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GORGEOUS LANDSCAPES AND WILDLIFE: THE IMPORTANCE AND DANGER OF ANTARCTIC TOURISM

PAISAJES Y VIDA SILVESTRE MARAVILLOSA: IMPORTANCIA Y PELIGROS DEL TURISMO ANTÁRTICO

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ABSTRACT: This article provides an overview of current trends in Antarctic tourism, highlighting the procedures adopted to minimize the risk of environmental degradation. Attention is paid to the variety of cruises that tourists can enjoy, the shifting national demographics of the industry, and the limited nature of search-and-rescue operations. The Antarctic Treaty's Protocol on Environmental Protection (1999) is discussed with emphasis on its applicability to Gentoo penguin colonies. The roles of the International Association of Antarctic Tour Operators (IAATO) and International Polar Heritage Committee (IPHC) are also analyzed at length. Twenty photographs have been included of the various sites and activities mentioned in the text.

KEY WORDS: Antarctica; Antarctic Tourism; Antarctic enviroment

RESUMEN: El artículo proporciona una visión general sobre las tendencias actuales del turismo antártico, enfatizando los procedimientos para minimizar los riesgos de deterioro ambiental. Se señalan la diversidad de cruceros, la evolución demográfica de la industria y la naturaleza de las operaciones de búsqueda y rescate. Se discute el Protocolo de Protección de Medio Ambiente (1999) en cuanto a su aplicabilidad a las colonias de pingüinos gentoo. La labor de la Asociación Internacional de Operadores Turísticos Antárticos (IAATO) y el Comité Internacional de Patrimonio Polar (IPHC) son analizados extensamente. Se incluyen 20 fotografías de diversos sitios y actividades mencionados en el texto.

PALABRAS CLAVES: Antártica; Turismo Antártico; Medio Ambiente Antártico

I. ADVERTISING FOR ANTARCTIC TOURISM

People who have travelled much of the rest of the planet are now turning their attention to its largest natural park: Antarctica. Cruise operators offer voyages that reveal the dramatic extremes of the frozen continent. It holds the distinction of being the coldest, driest, windiest, and highest location on earth. Various types of ships, from small expeditionary vessels to large Russian icebreakers and luxury expedition ships with reinforced hulls, enter Antarctic waters starting from Punta Arenas, Chile, and Ushuaia, Argentina. Usually they visit the Antarctic Peninsula and, when returning, South Georgia and the Falkland/Malvinas Islands. Whale- and bird-watching are popular activities, aside

from simply taking in the extraordinary views of the frozen terrain. Antarctica cruises offer zodiac excursions for up-close encounters with wildlife and the blue icebergs that float quietly in the vicinity. Kayaking and onshore camping offer further sources of diversion. On Antarctica tours, onboard experts lecture about the region's natural history, weather, and captivating wildlife commonly seen during a cruise to the frozen continent[1]. Smaller ships only carry about 300 passengers, including crew members, and make various landings at historic sites including abandoned whaling stations, active polar stations, penguin colonies or the shores on which seals lounge. Other ships carrying 3,700 passengers and crewmember are too large to organize landings, but they offer trips more reasonable prices.

II. ORGANIZATION OF ANTARCTIC SHIPBORNE TOURISM

Today Antarctic tourism is managed by the International Association of Antarctica Tour Operators (IAATO), an organization including over one hundred member companies that was founded in 1991 to advocate, promote and practice safe and environmentally responsible private-sector travel to the Antarctic[2]. IAATO members monitor the pattern and frequency of visits to specific sites within Antarctica. They also coordinate itineraries so that no more than a hundred people are ashore at the same place at the same time. One guide is obligatory per 20 visitors. Careful coordination ensures that tourists have the sensation of being alone in the extraordinary landscape, while others ships are waiting in the next bay or behind an iceberg.

Studies highlight the increasing popularity of seaborne tourism. During the 1992–93 season, twelve ships operated by ten companies completed 59 voyages with approximately 6700 passenger landings in Antarctica. This number nearly doubled by the 2000–1 season when there were up to 21 ships operated by the same number of companies, and they performed 131 voyages with approximately 12,100 passenger landings, aside from an unknown number of private yachts, which are not affiliated with IAATO[3]. For the 2005–06 season up to 270 voyages were predicted, with approximately 20,000 landings and the new category of 6,000 tourists aboard a ship without landings. The increase continues to this day at a sharper pace than anticipated by executive director of IAATO Denise Landau.

In 1990 Antarctica was visited by just 5,000 tourists, but by 2006–07 that number had grown to 37,552 while the following year saw a 22 per cent increase to 46,069[4]. Most Antarctic tourists come from the United States, followed by United Kingdom, Germany, Australia and Canada (Fig. 1).

