



**Adventure Tourism Companies & Climate Change:
Observations from the Himalaya, Amazon, and Polar
Regions Spark Adaptation Strategies for Business**

Ryan Piotrowski, Cambridge University & Xola Consulting

XOLA

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ABSTRACT

In contrast to leisure tourism, where more emphasis may be placed on man-made settings, adventure tourism's business model is thoroughly exposed to the slightest environmental changes. Adventure tour operators, with products and services that depend on healthy natural environments, have a regular and direct connection to important environmental issues such as climate change.

The broader tourism industry has mainly focused on adaptation strategies for two major travel sectors so far — coastal island and ski tourism. This paper focuses on the smaller players in remote environments. We believe that while adventure tour operators may respond to climate impacts in varying ways depending on their location of their operations, they can apply similar business practices to cope with its effects on their business.

This paper, written by Cambridge University student Ryan Piotrowski in collaboration with Xola Consulting, discusses and recommends management and business practices for sustaining adventure travel businesses in sensitive environments affected by climate change. An adventure travel company climate adaptation model is provided in the final section. The mitigation process of reducing carbon emissions is not the focus of this paper.

Under the hypothesis that adventure tour operators experience the effects of climate change sooner and to a greater degree than most other tourism businesses, a case study approach was used to examine operators in three different regions: polar, mountain and tropical forest. Three companies agreed to participate in this study:

- Snow Leopard Adventures; Uttarkhand, India
- Quark Expeditions; Arctic and Antarctic
- Amazon Tree Climbing; Manaus, Brazil

The overall trend that we observe is that climate change has not yet had a significant effect on the polar or tropical region adventure tour operators interviewed, but has affected tour operations in India's Himalaya mountain region slightly more. All of the companies interviewed are implementing operational and management focus towards climate change adaptation.

SIGNIFICANT FINDINGS:

- There is a high level of awareness by each company to consider future climate change effects and begin basing strategy for adaptation around it.
- Implementing itinerary changes, education, training and preparedness programs, and good environmental practices such as reduced emissions are adaptive strategies used by all of the tour operators.
- Documentation and study of environmental and weather conditions varied in degree, but overall none of the companies maintained a database for reference and planning purposes.

CONTENTS

Executive Summary	1
Introduction	2
Methodology	5
Polar Regions and Climate Change	10
Himalayan Climate Change	12
Amazonian Climate Change	16
Adaptation Trends	18
Frameworks and Best Practice Guidance	21
Conclusion and Forecasts for the Future	26
Bibliography	28

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Executive Summary

With their close relationship to the environment, adventure tourism companies feel and react to climate impacts to different degrees depending on location, but can follow similar business practices to cope with its effects. Common strategic, operational and marketing practices can be used to reduce business threats and take advantage of business opportunities as a result of climate change. As climate change effects become more prevalent and pronounced, companies need to proactively engage in adaptation, moving beyond a corporate responsibility mindset to the application of strategies to manage its business impacts. In reviewing the various adaptation methods currently applied, a general adaptive framework emerges for making climate change part of business and operational strategy.

Data gathered in interviews with three adventure tour companies in different environments — polar, mountain, and tropical forest — reveal ideas for specific climate adaptation techniques and strategic guidance for other adventure tour companies and the tourism industry in general. The interviewed companies' practices indicate that some adaptation methods for increased extreme weather events have always been practiced, while the long-term impacts of climate change have not significantly affected operations and strategy.

The graphic below summarizes the climate effect companies highlighted in this paper can expect to experience over time. The companies participating in this study are a polar cruise company that operates in the Arctic and Antarctic, a Himalayan-based adventure company, and a tree climbing operator in the Amazon. A brief review of climate change in the interviewed companies' specific regions is provided along with a discussion of each region's general climate conditions.

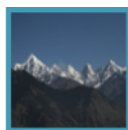
Surprisingly, we observe that climate change has not yet caused significant changes in business for the polar or tropical region tour operators interviewed, but has affected tour operations in the Himalayan mountain region of Uttarakhand, India. Regardless, all of the companies interviewed are beginning preparation to adapt through education and training, while slight itinerary changes have been a response to any existing climate impacts. Subtle differences between the companies are highlighted to provide insight towards future adaptation techniques.

Our research indicates that while adventure tour operators may not be adapting as rapidly as we expected to climate change, opportunities and threats from climate change need to be understood and managed as soon as possible. Strategy, operations and marketing highlight some initial areas for discussion around climate change adaptation. In order to adapt to climate change an Adventure Tourism Climate Change Adaptation model is recommended for the adventure travel industry based on existing models, interview findings. Adventure travel companies must proactively and dynamically engage in strategic adaptation to climate change in order to sustain their business.



POLAR

- Glacial, ice sheet and sea ice melt
- Ecosystem detrimental effects on organisms
- Negative impacts on infrastructure and indigenous way of life
- Ecosystem vulnerability to species invasion
- Increased permafrost thaw



MOUNTAIN (Himalayas)

- Glacial Melt
- Heatwaves
- Decreased water availability
- Pressures on natural resources and the environment associated with development
- Increased disease from increased flood and drought occurrence



TROPICAL FOREST (Amazon)

- Floods
- Droughts
- Gradual replacement of tropical forest by savanna
- Risk of significant biodiversity loss through species extinction
- Disease

Introduction

As tourism companies and other companies alter their business models to reduce carbon footprints and gain competitive advantage through environmental stewardship, questions arise as to the direct environmental impacts of climate change on current and future operations. Businesses seem to know climate change is an issue, yet are fragmented in their practical approaches to dealing with it.

Reports on tourism flow fluctuations and patterns based on climate change, sustainable tourism best practices, and other environmental factors such as carrying capacity of sites are being addressed and gaining popularity with scholars and publishers. However, an important question for the tourism industry is how companies will respond to climate change effects when confronted by them in the field. How will they modify their business management and operations as a result of climate change?

This paper's exploration of climate change's effects in three specific regions offers adventure tour operators some shared knowledge and information to pro-actively endure climate change. At the same time, the general tourism industry can perhaps learn from the adventure industry as well.

When this research was undertaken, we expected to find that that adventure companies are experiencing the effects of climate change sooner and to a greater degree than most other tourism businesses and therefore have valuable information to offer the tourism industry at large on how to deal with its effects.

We conducted an analysis of adventure tour operators in three different environments on how climate change is affecting their tours, how they are dealing with the effects, and their future visions, advice for other tour operators. Their insights offer some perspective and guidance for adventure travel companies to shape their path in coping with climate change.

Business Approaches to Climate Change

A brief overview of how business and the tourism industry in general are coping with climate change provides the context for the adventure tourism-specific discussion. Typically, adaptation and mitigation is linked to slowing down human contribution to climate change. Businesses are encouraged more than ever in the last five years to reduce Green House Gas (GHG) emissions. Doing so is considered responsible and a form of competitive advantage to encourage customer support, improve processes and reduce costs. Analysing GHG emissions throughout the value chain is a norm today for small and large companies competing in the global market place.

Hoffman and Woody provide a framework for climate change strategy that shows how various companies, including some active in the tourism industry, approach climate change (2007, p. 25).

Step 1: Know your carbon exposure – Assess carbon footprint and impact of the related market transition on your products and services.

Step 2: Take action to reduce your carbon footprint and assess business opportunities.

Step 3: Influence the policy development process

Within this type of framework and current business environment, little attention is given to addressing the near term physical impacts of climate change on businesses, perhaps because of debateable scientific forecasts and a lack of discussion and experience. Hoffman and Woody point out themselves, “thus far, very little attention has been given to the physical aspects of climate change. But, if you believe scientists, this is a concern and an opportunity that transcends regulatory market forces” (2007, p. 90).

Even superficial research on climate change strategy immediately demonstrates the need for businesses to gain competitive advantage by going beyond GHG emission risk and opportunity based adaptation and to focus more on the additional impacts of climate change. Porter and Reinhardt express in a *Strategic Approach to Climate* that companies need to act now and must handle the effects of climate on company operations strategically to include vulnerabilities to effects such as the availability of energy and water and the reliability of infrastructure and supply chains (2007, p. 22). Additionally, strategic thinking companies should assess risks and reduction methods and can seek competitive advantage by “creating products to exploit climate induced demand, by leading the restructuring of their industries to address climate issues more effectively, or by innovating in activities affected by climate change” (Porter and Reinhardt, 2007, p. 22). Lash and Wellington summarize climate strategy well: “Your company needs to beat competitors in two areas: reducing exposure to climate-related risks and finding business opportunities within those risks” (2007, p. 101).

Despite recent shifts in emphasis from the “need to act” (or reduce emissions) more towards “how to adapt” to the challenges associated with climate change, academic research has been lacking (Wilby et. al., 2009, p. 1193). Scientific articles focused on the impacts of climate change have far outnumbered articles on adaptation (Figure 1). Adaptation is becoming more popular as climate knowledge, data and visible effects are shared on a more local level. Business and society in general are interested in impacts and have sought forecasts for future planning. Focus on physical environments and ecosystems drastically changing pose concerns from water supply, health, and poverty to natural disasters and regional conflict. Business and society need to move beyond embracing climate change as a corporate social responsibility issue and wrestle it as a strategic issue (Porter and Reinhardt, 2007, p.22).

The tourism industry, along with the agriculture industry, are most likely to be affected and especially interested in the positive or negative effects of climate change on weather and natural environments by location (Holden, 2008, p. 215). For the tourism industry, climate change is a great concern for existing and future destinations and products. According to Gunn, tourism involves a diversity of “products” that are far more “perishable” than manufactured products and new development is more complex (2002, p. 10).

In addition to understanding effects of climate change on the environment, the tourism industry is beginning to examine climate adaptation strategies more closely. The Davos Declaration established between the UN World Tourism Organization (UNWTO), United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), with the support of the World Economic Forum (WEF) and the Swiss Government on 3 October 2007 in Switzerland offers recommendations for tourism stakeholders, including tour operators. The concept of adaptation is stressed at the same time as mitigation in the declaration’s recommendations for the tourism industry (shown in bold in Caption 1).

