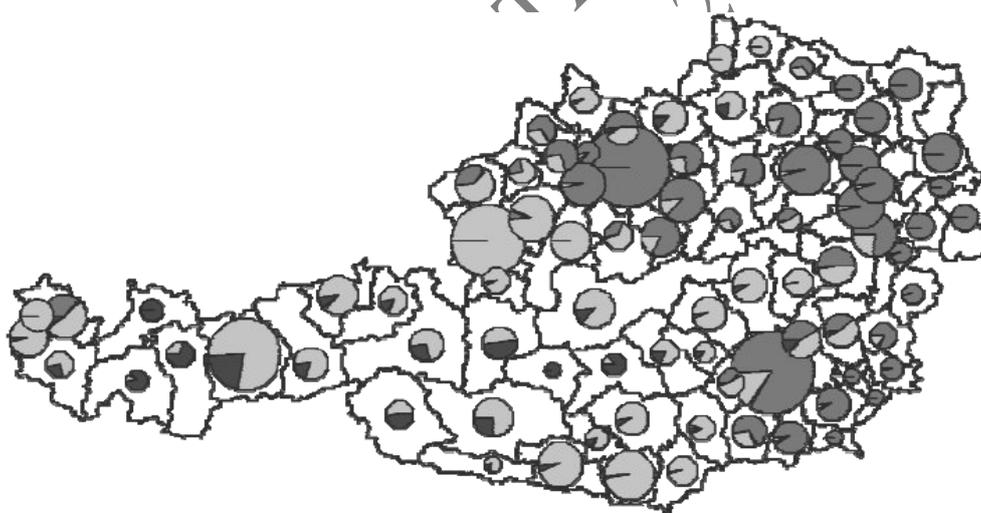
Table 1. Overnights during the winter season 2006/2007

	Overnight stays	Nationals	Foreigners	in total
1	Vienna	861.189	3.048.571	3.909.760
2	Sölden	65.103	1.662.953	1.728.056
3	Saalbach-Hinterglemm	250.137	1.142.098	1.392.235
4	Ischgl	84.573	1.110.747	1.195.320
5	Sankt Anton am Arlberg	83.681	828.535	912.216
6	Obertauern	225.425	666.692	892.117
7	Salzburg	245.196	622.550	867.746
8	Lech	130.274	702.556	832.830
9	Mayrhofen	39.308	788.023	827.331
10	Neustift im Stubaital	17.232	746.978	764.210

Source: Statistik Austria

As the altitude is playing the mayor role for snow certainty, further in figure 1 are indicated the Austrian districts in relation to their altitude with grey-black circles.

The size of each circle indicates the number of inhabitants based on the detailed data provided in Table 2 from ÖSTAT. The grey intensity indicates the share in each altitude range described above.



Dark grey: low altitudes Light grey: Altitude from 400m to 800m
Black: Altitude over 800m

Fig. 1. Map of Austrian districts, size of population, and shares in altitude classes
 (Source: Breiling eg., 1997)

Table 2. Rural Tourism according to population in altitude Zones of Austria

<u>Altitude in meters</u>	<u>Inhabitants</u>	<u>Area in km²</u>	<u>% of Austrian population</u>	<u>% of Austrian land area</u>	<u>Rural tourism</u>
117 – 400	4,366,101	21000	56	25	Some places
401 – 800	2,959,769	25200	38	30	Most places
801 – 1780	469,916	37800	6	45	Most profitable

(Source: ÖSTAT Austrian Census 1991, cited in Breiling et eg 1997,p.11)

In relation to the overnight stays of foreign guests, these figures are used as an indicator for the intensity of tourism. Out of 114 million guest nights in 2000, some 100 million are rural overnight stays. Winter tourism is associated with downhill skiing, cross country skiing, skating, and sledging and these activities are major attractions, helping to generate substantial income during winter time for the depending regions. So if climate conditions are suitable, this kind of tourism has probably the highest growth potential and that's why it developed to such an important fact in the overall economy of Austria. Some 50 million guest nights of Austrian rural tourism are due to winter tourism during November and April (nowadays the same as guest nights in summer that cover the period May to October). Also one winter guest night gives higher earnings than a summer guest night.

