

## Climate change and adaptation strategies for winter tourism

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The major impacts of the global warming over the last century:

The global surface temperature has increased between 1.1 and 1.6°F, Ice is melting especially the earth's pole and mountain glaciers, many species have been impacted, the sea water has risen by 3°F and finally there has been a shift of precipitation pattern and a rise of sea level.

The effects that could take place in the near future:

A rise of sea level between 18-59 cm by the end of this century predicted by scientists, some natural disasters are likely to become more common, health of people (especially elderly) by the fact of heat waves and the Arctic ocean which is expected to become essentially ice-free.

Consequences on ski industry:

Less snow, glaciers are melting (detrimental for skiing in summer), more extreme conditions due to a dysregulation of the earth and the fact of permafrost (risk of landslides).

Adaptation strategies have to be taken into account in order to maintain winter tourism and make the ski industry survive. A few ideas are presented according to the following mind-map. Although this model was established a few years ago (2003), most of the points mentioned are still relevant nowadays. It has become clear that it is our role to develop strategies that are sustainable for the future and focused on the environment as the main reason of these climate changes are caused by us humans. These changes can be seen positively as it represents a new challenge for winter tourism.

If we take into consideration the strategy of artificial snow-making, the main way for the ski industry to survive. However, this artificial resource is limited not only because of the quantity of water which needs to be provided, but also because the process in itself needs certain temperature and meteorological conditions (wet bulb humidity, temperature and wind). This strategy remains important as it is still to make snow in ambient air or just above the freezing temperature of water.

Development of higher terrains means obviously that as the temperature continues to rise in the future, we have to go higher to find fresher temperatures. Thus, the small resorts of low altitude are threatened and have to develop their all-year round tourism supply by diversifying tourism products (snowshoeing, pedestrian ways, thermal baths, spa) and being less dependent on snow.

Cooperation is also a really important topic. In order to survive, it is important to flesh out those means at different scales: the different actors within the resorts such as hotels, restaurants, activities suppliers and infrastructure, to a larger scale: resorts cooperating on different aspects to reduce the bad impacts of competitiveness.

Hotels can for example provide packages with the tourism activity providers, others offers can be elaborated in order to benefit different tourism actors (even the smaller ones) by offering packages. The alliance of different ski areas by providing special packs and other kinds of tickets is also a good way to enhance co-operations, an example of this would be the Magic Pass.

In order to put in place all of these measures in place, it is important to receive funds. Some resorts may have the chance to receive funds from private investors, but most of them are supported by the federal state.

Other interesting means taken by the ski resorts to achieve sustainability such as public transports (Jura Pass, etc). Finally, it is important to raise awareness of users of the ski resorts, by taking measures to show them that the mountain is scarce and that it is important to have respect towards it. Skiers have to be aware that the actual ski conditions will probably not last as we tend to have less snow.

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