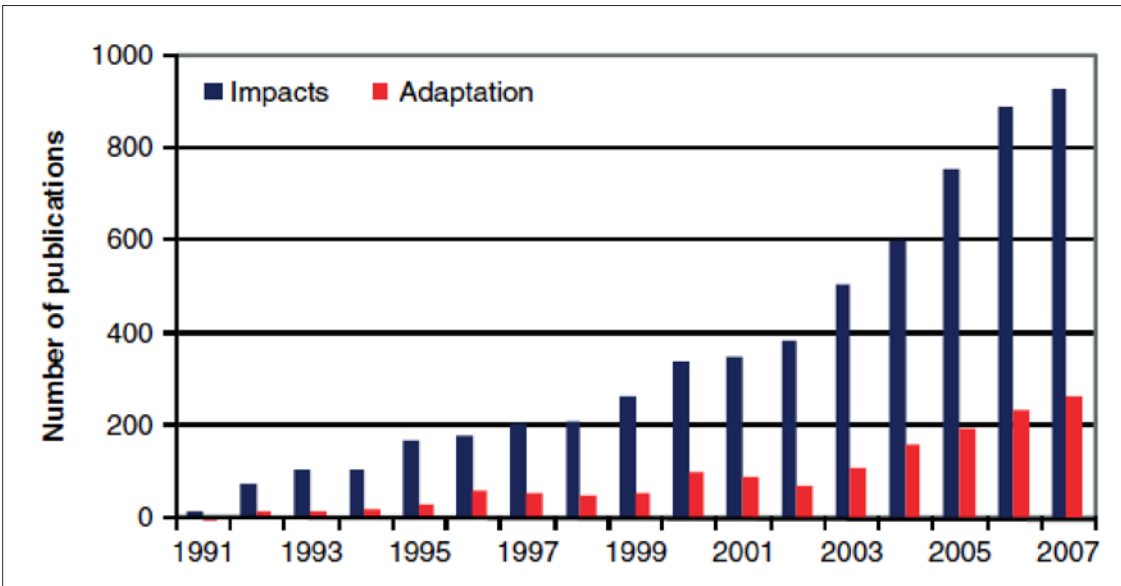


Figure1: Annual number of climate change science publications with the words ‘impact’ or ‘adaptation’ in either the title or abstract. (Web of Science (accessed 8 December 2007) in (Wilby, et al. 2009, p. 1194))

2) Tourism Industry and Destinations

- **Take leadership in implementing concrete measures (such as incentives) in order to mitigate climate change throughout the tourism value chain and to reduce risk to travelers, operators and infrastructure due to dynamic climate variability and shift. Establish targets and indicators to monitor progress.**
- Promote and undertake investments in energy-efficiency tourism programmes and use of renewable energy resources, with the aim of reducing the carbon footprint of the entire tourism sector.
- **Integrate tourism in the formulation and implementation of regional, national and local level adaptation and mitigation strategies and implementation plans. The Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change, coordinated by UNFCCC, represents an important opportunity for the tourism sector to enhance knowledge, increase capacities and stimulate action.**
- **Strive to conserve biodiversity, natural ecosystems and landscapes in ways which strengthen resilience to climate change and ensure a long-term sustainable use of the environmental resource base of tourism**
- **Seek to achieve increasingly carbon free environments by diminishing pollution through design, operations and market responsive mechanisms.**
- **Implement climate-focused product diversification, to reposition destinations and support systems, as well as to foster all-season supply and demand.**
- **Raise awareness among customers and staff on climate change impacts and engage them in response processes.**

Caption 1: Climate Change Recommendations for Tourism Industry and Destinations adapted from the Davos Declaration (Second International Conference on Climate Change and Tourism, 2007)

Adapting to climate will be vital for tourism as the future travel and tourism economy is expected to average four percent real GDP growth over the next ten years despite recent economic recession (WTTC, 2009). However, with future climate change impacts, traveller choice of destinations and expenditure will most likely shift based on climate. One example of this consideration is Deutsche Bank Research's recent "How Climate Change Influences Tourism" model to determine changes in tourist flows by region (Ehmer and Heymann, 2008). Such research not only indicates that all companies need to adapt, but that tour operators located in negatively affected regions have an especially strong imperative to develop adaptation strategies to influence traveller visits in order to save revenue streams.

In terms of adventure travel, the activities or product offerings are directly influenced by weather and the physical environment. In contrast to leisure tourism, where more emphasis may be placed on man-made settings, adventure tourism's business model is thoroughly exposed to the slightest environmental changes.

In a joint report made by the World Tourism Organization, the United Nations Environmental Programme and the World Meteorological Organisation in July 2008, *Climate Change and Tourism: Responding to Global Challenges*, adaptation measures are emphasized for various stakeholders across a few tourist areas that are currently feeling climate change: coastal tourist destinations, mountain destinations in terms of the ski industry, and natural and historic sites (UNWTO, 2008). One adaptation strategy example prescribed by the IPCC in regards to tourism is diversifying attractions and revenues and an example provided for the ski industry is moving to higher altitudes and artificial snow-making (IPCC, 2007). While the UNWTO report provides a good starting point for all tourist businesses to include adventure tour operators, the aim of this report is to focus more specifically on adaptation techniques for adventure travel companies.

Buckley defines adventure tourism as “guided commercial tours where the principal attraction is an outdoor activity that relies on features of the natural terrain, generally requires specialized sporting or similar equipment, and is exciting for the tour clients. This definition does not require that the clients themselves operate the equipment: they may simply be passengers, whether in a dogsled, a whitewater raft or a tandem parachute harness” (Buckley, 2006).

The Adventure Travel Trade Association, the professional organization of the adventure industry, defines “adventure” trips more broadly, based on recent consumer survey research, which indicates “adventure travel” can be said to include any trip that has two out of the following three aspects: physical activity, interaction with nature, and cultural learning or exchange.

This definition of adventure travel, with a greater focus on culture, was derived through primary research and analysis conducted in a series of consumer survey results administered by ATTA and Xola Consulting’s Paige Schneider in 2005.

In addition to having the same concerns for sustainable and community friendly practices as general tourism, it can be inferred that adventure tourism requires operational, management and technological adaptation more attuned to the slightest of weather and environment changes. Due to their business model and tactics for working in the natural environment, adventure tour operators may provide an early perspective on how to cope with climate change impacts on the physical environment. While many people are focused on forecasting future changes, some physical effects of climate change are already impacting business. Adventure tour operators may be one of the closest groups in proximity to felt climate change effects and can provide a glimpse at the challenges of remaining resilient as a business.



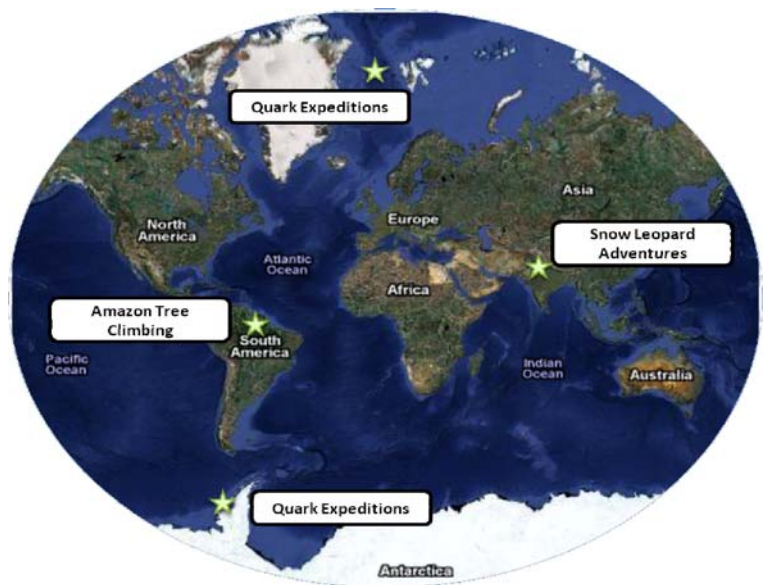
Methodology

The objective of this paper is to provide the adventure travel community and the tourism industry in general with analysis and recommendations for responding to the effects of climate change based on interview and detailed analysis of tour operators in three specific environments. The companies by region are:

- Polar** — Quark Expeditions (Arctic and Antarctic)
- Mountain** — Snow Leopard Adventures (Himalayas)
- Tropical Forest** — Amazon Tree Climbing (Amazon)

The methodology of this paper consisted of climate change and tourism industry research specific to various environments and types of adventure travel. Qualitative analysis was used to pair and define relationships and trends in how adventure companies are dealing with climate change. Additionally, general discussion and existing knowledge and reports from Xola Consulting, Inc. assisted in the development of final trends and relations to the general tourism industry.

The interviewed companies were chosen in polar, mountain and tropical regions to reveal similarities and differences in their general adaptation approaches to climate change. The regions were chosen because they are areas that haven’t received significant research attention in terms of tourism and climate change. The broader tourism industry has mainly focused on adaptation for two



major travel sectors so far — coastal island and ski tourism. This paper's focus is more on the smaller players in remote environments. Additionally, a mix of regions was chosen to emphasize that while adventure travel companies have different product offerings and locations, companies may learn from each other and pursue similar business practices. Due to the research timeframe, only one company per region was interviewed. Each interviewed company provided a representative who works closely with tour operations and business management to speak on their behalf. In one case, subsequent interview questions resulted in discussion with a marketing representative as well. Regardless of the mixture and amount of activities offered by each company, an analysis of general adaptation trends was the main focus.

Initially, a research objective was to highlight one outdoor trip or activity offered by each company in a case-study style report. However, the impacts of climate change were not as severe for each company to warrant such a method. Therefore, the discussion with companies covered any effects of climate change on all tour activities and trips offered. With the goal of discovering areas to focus climate change adaptation, the analysis method applied was qualitative and based on emerging patterns and differences paired with business concepts.

The interviews and discussion with adventure tour operators were based on the following primary questions.

- How is climate change affecting your trips?
- What are you doing differently as a result?
- What do you anticipate for the future and what advice do you have for other tour companies?

Secondary research on the impacts of climate change in each region was conducted to help discuss and determine the felt effects on the tour operators. A background on each company is presented and followed by interview results under the following subheadings:

- Climate Change Observed
- Adaptation Techniques
- Business Model Trends and Strategies
- Advice and Future Thoughts

Analysis was conducted after reviewing the findings from all three companies. Insights were derived from the interviews to answer the main question of how adventure tour operators are dealing with the effects of climate change that are present today. In answering this question, frameworks were created to highlight best business practices for the tourism industry. Additionally, with this report being among the first attempts to focus on tour operator business models in response to climate change, a simple template covering various areas of the business such as transportation, training, operations, etc. was not strictly applied as many areas may not be impacted by climate change just yet.

For the purposes of this paper, the following definitions derived from the Intergovernmental Panel on Climate Change (IPCC) Working Group II's Fourth Assessment Report (2007) will be used:

Mitigation — an intervention to reduce the sources or enhance the sinks of greenhouse gases (IPCC, 2001a).

Adaptation — actions in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2001a).

Simply, mitigation is an attempt to reduce and/or slow climate change and adaptation is an attempt to defend against negative and capitalise on positive climate change effects (Goklany, 2005 in IPCC, 2007).

FRAMING THE STRATEGIC SITUATION

In an effort to better define tour operator strategy as a result of climate change, two basic questions will be used to define the interviewed companies' strategic positions: 1) where is the firm competing? and 2) how is it competing? (Grant, 2008, p. 21). "Competing" in this context means remaining viable as a business faced with climate change effects, rather than aiming to achieve superiority over other similar businesses. The "where" will be explained in terms of environmental impacts as a result of climate change and variability. The "how" will be explained in terms of specific practices and adaptation techniques being used by each company. Therefore, a brief overview of climate change impacts in general and adaptation by tour operators will provide the back drop for discussion on recommended business practice.

CLIMATE CHANGE GENERAL IMPACTS

According to scientists, the earth is warming at its fastest rate in history due to increasing amounts of GHG's in the atmosphere. Despite sceptics attributing climate change to other causes such as cosmic rays, the general consensus is still that of warming. While society at large searches for ways to slow down the process, affects of climate change are beginning to be felt throughout the world. According to the IPCC it is difficult to isolate the direct observed impacts of climate change upon tourism activity because of the complex interactions that exist between tourism, the climate system, the environment and society (2007). Despite the sparseness of literature on the subject, this paper aims to discover any existing trends between three adventure tour operators and climate change (IPCC, 2007).