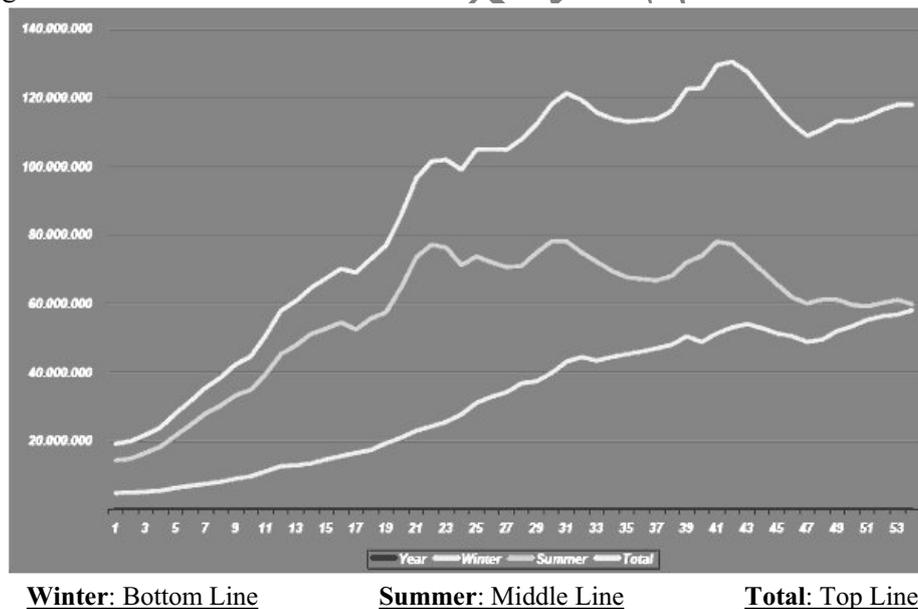


Fig. 2. Development of Austrian Tourism according to summer and winter 1951 to 2004
(Source: Tourism in Austria, 2005)

Looking at figure 2, it explains the growth of tourism according to summer and winter tourism from 1951 up to 2004. The peak of Austrian tourism was reached in early 90s with 130 million guest nights and has been gradually decreasing to 114 million presently. Summer tourism has been decreasing since the 90s and winter tourism has slightly increased during the same 54 year period. As result of these trends summer and winter tourist nights are now approximately the same.

3. Risks and hazards for winter tourism

Mountain regions are venerable areas for climatic changes resulting in little snow, declining glaciers and a strong floor erosion. These facts are not only affecting the surface, water resources, wild life and flora, but also the mountain tourism of a region. (e.g. Bürki, 2003).

At present, there are in total 666 ski resorts in the Alp region including Austria, France, Germany, Italy and Switzerland. Of these 666, only 609 (meaning 91%) ski resorts are having good snow conditions. Depending on the rising level of temperature, with only an increase by 1° Celsius there would only be considered 500 areas as snow secures, with an increase of 2° Celsius only 404 regions and with an increase of 4° Celsius only 202 regions. (e.g. OECD, 2007)

The altitude of skiing resorts is one of the crucial factors on the struggle of survival within the winter sport industry. Especial skiing resorts at a low level are sensitive for any changes in relation to the temperature in winter and snowfall. Already experiences in the past, like the winter season 1988/89 have shown the possible dramatic results of a winter with not sufficient snow. Heavy declines in tourist figures have lead to a massive financial shortfall in the tourism industry in the Alp region.