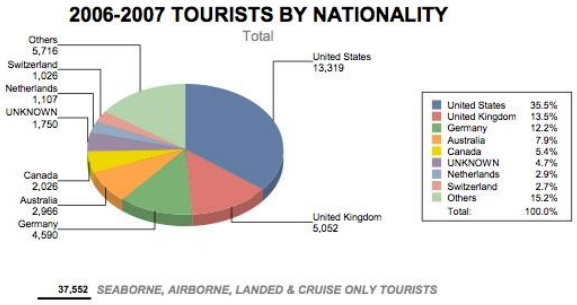

Fig. 1: Nationality of Antarctic tourists in the season 2006/07 (IAATO 2007).

Analysis of the 2009–10 season reveals a slight change in the number of ships and operators although the total of 36,875 visitors is approximately the same (Table 1). Due to the financial crisis the percentage of U.S. tourists decreased by 3.1% while Germans took overtook the British as the second largest visitor group due to an increase of 1.9% and a decrease of British visitors by 3.2 %.

Country	Number of visitors	Percentage
United States	11,953	32.4 %
Germany	5,211	14.1 %
United Kingdom	3,789	10.3 %
Australia	2,582	7.0 %
Canada	2,082	5.6 %
Netherlands	1,439	3.9 %
Japan	1,194	3.2 %
Switzerland	1,018	2.8 %
France	897	2.4 %
Argentina	866	2.3 %
Other	5,844	16.0 %
Total	**36,875**	**100.00 %**

Table 1: Nationality of Antarctic visitors in 2009/10 (after IAATO 2010).

Since 1989, approximately 200 Antarctic sites including 20 research stations are visited on the Antarctic Peninsula[5]. Some of these receive more than 100 tourists each summer season, while others are only visited once a season (www.iaato.org/tourism_overview). In fact, most of the visits concentrate on less than 35 sites and some of them attract approximately 10,000 tourists each season. The small museum in Port Lockroy (Fig. 2), which was the former "A" research station of the British Antarctic Survey from 1943 to 1962, rceives over 10.000 visitors annually. The summer crew running the museum monitors a nearby Gentoo penguin colony.

Fig. 2: A Gentoo penguin colony at the museum in Port Lockroy (Photo by Wilfried Korth, 4 February 2004).

Figure 3 shows the increase of shipborne tourists and the number of cruise ships and sailing vessels. In fourteen years Antarctic shipborne tourism increased by 430% while land-based tourists rose by 757% in the last decade[6].

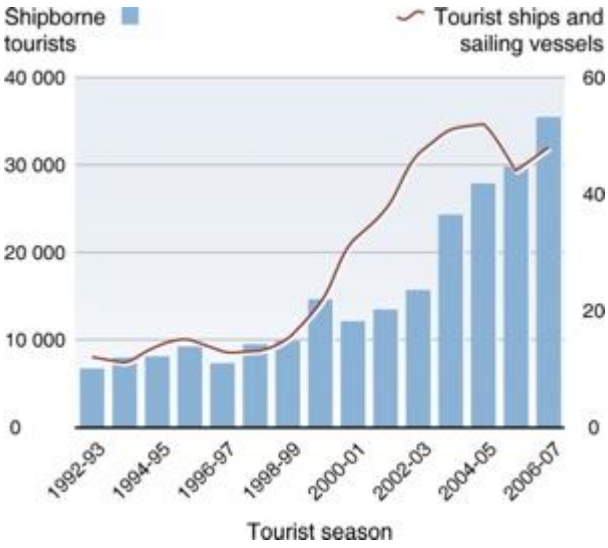

Fig. 3: Trends in Antarctic tourism 1992-2007 (UNEP/GRID-Arendal, 2007).

Most of the visits were made to destination in the Antarctic Peninsula, where cruise ships enjoy open sea conditions during the summer. During the 2007–8 season, 46,000 landings exceeded the anticipated number. During the summer, a number of large ships without reinforced hulls, for example, *The Golden Princess* which can transport up to 3,700 passengers, carry more people than the total personnel of all Antarctic research stations[7]. These ships only cruise in the open Antarctic waters, as they do not have ice-class certifications, for which reason cannot be safely operated near icebergs[8]. Such voyages are also very impressive. However, the pollution that they generate may pose a threat to the environment. Most cruise ships sail close to shore and, if they are damaged in shallow water, the result can be disastrous, as search-and-rescue operations for large ships remain impossible.