Climate change has resulted in temperature increase, sea level rise, melting snow and ice, extreme weather events, and affects humans and ecosystems (UNEP, 2009). Between 1995 and 2006, eleven out of twelve years were the warmest on record since 1850 and in the last century the sea level has risen 17 centimetres (UNEP, 2009). Satellite data since 1978 has shown a 2.7 per cent decrease in sea ice extent per decade and mountain glaciers and average snow cover have declined in both hemispheres (UNEP, 2009). Climate change has increased weather related disasters as a result of warming temperatures and changes in precipitation (Figure 2).

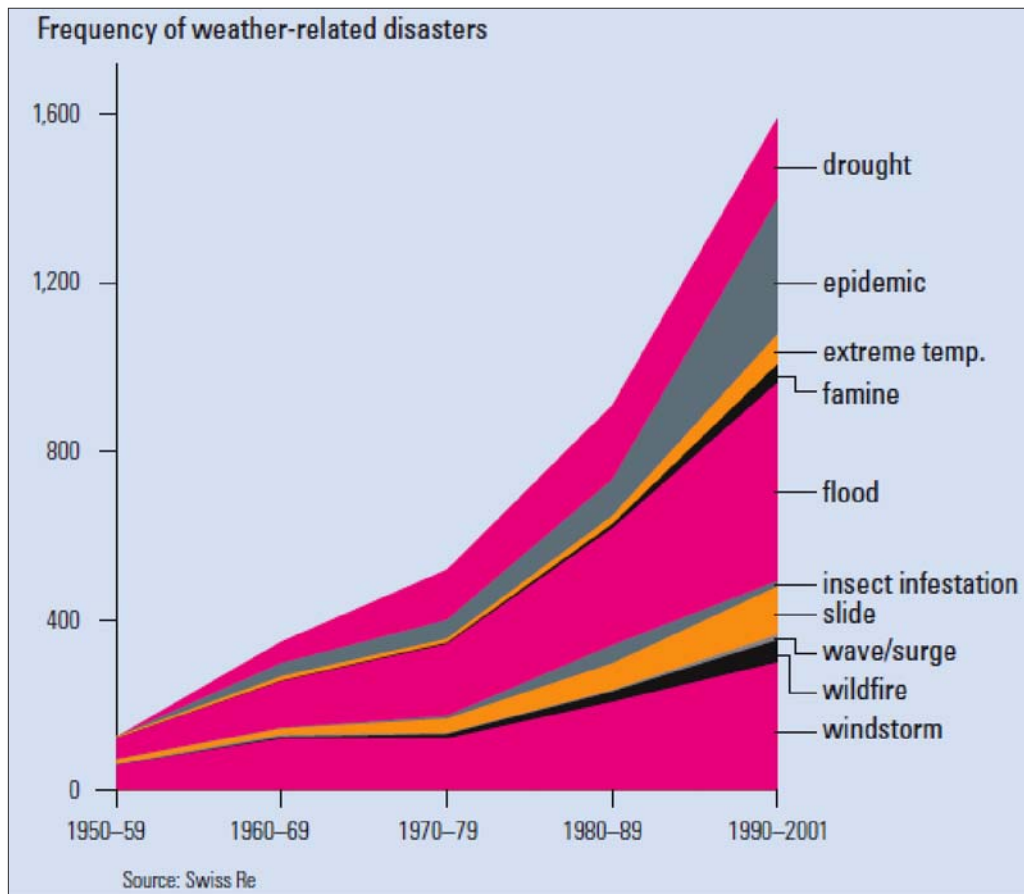


Figure 2: Frequency of Weather Related Disasters (Lash and Wellington, 2007)

Figures 3a and 3b provide an overview of the most recent weather and climate activity observed during 2008. While some changes in temperature and weather patterns have not existed for a long enough period to be technically labelled as climate change, the increase in extreme events and weather variability remains a threat for business and society.

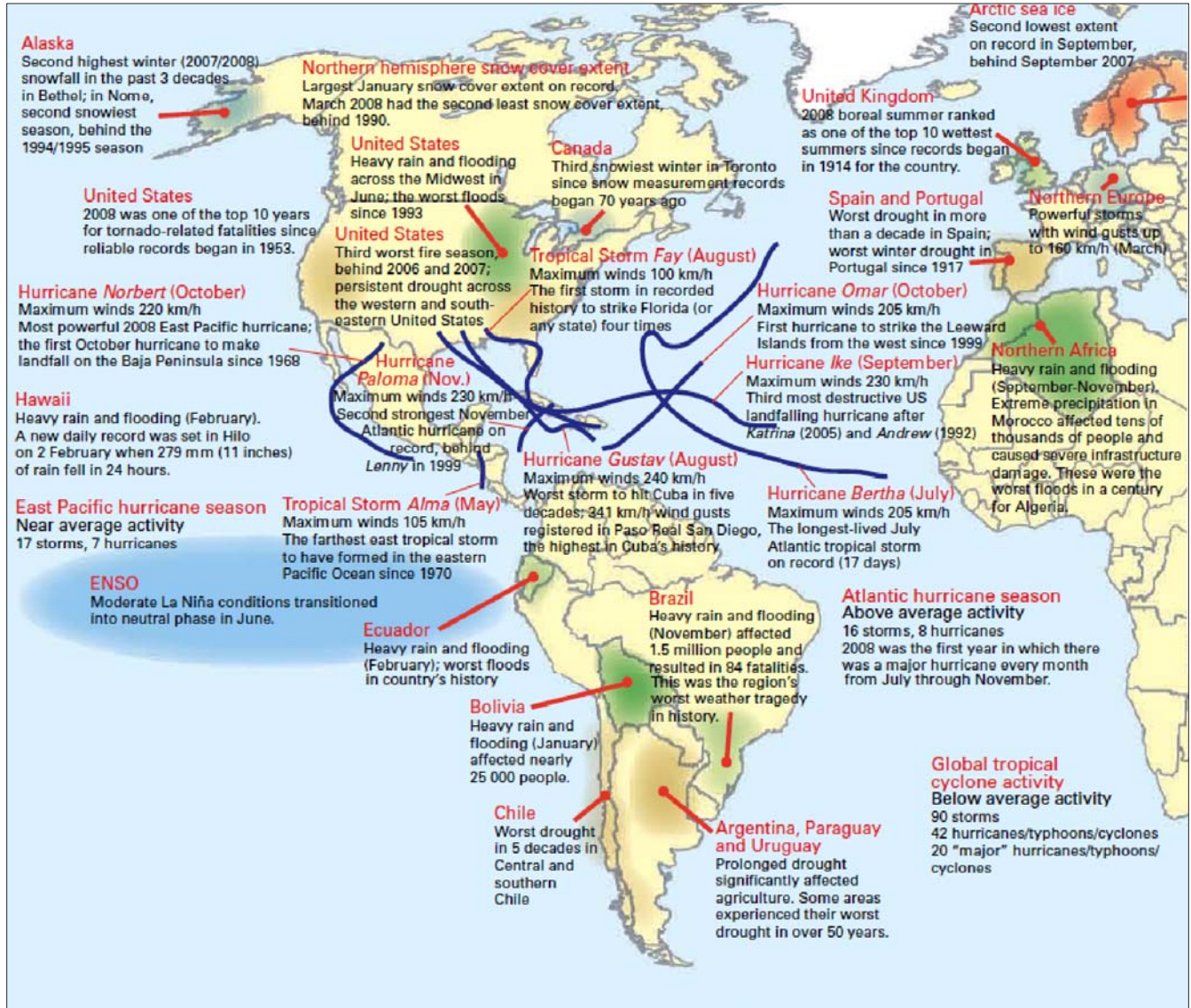


Figure 3a: Part A of world map reflecting climate change adapted from WMO statement on the status of the global climate in 2008 (WMO, 2009)

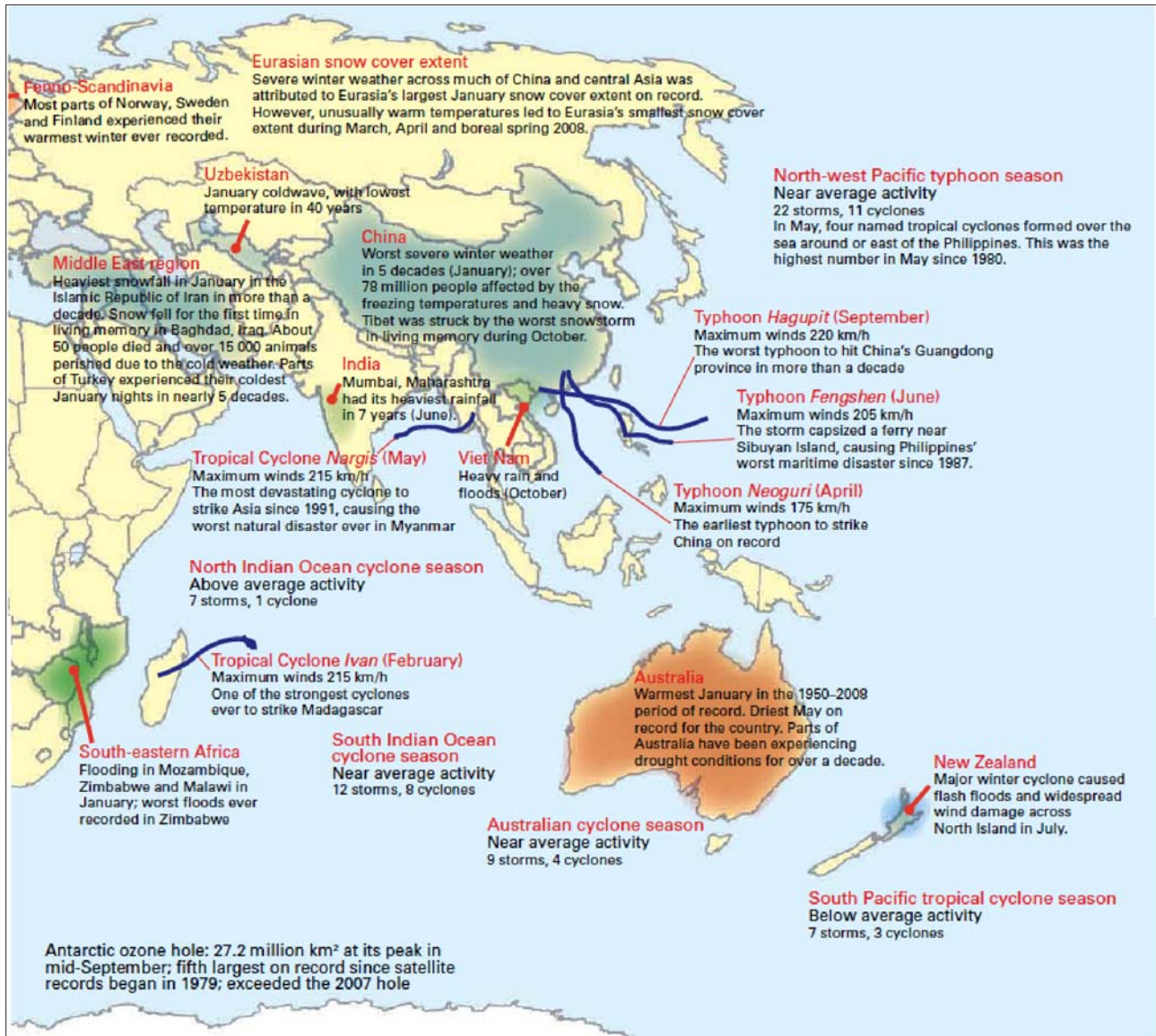


Figure 3b: Part B of world map reflecting climate change adapted from WMO statement on the status of the global climate in 2008 (WMO, 2009)

Adventure tour operators may be located near or far from climate change impacts, but all companies will be exposed over time. Temperature changes and weather are a couple examples of factors that directly influence adventure travel business. The companies highlighted in this paper are a polar cruise company that operates in the Arctic and Antarctic, a Himalayan-based adventure company, and a tree climbing operator in the Amazon. A brief review of climate change in the interviewed companies' specific regions is provided in Figure 4. Each region will be discussed and then followed by the respective tour operator's interview summary on the impact of climate change and their adaptation techniques.