Especially the small not so potential villages have very often financial problems, to develop and invest in the needed infrastructure (e.g. Snow canons, development of higher skiing slopes, etc) for a long term benefit and in avoiding and preventing the high risk level to happen with a full impact. Also it is very difficult to raise the needed money, if the region has not the needed funds themselves, as banks are in the meantime aware of the high risk of skiing areas which are below the 1.500 m sea level, which to experts is the magic altitude for secure snow conditions. (e.g. Elsasser & Bürki, 2002).

Looking at the consequences of this warming, you can predict the following risks and hazards:

- Less snow will be available; within the Alps only 61% of the present ski areas would have natural snow. (e.g. Abegg, 2006).
- Tourism season in winter would decline, especially in lower altitude regions.
- Heat waves could increase in the Alps by 30% (e.g. Beniston, 2005)
- Skin cancer risks could increase (e.g. König, 1998).

- Natural disasters (flooding, probability of mudflow, etc) would occur
- Dependency on the winter tourism would be even bigger then before
- Financial shortfall due to the lack of tourists
- Unemployment as a result of a declining demand

Breiling & Charamza (1997) have split their research in two different areas which are climate and winter tourism. The winter tourism for them is defined and consisting of inhabitants and employment, overnight stays and infrastructure. Within these facts there are as well the biggest risks and hazards for the industry. "A good winter for the Ski sport is given, when within a timeframe from the 1st of December until the 15th of April on at least on 100 days a snow level of at least 30-50 cm is present. A bad winter is given, when on less the 40 days enough snow is present. A rainy day or too much snowfall during the day is classified as a bad skiing day (Abegg, 1996).

Taking this into account, studies of the Austrian Tourism Board have shown, that among the main motivation for winter tourists in Austria are the attractive ski resorts (stated by 54%) and snow certainty (stated by 37%)

The development to a destination for winter tourism lead as well to a dependency of most of the villages. The word "tourist mono structure" describes the circumstances of this development clearly. Studies which have been looking into chances of alternatives to this dependency came to the result, that there are some development possibilities to the present situation, but are they are said to be very small.

4. Strategies and solutions

The consequences on the winter sport industry and in particular the ski resorts especially affected by the climate change lead at present to the most important strategies to avoid or minimize a negative development of the winter tourism by extensions of snowmaking facilities, the improvement of the slopes and the joint venture of the ski resorts on a national but also on a Europe wide level. Offering a wider variety of program and activities, including Indoor Sport, could be a beneficial action for the future. (e.g. Smith, 1990).

Needed measure adoption must be put into practice. So for the skiing resorts, it will be the adaptive capacity (not climate) that will determine the future of alpine (winter) tourism, not only in Austria, but in all the skiing regions of the Alps.(e.g. Abegg, 2006).The most important measure adoptions for winter resorts suffering from a lack of snow are(Abegg, 1996; Behringer and e.g., 2000, Bürki, 2000, König, 1998, Schneider and e.g., 2005):

- Concentrate skiing tourism only to the high regions with applicable ski resorts in the west of the country

- Technical solutions like artificial snow shall be used, which is effective but very cost intensive, ineffective at higher temperatures as well as not good looking in the overall landscape.
- Modern solutions for the preparation of the slopes
- Protection of the melting of glaciers with special synthetic awnings
- Improvement of infrastructure by replacing T-bars through chairlifts
- Diversity of program, being independent from skiing (like ice skating, bob sliding, wellness, Golf, Squash, Tennis, etc)
- A more flexible price policy f.e. according the number of operating lifts, etc.
- Increase of social and cultural program in the resorts with festivals, concerts, exhibitions, games, club life, shopping or intense night life.
- Adopted insurances for the regions in combination with weather derivatives

Insurances can only minimize the loss of some mild winters, but are no protection against a constant development of general warm winters as predicted. If here cant be found a way to facilitate the minimization of risk by the involvement of companies, organizations or even governmental institutions, in the long run there will be a big group of “losers” within the winter tourism of the climatic changes in Austria, having also a mayor impact on the distributive justice of income.

Conclusion

Even if it wont come to a climatic change, the resent years have shown, that the sensitiveness of the climate has grown as well as the variety of the climate.