Serious accidents can also occur on the Antarctic icecap, requiring that tourists receive medical treatment. These incidents may increase when more people travelling to the interior of the Antarctic continent are not checked by a physician beforehand, as required of those individuals who work at research stations. For instance, on 31 December 2009, a group sponsored by Antarctic Logistics and Expeditions (ALE) left its base camp at Patriot Hills (80°20'S, 81°25'W) and was flown by ski-equipped aircraft to the South Pole, which is located 2,840 meters above sea-level, and the air temperature was –25° C. Approximately four hours after departing, the group encountered the Kaspersky Commonwealth Expedition consisting of seven women who had skied over 550 miles (900 km) from the edge of Antarctica to the South Pole, pulling their sleds. Thereafter the ALE group was to visit the U.S. Amundsen-Scott South Pole Station, yet one of the visitors become serious ill and requested medical assistance. He was taken to the extensive medical facilities at the South Pole station. Later he had to be evacuated from Antarctica and taken to a hospital for further treatment. ALE requested that the National Science Foundation (NSF) deploy one of its aircraft for an emergency flight to Christchurch, New Zealand. The NSF agreed to this and prepared one of its Air National Guard ski-equipped LC-130 aircraft, based at NSF's McMurdo Station at the Ross Sea, to carry an experienced medical trauma team to the South Pole to transport the patient to Christchurch. While this individual could be saved, search-and-rescue operations remain unprepared to respond to larger-scale accidents.

On 23 November 2007 the first Antarctic cruise ship *MS Explorer* operated by Lindblad Expeditions sank in the Bransfield Strait, about 80 km east off King George Island after a collision with an iceberg[9]. See figure 4.

Fig. 4: The red-hulled *Explorer* capsized in an icefield 80 km east of King George Island on 23 November 2007.

The rescue was organized by the Argentine Coast Guard and the Chilean Navy Center for Search and Rescue. All 154 passengers were evacuated unharmed. They drifted in lifeboats for five hours until being picked up by the first arriving ship, the Norwegian vessel *MS Nordnorge*, and taken to King George Island, where they were housed by the Chilean Frei Montalva Station and the Uruguayan Artigas Base. From King George Island a C-130 Hercules transport aircraft of the Chilean

Air Force flew them to Punta Arenas, Chile. The *Explorer* sank about 20 hours after colliding with the iceberg.

This was not an isolated incident. On 28 December 2007, with 346 individuals onboard, the Norwegian cruise ship *MS Fram* experienced engine problems and drifted into an iceberg.[10] Fortunately no leakage resulted and it was able to sail back to Ushuaia. On 30 January 2007, with 370 individuals onboard, the Norwegian cruise ship *MS Nordkapp* ran aground near Deception Island resulting in the spillage of marine diesel oil. The environmental consequences were limited, but could have been much worse. This event was "a big wake-up call" for Dr. John Shears, head of environment and information at the British Antarctic Survey[11]. He made it clear that more stringent supervision of tourism is urgently needed. Unfortunately there is no state or international law that governs tourism in Antarctica. The main problem is that the Antarctic Treaty can only take over supervision or regulations of tourism when an unanimous decision is made by its member nations, which is still lacking.

III. ENTERING THE CONTINENT

Tourists feel exhilarated when they finally approach the Antarctic continent after passing through the usually rough Drake Passage between South America and the Antarctic Peninsula. Deception Island in the South Shetlands is one of the first stops. Entering the caldera through the narrow passage called Neptunes Bellows is a special highlight of every cruise (Fig. 5). Before tourists make their first landing, expedition leaders and tour guides inform them of the guidelines for proper conduct, per the criteria established by IAATO[12].

Fig. 5: Leaving the caldera of Deception Island through Neptunes Bellows (Photo by Cornelia Lüdecke, 2 March 2007).

Tourists are confined to the role of observers. They are prohibited from removing anything from the continent and must maintain their distance from animals. They are not to step on mosses or lichens, as these plants do not recover quickly in the extreme climate. Nobody is allowed to bring food onshore, and any form of littering is strictly forbidden, as is smoking. Tourists have to stay together as a group and follow their guides, especially when they are hiking near the landing site.

People are not allowed to enter historical huts except on very rare occasions, and then they must be accompanied by authorized personnel.

Tourists are allowed to go ashore only after agreeing to follow these guidelines. At Whaler's Bay on Deception Island they see the remains of an old whaling station that was destroyed by volcanic eruptions in 1927. They then continue to a research station of the British Antarctic Survey which includes a small landing strip and aircraft hangar. Penguins and seals serve as additional points of interest in the largely abandoned area. Due to the volcanism special activities are offered on the shore of Whaler's Bay. Crew members dig a pool in the sand, and it quickly fills with hot water. Tourists are allowed the bathe therein, which makes for a memorable experience given the cold weather and frequent snowfall (Fig. 6).

Fig. 6: Japanese tourists taking a bath on the shore of Deception Island at Whalers Bay (Photo by Wilfried Korth, 3 February 2004).