Polar Regions and Climate Change

The Polar Regions witness the greatest temperature changes and provide the most obvious indicators of change. Melting Arctic ice increases albedo effects leading to increased warming and temperature from less ice cover to reflect the sun's rays. The Arctic is often considered as the "Canary in the Coal Mine" for predicting climate change effects on the rest of the world as faster melting leads to sea level rise and changes in winter weather (Agencies, 2007). The average Arctic temperature rose at a rate almost double the world's average rate over the last few decades (Hassol, 2004).

The Antarctic has not seen the same temperature increase as the Arctic, but it is still considered one of the most rapidly warming spots on Earth with climate change affecting penguins as well as microscopic life at the base of its ecosystem (ScienceDaily, 2009).

A look at recent Arctic change between 2007 and 2008 reveals general patterns that are likely to continue and impose further impacts on polar tourism (Figure 5).

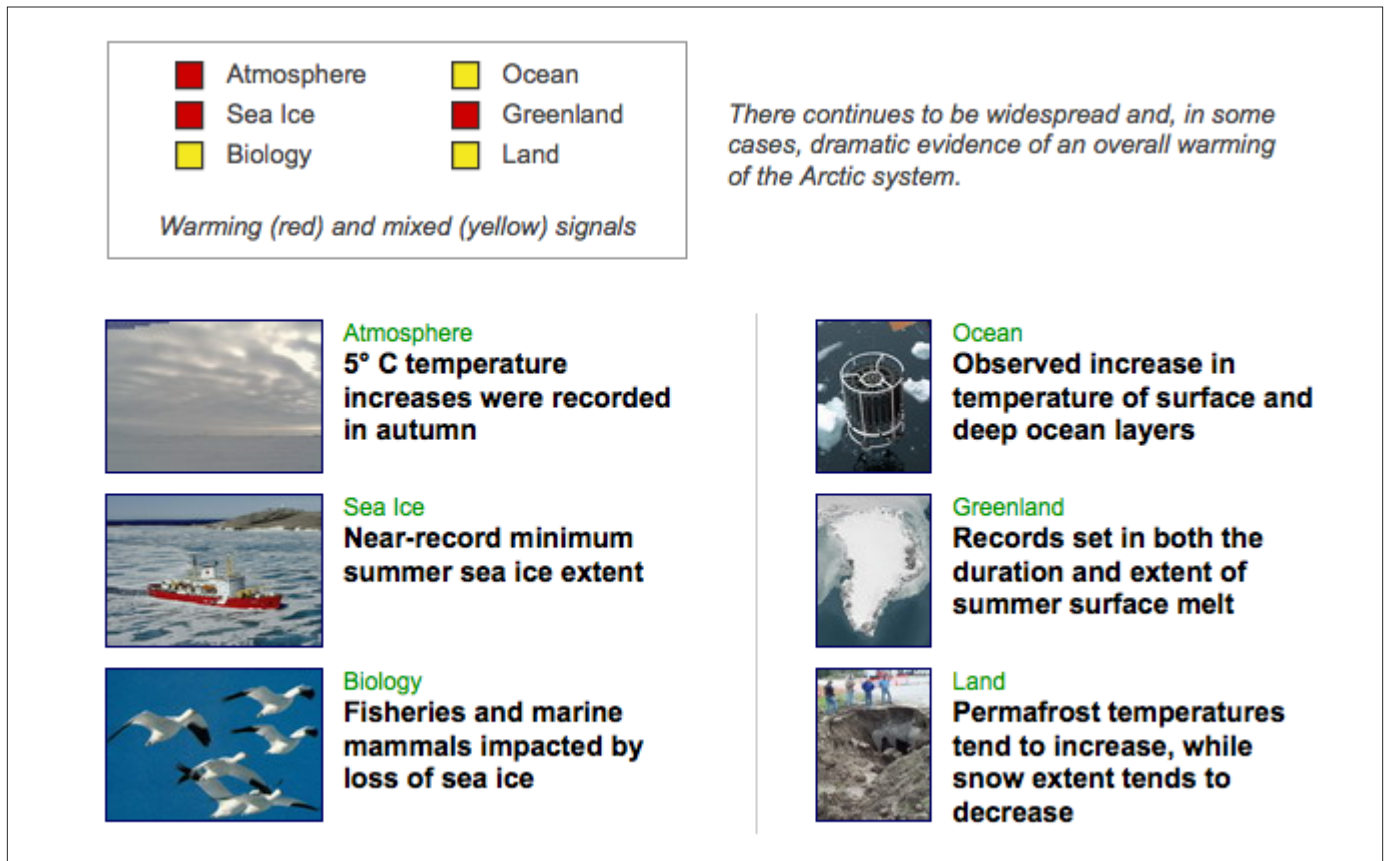


Figure 5: Arctic Report Card 2008 (NOAA, 2008)

With temperature predictions of a 5 — 7°C increase over the next 50 years in northern latitudes, seasonal sea ice reduction around many cold water islands will affect ecosystems, local residents and natural amenities for tourism (Baldacchino, 2006, p. 36). Popular destinations such as Svalbard have experienced warmer climate, more rain and a 10% reduction of glacial ice volume since the 1960's (Baldacchino, 2006, p. 137). The natural environment in the Polar Regions is one of the fastest changing areas on the planet.



Quark Expeditions

HISTORY

Quark Expeditions, Inc. is a polar adventure company that has offered polar sailing expeditions since 1991. Quark has the largest Antarctic fleet and is able to travel farther than other companies in the Arctic with nuclear-powered icebreakers equipped with helicopters and zodiac boats. Quark has a wide variety of tour offerings and promotes environmental and polar education during their trips.

ACTIVITIES

Cruises throughout the Arctic and Antarctic to the most remote locations for hiking, camping, bird watching, marine animal spotting, sightseeing, research and educational activities.

BELIEFS/PRACTICES

Combining adventure travel with environmental responsibility and education of the Polar Regions. Quark adheres to strict policies to ensure environmental, wildlife and passenger safety and is an active member of the International Association of Antarctica Tour Operators (IAATO) and the Association of Arctic Expedition Cruise Operators (AECO). Quark developed the Polar Ambassadors program as a tool for people to encourage each other to help combat negative environmental impacts and climate change.

INTERVIEW RESPONSES

Climate Change Observed:

Glacial Retreat. Nautical chart dates reveal glacial retreat and parts of land that were attached by glaciers are now islands in Svalbard. The Monacobreen glacier provides an example where Quark tour ships park where the glacial front exists on map, while the ships' radar indicates that the glacier is two miles away.

Hanging Glaciers and Bare Rock Walls. In South Georgia and the Antarctic Peninsula, more land is revealed where tide water glaciers used to flow into the sea.

Increased Snowfall. Tours noticed increased snowfall and that the snow remains longer than usual over the last few years in Svalbard. Since walking on snow can cause damage to vegetation underneath, some sites had to be removed from early season itineraries.

Antarctic Biosecurity Threat. Despite not directly witnessed, biosecurity is becoming a bigger issue in Antarctic with new species arriving and fear of further introduced species.

ADAPTATION TECHNIQUES:

- Itinerary designed to limit fuel consumption, reduce emissions and limit site visit physical impacts. No longer land at all landmass sites during voyages, but provide travellers similar views and experiences while at sea in proximity to such sites. Reduce movement on snow covered trails.
- Inclusion of presentation and seminars on climate change during shipboard educational program. Discipline experts (history, geology, ornithology and marine biology) provide specific examples as appropriate.
- Internal committee appointed to advise the executive team on climate, conservation and waste management
- Biosecurity program for crew, staff and passengers will be increased next season with comprehensive checks of backpacks, clothing, boots, walking sticks and tripods, etc. Purchase of vacuum cleaners for ships will assist the process and passenger must sign declarations to ensure clean equipment and apparel.

Business Model Trends and Strategies:

- Operations: Itinerary routes and site visits modified to avoid further potential climate change impacts. Climate change education and research emphasised for staff and travellers. Continued mitigation against climate change through reduced emissions while adapting as necessary based on good information. Also, maintain sound practices to reduce environmental impact.
- Philosophy: Increased education and involvement by staff and passengers towards environmentally responsible practices. Example Polar Ambassadors program to encourage climate change mitigation in general society.

Advice and Future Thoughts:

- Take a proactive approach to climate change by staying informed, building expertise within the organisation and educating staff and clientele
- Base decisions on sound factual evidence and avoid “spin”. Make meaningful decisions.
- Take advantage of new and cleaner technologies.
- Engage wider communities – industry, research organisations, and governments.

Himalayan Climate Change

Climate change is a major issue in mountainous regions where warming trends are greater and magnified over smaller distances as a result of altitude change. The Himalayas have the largest number of glaciers behind the Polar Regions and studies have shown that 67% of glaciers are retreating and at faster rates than other mountain ranges (Rao, Areendran, and Sareen, 2008). Glaciers in Uttarakhand, such as the 30.2 km long Gangotri have been receding at an average annual rate of 7.3 meters (Uttarakhand Sustainable Development Summit, 2008). The Gangotri is vital for supplying the Ganges River’s water supply (Figure 6). Additionally, several rivers running into Asian countries depend on Himalayan glaciers. An accelerated rate of glacial melt combined with increasing temperatures will have serious consequences for freshwater ecosystems, animals, industry, and people. According to the IPCC, many rivers may become seasonal rivers (2007).



Figure 6: Retreat of the Gangotri Glacier (Earth Observatory, 2009)

As a result of seasonal changes, floods and droughts are likely to increase and there is likely to be more flash floods resulting from increased numbers and magnitude of extreme precipitation events (Shrestha, 2009). As can be seen in Figure 7, India is projected to experience very high levels of water shortage as a result of climate change (UNEP, 2009).