Global changes, particularly global warming, could have serious consequences for winter tourism. Most of winter resorts have adapted or are planning to adapt to global warming by establishing different strategies and actions. This could be problematic for two reasons: first, the costs of the adaptations are in most of the case too high in relation to the possible income, so tourist companies incl. skiing lift operators, hotels, etc encounter serious trouble as they pay back loans with inadequate income; second, the pace and magnitude of global warming are not known and adaptations made today might be inadequate tomorrow (Breiling, Charamza 1999).

Most of the resorts are exclusive winter tourist resorts and dependent on international tourists and are more sensitive to the climate even if they are higher up and have better conditions for skiing and winter sports. The investments into climate adaptation can be beneficial for the economy of larger regions. Winter resorts and regions must take immediate action and not wait until the right time for these changes has passed.

REFERENCES

1. Abegg, B. (1996), *Klimaänderung und Tourismus. Klimafolgenforschung am Beispiel des Wintertourismus in den Schweizer Alpen*, Schlussbericht NFP 31.
2. Abegg, B. (2006), *Climate change and winter tourism*, OECD Report on Adaptation <http://www.oecd.org/dataoecd/58/4/37776193.pdf>
3. Agrawala, S. (2007), OECD – Klimawandel in den Alpen
4. Behringer et al. (2000), *Participatory integrated assessment of adaptation to climate change in Alpine tourism and mountain agriculture*, Integrated Assessment 1, 331-338.
5. Beniston, M. (2005), *Warm winter spells in the Swiss Alps: Strong heat waves in a cold season? A study focusing on climate observations at the Saentis high mountain site*, Geophys. Res. Lett. 32.
6. Berritella e.g. (2004), *A general equilibrium analysis of climate change impacts on tourism*, EEE Working papers series 17.
7. Braun e.g. (1999), *Potential impact of climate change effects on preferences for tourism destinations. A psychological pilot study*, Climate Research 11, 247-254.
8. Breiling, M. & Charamza, P. (1997), *Klimasensibilität Österreichischer Bezirke mit besonderer Berücksichtigung des Wintertourismus*, Report 97:1. Austria: Institute for Landscape Planning.
9. Breiling, M. & Charamza, P. (1999), *The impact of global warming on winter tourism and skiing: a regionalised model for Austrian snow conditions*, Regional Environmental Change, 1 (1): 4-14.
10. Bürki, R. (2000), *Klimaänderung und Anpassungsprozesse im Wintertourismus* EEA Report No 2/2004 "Impacts of Europe's changing climate" http://reports.eea.europa.eu/climate_report_2_2004/en
11. EEA Technical report No 7/2005 „*Vulnerability and adaptation to climate change In Europe*”. http://reports.eea.europa.eu/technical_report_2005_1207_144937/en
12. Elsasser, H. & Bürki, R. (2002), *Climate change as a threat to tourism in the Alps*, Climate Research 20, 253-257.
13. König, U. (1998), *Tourism in a warmer World*, Implications of Climate Change due to Enhanced Greenhouse Effect for the Ski Industry in the Austrian Alps.
14. Österreich Werbung (2007), *Research & Development, Winterurlauber 06/07* Available online, <http://www.austriatourism.com>
15. Peck S. (2006), *"The Development of winter sports infrastructure in Austria during 1995 to 2005"*, M.Sc. thesis in regional planning. TU Wien. In German: Die Entwicklung der Wintersportsinfrastruktur in Österreich von 1995 bis 2005
16. Schneider et al. (2005), *Schneesport ohne Schnee? Mittelgebirge (mitten) im Klimawandel*, In: Praxis Geographie 5/2005.
17. Smith, K. (1990), *Tourism and climate change*, Land Use Policy 7(2), 176-180.
18. Statistik Austria (2005), *Tourismus in Österreich 2004*, pp 18. Available online, <http://www.stat.at/neuerscheinungen/tourismus2004.shtml> CIA