Additionally, “climate change is affecting ecosystem services by affecting forest type and area, primary productivity, species populations and migrations, the occurrence of pests and disease, and forest regeneration.” (Shrestha, 2009)

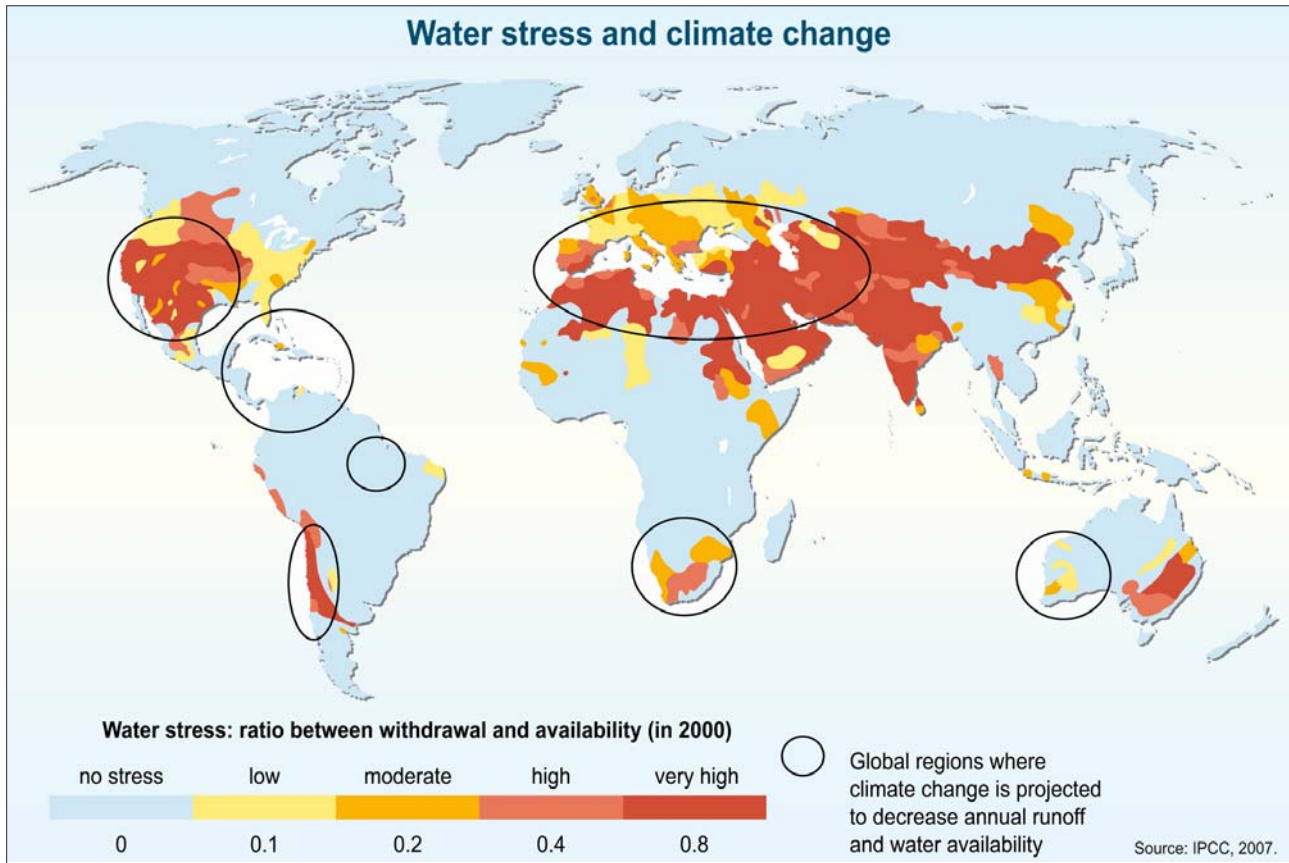


Figure 7: Expected Water Stress and Climate Change from *Climate in Peril* (UNEP, 2009)



Snow Leopard Adventures

HISTORY

Snow Leopard Adventures Private Limited was established in 1990 in India and offers adventure tours throughout the year that emphasise safety, eco-friendly practices and education. Snow Leopard's tours are based out of Uttarakhand, India and outbound trips are offered to other Himalayan destinations in Bhutan, Tibet and Nepal.

ACTIVITIES

Rafting, trekking, cycling, rappelling, skiing, fishing and various types of safaris. A wide portfolio of tours that cater to corporate programmes from retreats to outbound training, family adventures and school trips.

BELIEFS/PRACTICES

Sound planning and emphasis on safety and environmental responsibility. "Eco Logical" efforts towards environmental conservation and sustainability. Snow Leopard established SAVE (Study and Value Environment) in order to bring school children together to make them more sensitive to the environment. Additionally, Snow Leopard has written its own Ecological and Safety Codes of Conduct and incorporate environmental awareness and eco-friendly education into all tours.

INTERVIEW RESPONSES

Climate Change Observed:

Summer Temperatures Occurring Earlier.

- Snowfall in areas around 7,500 feet occurring in late January instead of late December, since 2001 (excluding 2007).
- Temperatures at 7,500 feet increase up to as much as 35° C in place of 32° C. Evergreen species in Doon valley region declined from 70% in 1958 to around 25% today. Increased temperatures are partly responsible for changing vegetation patterns, changing soil patterns and a drop in the water table.
- Increased temperatures result in less guest occupancy on trips two weeks earlier than usual. In Shivpuri (at 1,000 feet) temperatures rise up to as much as 42° C in the summer. Guest numbers on tours decline the third week of May instead of the first week of June.

Water Scarcity at Higher Camps. In a region near Chamba, the combination of existing lower water table due to geography, alpine canopy and stream use by local village and resort development near Kanatal has exacerbated water scarcity resulting in vehicles having to travel as much as 20 miles to fetch water for tours since 2002. Change in vegetation patterns has reduced the soil retention capacity and led to a drop in the water table.

Extreme Precipitation Events. Stormy conditions near beach sites are being felt two months prior to the close of rafting season which officially closes for the monsoons (end of June) which results in lost revenue from dismantling campsites earlier than usual. However, extreme precipitation events rarely negatively affect water-based activities.

Changes in Flora. Observations by locals point out that Ban Oak (*Quercus leucotricophora*) is being replaced by Chir (*Pinus roxburghii*) from a 90:10 to nearly 50:50 ratio. Pines have larger root systems, which lead to a drop in the water table, while oaks keep in moisture and humidity. This escalates the warming process in the region.

ADAPTATION TECHNIQUES:

Increased Temperatures:

- Water based activities scheduled for the hottest period of the day.
- Beach campsites are preferred due to milder temperatures from their proximity to rivers. However, extreme storm conditions can offset the gain.
- Conferences for corporate training modules held inside concrete structures.
- Games and other activities take place in the evening during cooler temperatures.

Water Scarcity: Tourists limited to one bucket of hot water a day

Extreme Precipitation: Camp staff is trained to handle emergency situations and extra tents are kept at fixed campsites away from the beach campsites in case of evacuation. Since weather patterns are highly unpredictable, substitute products to replace lost tour revenue are being created.

Reduced Flora and Wildlife: Maintain a healthy amount of vegetation in and around campsites to maintain the environment and offer an alternative habitat to birds and other animals. As an example, birdwatching became an unintended additional activity as a result of attempts to reduce dust from nearby highway development at the Shivpuri campsite by maintaining approximately fifty different species of trees and plants. In turn, this allowed migrating birds to inhabit the site in addition to reducing dust.

Business Model Trends and Strategy:

Operations: Adaptation combined with mitigation.

- **Adaptation:** Itinerary timeline adjusted to cope with temperature increase. Utilize structures and sites to alleviate pains of increased temperatures. Staff trained to react to extreme weather events. Proactive promotion and increased product mix by increasing the number of flyers to attract guests and creating products that are in less affected regions or are tied to cultural or historical sites.
- **Mitigation:** Reduce driving when possible to reduce emissions (trek up the last mile to temporary campsites where roads are barely driveable). Use solar lanterns in place of kerosene at beach campsites. Instead of investing in infrastructure for electricity at high altitude campsites, use a generator for two or three hours a day.

Philosophy: Remain prepared and vigilant to unpredictable weather. Educate and keep staff updated on latest climate trends and research in the Himalayas. Reduce consumption wherever possible and maintain the environment. Educate travellers and community members on climate change and individual best practices. Influence stakeholder policy to promote environmental conservation.

Advice and Future Thoughts:

- Continue proactive and sustainable practices while educating staff and guests on climate change and the environment.
- “Frequent weather audits need to be conducted, once every quarter, and on these lines safety and feasibility measures at sensitive campsite areas (like beaches) need to be evaluated.”
- Visitor number control procedures are a must in fragile higher altitude regions. In low lying regions with less traveler environmental impact, regulation numbers can be formulated on a daily basis in response to the season and the number of tour operators.
- Adventure tour products will inevitably experience change based on their dependence on the preservation of natural resources. “The only concern is that product components are being curtailed due to unpredictable weather patterns, but from a broader perspective, it can be considered a positive development that is actually pushing reform measures.”
- Continue marketing and sales promotions combined with product mix diversification.

Amazonian Climate Change

The Amazon rainforest is suffering from changes in seasonality and weather patterns as a combined result of climate change and deforestation. Specifically, temperature increases and decreases in soil water are projected to begin an Amazon transition from tropical forest to savannah in eastern Amazonia by mid-century (IPCC, 2007). In mid-June this year, the Negro River reached its highest water level in fifty-six years as shown by NASA satellite imagery in Figure 8 (Earth Observatory, 2009). In 2005, the Amazon experienced its worst drought and scientists are not positive that it was a result of climate warming, but expect such extreme drought events to become more common as a result of climate change (Painter, 2007).

Increased temperatures and changing rain patterns will affect the region's forests, water availability, biodiversity, agriculture and human health as a result of freshwater system degradation, ecologic loss, increased erosion, decreased agriculture yields, increased insect infestation and spread of infectious diseases (WWF, 2009).



Figure 8: Satellite image of Amazon and Negro Rivers near Manaus, Brazil — Top image acquired June 7, 2004, bottom image acquired June 29, 2009 (Earth Observatory, 2009)





Amazon Tree Climbing

HISTORY

Amazon Tree Climbing was founded in 2006 as a sustainable outdoor activity to sensitize people to the value of the tropical forest through rock climbing techniques. It was the first recreational tree climbing company in Brazil. Amazon Tree Climbing is based in Manaus and operates on the Negro and other nearby rivers. Despite its infancy as a company the experience of staff ranges from natives to guides with three to fifteen years of experience.

ACTIVITIES

Climbing tree canopies with mountain climbing gear, river cruises, kayaking, cultural visits, trekking, and overnight jungle camping.

BELIEFS/PRACTICES

Operate with small groups to reduce environmental impact and better respect the local cultures visited. Support sustainable practices and work together with others to limit environmental impacts. Educate visitors on this philosophy. Follow strict safety standards. Amazon Tree Climbing is partnered with Leave No Trace - Center for Outdoor Ethics, Sustainable Travel International and other eco-friendly groups.

INTERVIEW RESPONSES

Climate Change Observed:

River Water Levels. Most visible and direct impact has been changes in water levels. Winter is the rainy season and summer the dry season. Experience with very long winters followed by long periods of drought, instead of getting some rain during the summer as in the past. One of the highest water levels ever during the Amazon winter was reached this year, while one of the most severe droughts occurred in 2005. Water level has varied over 70 feet from the low to the high season, but shifting water levels is normal and tour operations have grown used to such adaptation before climate change.

No extreme temperature changes noticed.

Media Impacts. Emphasis by media of droughts and other extreme weather events causes travellers to switch destination based on reports resulting in lost revenue. On the other hand, there is a trend of people visiting the Amazon because they are afraid it won't exist much longer – which they comment is “mainly a result of deforestation for cattle farms and plantations, though!”

Reduction in Plant Species. Not visibly seen, but they have heard about this and understand that the slow death of a variety of plants as a result of drought conditions have overarching impact on the local ecosystem.

Adaptation Techniques:

- Water level change is a normal occurrence regardless of extreme climate changes. Typical adaptation techniques include using the bigger rivers that always have water and sometimes beginning tree climbs from a canoe when there is no beach to land on. Additionally, routes are changed based on what is better during the season while tours continue throughout the year. An example of this is not visiting a river that typically has many waterfalls during a high water level because there will be no waterfalls.
- Explain to customers that the media can be sensationalist and provide customers with honest information about the situation when there are extreme weather patterns.
- Use travel experience to educate. Particularly use the scenario of being close to nature during a significant emotional experience at 140 feet off the ground to explain man's impact on the environment.
- Educate travellers on sustainable practices. Use of boat with solar panels and water and sewage treated on board. Advise and motivate other groups in the value chain to improve facilities and services in regards to climate change such as cleaning trash, improving trails and planting trees.

Business Model Trends and Strategy:

- Operations: Sustainable Practices and education emphasised to staff, tourists and other players in the tour value chain. Ensure traveller safety while adapting activities to subtle climate change impacts.

- Philosophy: Share knowledge and provide an example for others in dealing with climate change affects.

Advice and Future Thoughts:

- Future is uncertain, but actions and decisions now create either a positive and greener or more difficult, future. “Think globally, act locally.”
- Amazonas is on a sustainable path as the most preserved Amazon state. Amazonas has practically no roads currently to allow for logging and other activity. Environmental stewardship is key for survival.

Adaptation Trends

While the trail or business scheme for each tour operator slowly begins to take a new course as a result of climate change, adaptation will become essential for maintaining a clear path that leads in the right direction for future operations and business practice.

- **The general thesis of adventure tour companies feeling climate change effects earlier than other industries has not blatantly emerged.** The interviewed companies report witnessing varying degrees of climate change, but not having to adapt too much so far. Some of the adaptation methods for increased extreme weather events such as water level changes in the Amazon or storms in Himalayas already exist, while the long-term impacts of climate change have not been felt fully enough to significantly alter operations and strategy. All of the companies foster sustainable and environmental practices such as reducing carbon emissions throughout their operations, but have not had to adapt too much to climate change thus far. Overall, patterns do emerge between the companies that may apply to other tour operators as well. One of the main concepts witnessed is the level of awareness by each company to consider future climate change effects and begin basing strategy for adaptation around it. Implementing itinerary changes, education, training and preparedness programs, and good environmental practices such as reduced emissions are adaptive strategies used by all of the tour operators.

These similarities are depicted in the following chart.

	Quark Expeditions	Snow Leopard Adventures	Amazon Tree Climbing
Itinerary changes	Tailor site visits to reduce impacts from tour on polar terrain affected by climate change	Shuffle the location and time of activities to remain cooler	Adjust routes based on flooding for more positive experience.
Education	Ship Board Classes; Polar Ambassador Program	Tour Discussion; SAVE Program	Tree Canopy Discussion and Education
Training and preparedness	Special Advisory Committee; Biosecurity program	Highly stress Safety & Ecological Codes of Conduct	Highly trained staff prepared to launch a climb from a canoe into a tree
Reduction of emissions (mitigation)	Experience areas without stopping everywhere lowers fuel consumption and reduces stress on heavily visited sites	Use solar power; Walk part of journey in place of driving; Limited generator use in place of electricity infrastructure	Operate in smaller groups to reduce environmental impact; Use of solar panels on boats

In terms of itinerary changes, adventure travel companies will see increasingly more alterations with seasonality, daily scheduling of events, route planning and site selection. Education as well is no longer an option, but a standard practice that allows tour operators and society to jointly face climate change. Training and preparedness is an extension of education as companies seek to ensure flexibility, knowledge and practices for staff to react to climate change and make informed decisions with traveller and environmental safety in mind. Additionally, reduction of emissions and

other environmental practices fall in line with and are often coupled with adaptation techniques such as shortening routes to not only save fuel, but to reduce impacts on the natural environment.

At the same time subtle differences emerged between the interviewed companies. Snow Leopard Adventures felt the greatest climate impacts as a result of increased temperatures, water availability and weather changes. For these reasons it has carried out the most adaptation meas-

ures thus far such as rescheduling and relocating specific activities and creating new activities to attract travellers. Quark Expeditions and Amazon Tree Climbing were carrying out normal operations with no major changes, but with a view to understand and prepare for change.

Similar to most adventure travel companies, the three interviewed companies operate with varying levels of business process formality, but do incorporate meetings and other discussions on climate change with staff. Quark Expeditions is the closest to having an established climate change group, while the other companies freely discuss and make it part of scheduled business activity and staff training.

Documentation and study of environmental and weather conditions varied in degree, but overall none of the companies maintained a database for reference and planning purposes.

Both Quark and Snow Leopard discussed future agreements that travellers would have to sign in regards to biodiversity or responsible tourism to help protect the environment.

While the use of various mitigation technologies was a general theme between companies, adaptive technology to reduce or eliminate climate change impacts directly on tour operations was not present for any of the companies. The tour product(s) may be altered more in terms of location, schedule or type of activity than forced to remain consistent through additional technologies not yet discovered. Predicting the future route of technological implementation amidst increased climate impacts is difficult. Technology on a small and reasonably priced level may be introduced for example to comfort travellers or enable access to difficult to reach sites. Small adventure companies will most likely become more innovative while reacting to future climate impacts.

Snow Leopard provides one of the major differences between the interviewed tour companies in terms of regional policy and culture. It has experienced the greatest impact from climate change in a community that is described to be slow to adapt to environmental friendly practices from a policy standpoint (Joshi, 2009). While nations such as Norway require tour companies to make travel reservations a year out to cut down on environmental impacts in Svalbard, the concept of sustainable tourism is described as being a “novel idea” in the back of a travel magazine in India (Joshi, 2009). For Quark and Amazon Tree Climbing, world and local communities appear quicker to respond with policy for polar and tropical forest regions.

Additionally, the media played different roles for each travel company. Amazon Tree Climbing specifically listed the media as an issue for deterring visitors during extreme weather events and at the same time pointed out that many people travel as a result of wanting to experience the rainforest before climate change and deforestation destroy it. Quark Expeditions has not seen a major increase in number of travellers as a direct result of climate change (Campbell, 2009). Meanwhile forecasts in India can be assumed to make a difference on Snow Leopard’s business as reports may decrease or increase the number of customers. Regardless of external factors such as SARS and terrorist activity, traveller occupancy has shifted as a result of extreme seasonal weather at a couple of campsites as shown in Figure, 9 (Joshi, 2009).

Another concept that received varying emphasis by tour operators is preparation for traveller fluctuations in overall volume and shifts in desired activities.

The trends and subtle differences between the interviewed companies reveal practices to keep in mind and hint at future approaches for tour operators to forge trails against climate change.

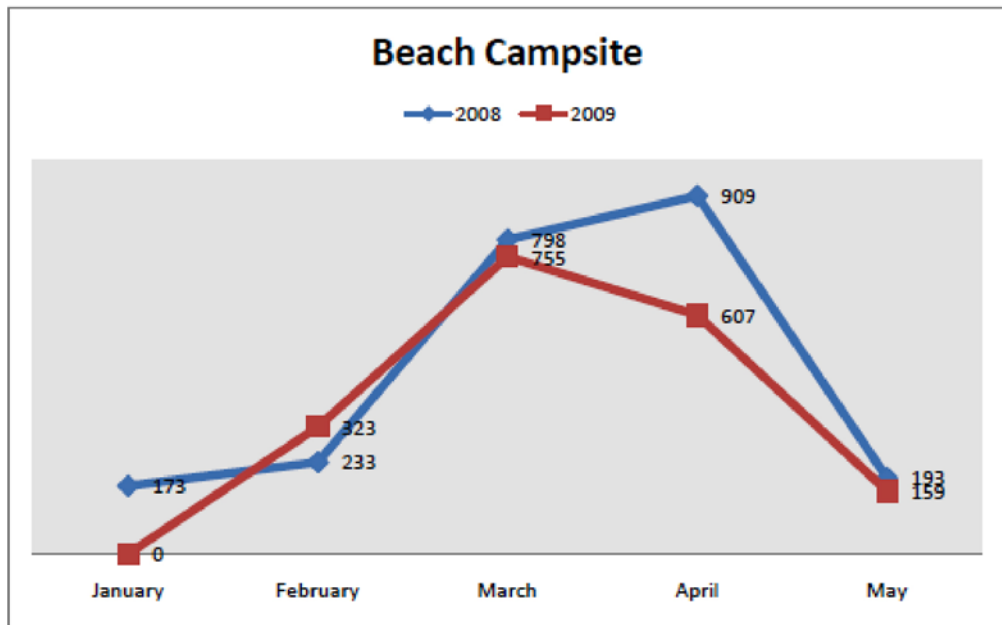
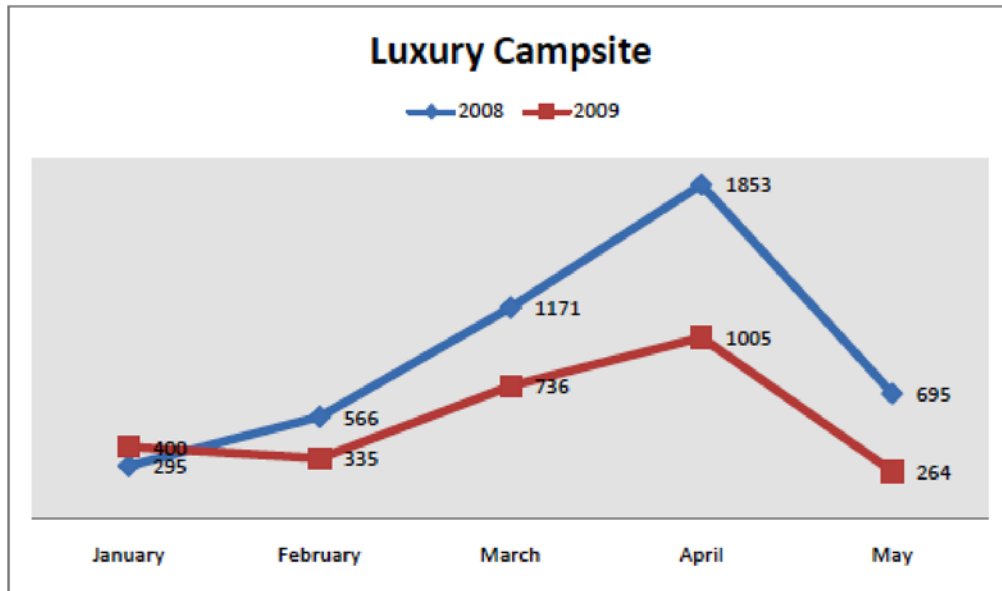


Figure 9: Example Snow Leopard Campsite Occupancy: Number of occupants from January to May 2008 & 2009 (Joshi, 2009)

The graphs above display occupancy numbers at two campsites during the first half of the last two years in Uttarkhand, India. Snow Leopard is confident that climate change was responsible for the decrease in occupancy during this period. The river campsite's sharper decline in occupancy highlights the effect of unexpected weather conditions.

Frameworks and Best Practice Guidance

MINIMISING RISKS AND SEIZING OPPORTUNITIES

There is a general trend among adventure companies of remaining focused and adapting business models and strategy soon to effectively manage inevitable change and make good decisions. Overall, opportunities and threats need to be managed regarding adaptation to climate and common methods emerge to keep each of the interviewed as well as other tour providers on track as a business. A closer look at business strategy, operations and marketing highlights options for engaging opportunities and avoiding threats from climate change.

	Opportunities	Threats
Strategy	<ul style="list-style-type: none"> • Create Expertise to gain competitive advantage • Educate and communicate internally/externally • Work with stakeholders to build adaptation networks 	<ul style="list-style-type: none"> • Failure to act in a timely fashion • Poor decision making • Failure to budget for adaptation requirements
Operations	<ul style="list-style-type: none"> • Diversification • Flexibility • Activities to promote and share best environmental practices 	<ul style="list-style-type: none"> • Failure to manage resources • Relying on a single product
Marketing	<ul style="list-style-type: none"> • Promotion strategies to encourage and reassure customers • Promote new activities and/or methods to enjoy extreme environments 	<ul style="list-style-type: none"> • Complacency to not grow customer base • Other regions and activities taking market share

The key theme for tourism operators is proactive and dynamic adaptation. Adaptation is an ongoing practice that relies on concerted effort and well-informed decision-making. Strategy, operations and marketing practice will be discussed in further detail to emphasise the points listed under opportunities and threats.

STRATEGY

Companies must focus on questions for how to cope and develop the business, rather than become complacent or resort to a reactionary strategy. Failure to adapt now can become more costly as a result of not having the necessary resources in place ahead of time. A commonly referred to example of failing to adapt in business comes from Kodak and digital photography technology. Kodak was first to possess the digital camera, but failed to understand its customer and offer it as a product for the masses. Kodak’s strategy resided in complacency around its proven products. Similarly, adventure tour companies need to be responsive and adapt to climate change.

Adventure travel companies rely on very specific core competencies such as tree climbing and breaking through ice with cruise ships. Competitors should find it difficult to enter the market and compete against such companies because of the rare, non-substitutable or costly to imitate aspects of their core competences (Sloman and Hinde, 2007, p. 284). Instead of solely focusing on competition, climate change poses threats and opportunities that can either enhance or diminish niche skills and product offerings. Adventure travel companies need to treat climate change impacts as one of their greatest competitors.

Creating climate change expertise through a committee or individuals can provide competitive advantage against climate change. Outsourcing expertise may prove costly for a small tour company and it is rare for a consultant to possess such specific knowledge about a niche company and climate change. Creating expertises is vital towards dedicating the time and effort to gain the best intelligence to combat climate impacts and educate leadership and staff. Analysis of internal and external factors should drive strategy.

As part of the education process and the need to manage difficult to predict weather and climate scenarios, research is key. The appointed climate change person(s) should work throughout the organisation to track and maintain climate, weather, physical changes encountered and other methods/examples of climate change impacts. Additionally, the climate change specialist(s) should be well read on latest research and encouraged to interact with other tour operators, academic institutions, NGO's and local communities to better understand the climate setting. Annual reports and educational events can become deliverables as well. Accurate information will provide more weight for effectively engaging in policy discussion and in dealing with the media and customers.

Strategic simulation exercises for coping with various degrees of climate impact are effective tools for planning and decision-making. A team can discuss or work out rough plans for minimal to extremely high climate change impacts. Addressing the natural environment and resource impacts on tours and what can be done ahead of time will reduce organisational myopia towards the need to adapt. Resource and fiscal planning will also be important. Resources and capabilities may be assessed in terms of strategic importance and relative strength in order to determine the potential for sustainable competitive advantage against climate change (Grant, 2008, p. 157).

Education on climate change and measures to adapt as a community is important for relationships between tour operators, other value chain members and stakeholders. Encouraging combined efforts can be achieved when all parties are knowledgeable about the stakes at hand. Policy development between stakeholders and tour operators is necessary to advance sustainable adaptation beneficial to all parties. Additionally, strategic alliances between tour operators in the same regions and/or members in their value chain may reduce costs and improve adaptation results.

While the product offers for such niche adventure tour companies typically remain their core business, strategy must be focused on adapting to maintain the business through product resilience combined with product creation for some companies. Snow Leopard Adventure provides an example of a company that has begun to diversify their product mix in order to maintain and attract customers. Adventure tour companies compete more through product differentiation than cost leadership as a result of the unique products that they feature. Providing products and services to a niche client base will require change to maintain market share and profitability while competing with the tourism industry.

Defining strategic direction based on informed approaches and shared effort is vital for sustaining any adventure travel business. As climate change inevitably influences and reshapes business models, companies need to incorporate climate change adaptation into strategic planning now.

Moutinho provides a useful summary when he writes about managing in an uncertain environment in *Strategic Management in Tourism*, "An industry faced with turbulent environments cannot cope simply by relying on the accumulated experience of those within it, or on conventional formal strategic planning processes to develop strategies which can cope. In the future, strategies based on prediction and predetermined planning will have to give way to strategies which emphasize preparation, detection of environmental change, flexibility and responsiveness" (2000, p. 36).

OPERATIONS

Operational changes are very specific to location and types of activities. Regardless, common themes and flexibility to alter transportation, accommodation, resources, programs, schedules and other factors based on climate impacts need to be understood.

Adapting activities and product offerings will be vital to maintaining a customer base as original activities may no longer exist over time or during certain seasons. A key to reducing the impact of lost revenue from trip limitations is to create new activities or combine activities to complement gaps in original tour models from climate change. Diversification of product offerings can spread risk and provide protection from seasonal and extreme weather impacts. Additionally, decentralisation of operations and employee education can promote successful flexibility to adjust tours on the spot and ensure customer satisfaction.

Additionally, subsequent affects from impacts to the natural environment consist of water conservation, waste storage and removal, biosecurity and other practices. Sound environmental practice is an essential part of normal operations. Snow Leopard planted trees initially to reduce dust from nearby highway development and unintentionally ended up creating a habitat to sustain wildlife. Building on this lesson, companies can offer solutions to their environment and create attractions. Snow Leopard Adventures ended up with the added activity of bird watching as a result. Despite the challenge to sustain core business activities, opportunities exist to promote further adventure and environment-based products.

Policy involvement and stakeholder management are important business activities. Interaction with other tour operators and the local community can strengthen relationships towards confronting climate change. Sustainable supply and value chain management should become a focus to not only reduce emissions, but to encourage good environmental practices. Amazon Tree Climbing for example does this by promoting practices such as planting trees and site management at businesses in their value chain such as ports and accommodation sites. Through codes of conduct and assessment of supplier compliance, companies may collaborate with their suppliers to satisfy customers and gain competitive advantage as well (Font et. al., 2007, p. 262). While codes of conduct and policy are more on a strategic level, adherence and evaluation are operational tasks.

Continuous improvement is an inherent business goal to maintain competitive advantage and provide positive customer experience while reducing costs. Climate change is bound to further impact the supply and demand elements of adventure travel. The supply of natural resources, communities and sites to visit needs to be balanced with demand changes as a result of climate and customer psychographics. The ability for tour operators to shape both dimensions will be a result of modifications to maintain and/or create new activities in a fragile environment while providing truly positive experiences. Managing resources and traveller demand while overcoming environmental change may be achieved based on forecasts, shared information and flexibility. Monitoring the effectiveness of adaptation and management techniques is essential for achieving optimal levels of service and diffusing vulnerabilities.

Overall business strategy should promote operational adaptation and response to reduce threats and increase opportunities.

MARKETING

As travellers begin to travel to different regions as a result of temperature and weather changes, marketing plays an important role in maintaining business success. Market trends and customer needs will be increasingly influenced by climate change and companies will have to adapt their marketing plan. Product mix, promotion and price are variables that can be altered to retain and increase customers, while product place and distribution tend to be fixed.

An active campaign to highlight a diversified and reliable portfolio of adventure activities is important. Repositioning and redirection of activities based on sites and season should be considered in terms of local climate impacts, but also in terms of what travellers demand on a global level and when. Product promotion should provide clear information and generate excitement for activities that may not make the most sense in the minds of traditional travellers. Contingency planning will provide preparation for extreme weather incidents and communication about them. Companies should continually promote the environment and adventure as reasons for travellers to challenge themselves and seek enjoyment in the face of climate change conditions. For example, Snow Leopard explained the following approach as “instead of just focusing upon the adrenalin rush of rafting, greater emphasis is given to activities like treks, highlighting that the experience proves to be more enlightening and rewarding from a broader perspective” (Joshi, 2009).

Travellers are interested in climate change and what is happening to the environment. Therefore, companies should continue to educate and promote environmental programs. Eco-tourism provides an opportunity for travellers to help maintain the environment as well as the tour operator’s activity base. Other programs via the internet and media can educate and assist “want to be” travellers to contribute to environmental causes from home. Quark Expeditions’ Polar Ambassador Program and on-line travel blogs are a good example of this. Local community engagement is another important media relations and marketing event to attract attention for the business and promote the environment and climate adaptation. Interacting with schools and other organisations can increase network effects to attract customers as well.

In some cases, targeting local customers versus global customers may provide more sustainable business. As niche companies, adventure tour operators will most likely not consider changing their target audience. Most of Snow Leopard’s customers are from India, but promotion may be pushed more towards international travellers unaccustomed to the weather of India. It may be easier to encourage people in the surrounding area to engage in activities during off peak seasons with discount offers. For some activities such as polar cruises, the customer base is not located in the tour region. In the Amazon, many of the customers are international travellers. At the same time, there may be a broader local market that can be tapped into during off peak time. Redefining the target customers and product mix will become important in maintaining customers for tour operators in regions facing adverse climate change impacts.

Price is difficult to change or compete on for traditionally niche companies. However, packages and other deals during off peak seasons or incentives to travel despite higher temperatures or weather variability should be considered. An important aspect of marketing in response to climate change is providing a sense of security. Accurate and honest information is essential to maintain company image. Travel insurance against adverse weather and other climate change mitigation policies for customers should be offered if possible. Such campaign incentives can reduce the number of customers avoiding such trips and encourage others to join trips that otherwise would not have.

Also, customer service is an integral part of maintaining and encouraging future customers via word of mouth promotion or other sales campaigns. Adventure tour company staff will be better prepared to deal with climate change through effective change management and leadership emphasis on climate education and discussion. Providing employees with an understanding of the why behind strategic, operational and marketing decisions can ensure increased satisfaction, job focus and improved customer service.

Strategy, operations and marketing are areas that tourism companies should consider now and use to assist in determining and preparing for financial impacts as well.

Best Practice Guidance Adaptation Steps

In considering climate adaptation steps, many companies have experience implementing new strategic policies and practices. Climate impacts in developing countries and specifically in small island states have received considerable attention with regard to economic, social and environmental adaptation. Such research offers a more specific adaptation process that is specific to climate change.

One existing framework for tourism adaptation came as a result of lessons learned from 24 development projects undertaken by AIACC in Africa, Asia, Latin America, and small island states (Simpson et. al., 2008). Portions of this adaptation framework are particularly relevant in light of adventure tour operator trends. Below is the framework with examples of how Quark Expeditions, Snow Leopard Adventures and Amazon Tree Climbing are currently meeting some of the steps.

Framework	Examples in Adventure Tourism
1. Adapt nowSave money in long run by adjusting upfront
2. Create conditions to enable adaptation:	...Climate committee to advise leadership
3. Integrate adaptation with development	
4. Increase awareness and knowledge:Polar Bear Club; Education in tree canopies
5. Strengthen institutions:	
6. Protect natural resources:Plant trees; Avoid trekking on permafrost
7. Provide financial assistance:	
8. Involve those at risk:Cultural and stakeholder interaction
9. Use place-specific strategies	Reduce stops, same experience from boats

This framework provides reasonable points to consider. A seven step process emerged as a result of combing frameworks developed by UNEP (1988), UNFCCC-NAPA (2001), UNDP (2004), USAID (2007) and knowledge from the AIACC project (2007) as “A Framework for Climate Change Adaptation in the Tourism Sector” (Simpson et. al., 2008).

For the purpose of this paper, an adaptation process was developed for adventure tour operators (Figure 11) given their unique characteristics: greater reliance on hard skills in the field, intensive product changes possible as a result of climate change effects. The approach provides a clear concept for action with an emphasis on environmental monitoring and constant product adaptation.

Adaptation should be a dynamic process to confront opportunities and threats throughout the organisation and with stakeholders. This is a continuous cycle where the company can and should manage each stage simultaneously as a result of multiple adaptation requirements and varying priorities. Also, adaptation strategy to assist business, the environment and the community

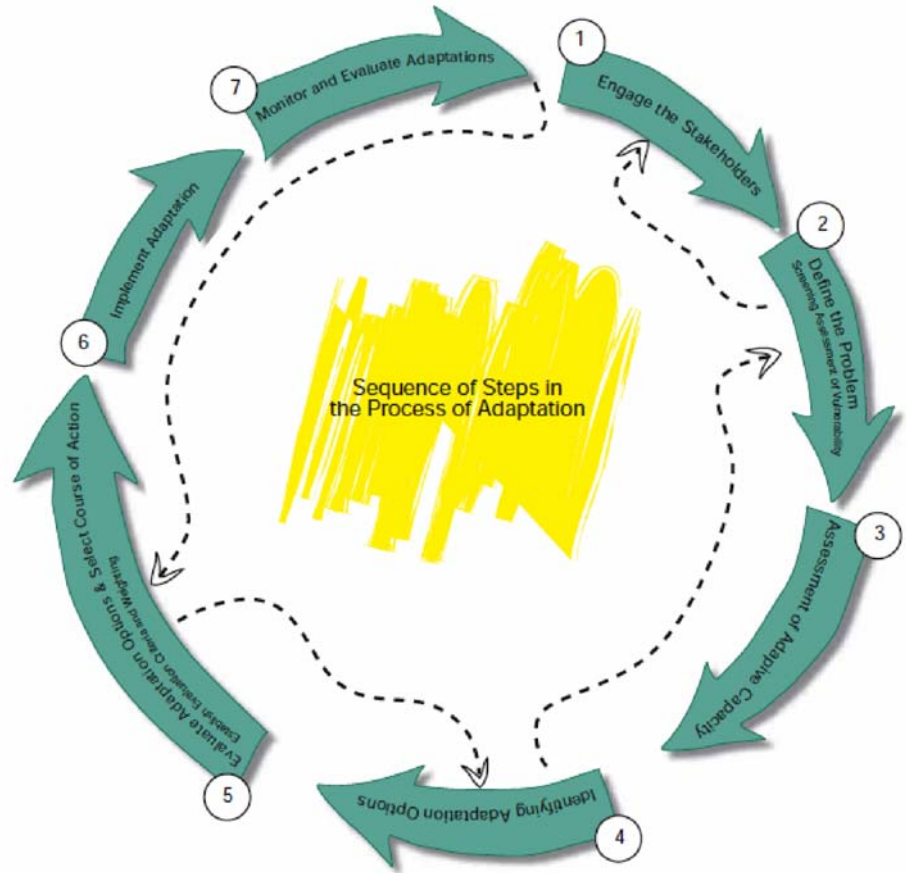


Figure 10: Seven Step Framework for Climate Change Adaptation in the Tourism Sector (Simpson et. al., 2008)

should be easier to introduce and employ as a result of many adventure tour operators already exercising sustainable and conservation oriented strategies. The stages of adaptation are as follows:

IDENTIFY

- Research and communicate potential climate change impacts. Educate staff and stakeholders to do the same and discuss.
- Consider required and available resources, costs, and impacts on personnel, operations, logistics, sales and marketing.
- Designate experts and committees as necessary to advise management and staff similar to Quark Expeditions. Encourage company members to record environmental changes during trips such as temperature and snow line in order to enhance local information for decision making.



Figure 11: Adventure Tourism Climate Adaptation Model

PLAN

- Explore options based on various scenarios within the company and externally with stakeholders. Conduct course of action (COA) analysis and prepare contingency plans.
- Prioritise and organise adaptation measures. Rehearse and discuss as necessary.
- Allocate and obtain necessary resources.

IMPLEMENT

- Involve all stakeholders to produce greater effects. Include travellers where possible as part of eco-tour activities to reduce costs.
- Responsibly manage and oversee Implementation.

EVALUATE

- Assess effectiveness internally and with stakeholders. Base evaluation of adaptation on criteria such as “costs, benefits, equity, efficiency, urgency and implementability” (Burton et. al., 2000, p. 239).
- Maintain records and information on implementation methods and effectiveness. Share information with other tour operators and stakeholders.

The research for this paper did not focus significant attention on community relations and policy as climate change tends to be currently bundled with sustainable practice and interaction. Strengthening institutions and involving those at risk should be part of any strategy. This will likely become more prevalent in the future as tourist companies react more closely with the local community and government to the physical impacts of climate change. Also, the financial capacity to adapt will range widely depending on location specific conditions. Budgeting is a major part of each stage as well during adaptation.

Conclusion and Forecasts for the Future

Climate change impacts are predicted to escalate with increased warming effects. As discussed, acute natural disasters may increase in volume while slowly changing climate effects will increase in their speed and influence on natural environments and society. Estimates of glacial melt and sea level rise are constantly increasing. Trends for inland climate change impacts show seasonal weather changes, increased temperatures and droughts to become more prevalent as well. While this paper provides insight from a few adventure travel companies' current interaction with climate change, the implications on future business will become much more transformative twenty or more years from now. Some outdoor activities and local communities in remote regions may no longer exist. Resource and capability constraints need to be strategically managed to overcome such fate. The Adventure Tourism Climate Adaptation model provides a useful tool to begin the longer journey of sustaining adventure travel business through effective business strategy and practice.

Areas for Further Research

The aim of research was to explore how adventure tour companies are dealing with climate change impacts and make recommendations. The focus was on adaptation, an area not researched as much as climate change mitigation. Through interviewing a few companies, it became evident that climate change effects have yet not had a significant impact on tour operations. Despite the lack of impacts on their business models, approaches and best practices emerged for climate strategy to begin the adaptation process.

In the span of six weeks, further areas of research have emerged. Ideally, a larger sample size of companies from other regions such as coastal and desert regions and a larger number of interviews from the same region may provide further insights and evidence to support findings. Additional specific examples and materials from companies can provide greater depth. Also, parallels between similar activities in regions or a larger portfolio of adventure sports may be explored in terms of climate change adaptation.

In addition to strategy, operations and marketing threats and opportunities, finance, human resources, and logistics may be focused on. Value chain analysis may become more popular as companies physically adapt more to climate change. Stakeholder interaction and policy formation/influence are examples of other topics to focus on.

Lastly, the quantifiable costs involved with adaptation may be a difficult subject for such diverse and niche tour operators, but applying costs to specific recommendations in this paper would be very interesting as companies further adapt.

In closing, we see that adventure travel companies working in close relationship to their environment need to begin adapting to climate change impacts now to sustain their business. While Quark Expeditions and Amazon Tree Climbing have not been influenced enough to drastically change business strategy and Snow Leopard has begun some adaptation, all of the companies are very open to engaging and understanding the impacts of climate change on their natural environment, resource base and customers in preparation for future adaptation. All of the interviewed companies are champions at practicing sustainability and encouraging environmental education. As tour operators make small changes now, they should remain proactive and dynamically manage their future business strategy. While confronting climate change, leadership, communication and education will assist in reducing costs, easing operational change and sustaining a potentially fragile business over the long run. Similar to trekking, responsible terrain and weather analysis, planning and packing will enable tour operators to successfully reach their destination.

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ADDITIONAL REFERENCES

Globe with general company locations under the 'Objective' section was cropped from Google Maps (Available at: <http://maps.google.co.uk>) and edited with Microsoft PowerPoint 2007.

Photo source for pictures used in 'Figure 4: Summarised Climate Change by Region':

Iceberg picture [Online]. Available at: <http://greatscat.com/2007/08/what-polar-ice.html> (Accessed: 12 August 2009).

Manaus river picture [Online]. Available at: www.opcotours.com/.../manaus/pckg_manaus.html (Accessed: 12 August 2009).

Uttarakhand mountain range picture [Online]. Available at: http://farm3.static.flickr.com/2328/2000003309_ff9d20ee45.jpg (Accessed: 12 August 2009).

Interviewed Companies:

Quark Expeditions, Inc. Norwalk, Connecticut, United States www.quarkexpeditions.com

Campbell, Prisca (Marketing Manger) from Quark Expeditions, Inc. (2009) Interviewed by Ryan Piotrowski for MBA 2008 Individual Project, University of Cambridge, Judge Business School, 6 August.

Contini, Francisco (Vice President, Marketing and Group Sales) from Quark Expeditions, Inc. (2009) Interviewed by Christina Heyniger, Xola Consulting Inc. May 2009.

Davis, Bill (Director, Expeditions Operations) from Quark Expeditions, Inc. (2009) Interviewed by Ryan Piotrowski for MBA 2008 Individual Project, University of Cambridge, Judge Business School, 27 July to 5 August.

Snow Leopard Adventures Private Limited, New Delhi, India

www.snowleopardadventures.com

Joshi, Parth (Executive, Marketing) from Snow Leopard Adventures Private Limited (2009) Interviewed by Ryan Piotrowski for MBA 2008 Individual Project, University of Cambridge, Judge Business School, 24 July to 24 August.

Amazon Tree Climbing, Manaus, Amazonas, Brazil

www.amazontreeclimbing.com

Cunha, Eduardo from Amazon Tree Climbing (2009) Interviewed by Ryan Piotrowski for MBA 2008 Individual Project, University of Cambridge, Judge Business School, 29 July to 11 August.

The company history, activities and beliefs/practices sections were written based on interview discussion and company website information. The interview response sections are summaries of e-mail discussions with each company.

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