When people return to their cruise ship, they have to wash their boots before taking them off and store them on shelves to avoid contamination of the next Antarctic site with pathogens from wildlife, insects or other material.

IV. CLOSE ENCOUNTER WITH ANTARCTIC WILD LIFE AND FLORA

The Protocol on Environmental Protection to the Antarctic Treaty entered into force on 14 January 1998 with the aim to protect the Antarctic environment. It includes annexes on marine pollution, fauna and flora, environmental impact assessments, waste management, and protected areas[13]. Within this framework tourists are allowed to visit seal-covered shores and penguin colonies, and they are required to maintain a distance of five meters from the animals[14]. A distance of fifteen meters is required in the case of fur seals to prevent an encounter with an aggressive bull. However, sometimes tourists have to go through a crowd of emperor penguins to make a landing (Fig. 7) or enter an island (Fig. 8).

Fig. 7: Landing in Gold Harbour on South Georgia although the shore is occupied by king penguins (Photo by Cornelia Lüdecke, 9 March 2007).

Fig. 8: A path crossing a group of gentoo penguins at Petermann Island (Photo by Cornelia Lüdecke, 3 March 2007).

Sometimes tourists are unable to maintain the proper distance because they are approached by curious penguins (Fig. 9).

Fig. 9: A curious gentoo penguin tries the trousers of a guide at Aitcho Island (Photo by Cornelia Lüdecke, 3 February 2007).

John Shears reported that the impact of tourists on the Gentoo penguin colony at Port Lockroy is only minimal due to proper management and control, although the area is heavily visited[15]. If tourist groups are properly guided these encounters do not pose a serious threat to the wildlife.

But what about the small alien species that tourists may carry from one Antarctic landing site to another on their clothing or other items that are not cleaned after they return to the ship? (Fig 10).

Fig. 10: A day pack placed among a fur seal and king penguins at Gold Harbour on South Georgia (Photo by Cornelia Lüdecke, 9 March 2007).

A wide range of non-native species are not present in Antarctica and the sub-Antarctic islands. These introduced species include microbes, algae, fungi, vascular plants, invertebrates, fish, birds and mammals[16]. An effective decontamination prior to each of the landings is essential, as a report published in 2001 has shown[17]. The stringent biosafety protocols of IAATO, designed to prevent the spread of seeds and insects, also need to be respected. Additionally the Ballast Water Convention requires ships entering the region to take aboard fresh ballast water at the Antarctic Convergence. Unfortunately this does not prevent the widespread contamination of ships' hulls by

various species of plants and animals. In 2006 the Antarctic Treaty Consultative States warned that hull contamination may be “the most significant pathway for marine introductions”[18].

V. HISTORIC SITES

If tourists go ashore, they are instructed to pay special attention to historic sites. They are not to step on relics or to enter old huts unless specifically authorized to do so. However, they often do not realize that stones arranged in certain pattern are considered part of the sites. This happens at sealing sites established in the early nineteenth century at places like Yankee Harbour on the south-western part of Greenwich Island close to Bransfield Strait, where people are allowed to handle the try-works (cast-iron pots) from the sealing era (Fig. 11)[19].

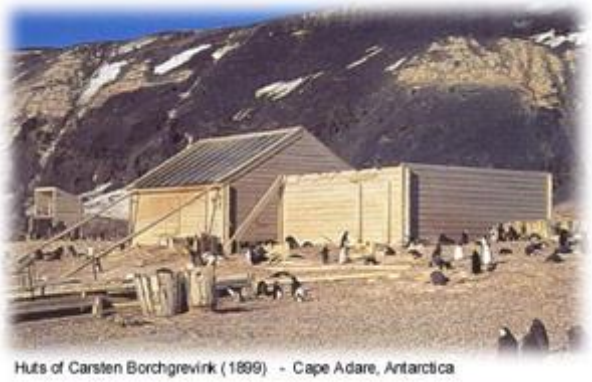

Fig. 11: Try-works at Yankee Harbour (Photo by Maria Ximena Senatore, January 2006).

Such sealing sites are usually within 100 meters of the shore and are not easily identified by non-specialists. In the 2007–8 season, 17 ships carried about 4,000 tourists to this site and it has been visited by 19,000 tourists since 2000. One of the most challenging tasks of the guides is to prevent people walking on the try-works (Fig. 12).

Fig. 12: Tourists around the try-pot at the historical sealing site of the 19th century at Yankee Harbour (Photo by Maria Ximena Senatore, January 2006).

Most of the changes at the sites were due to nature, when wind partially covers the stone settings with sand one year and exposes them in another. Extensive archaeological research of historical whaling sites from the 18th and 19th century was conducted at Byers Peninsula of Livingstone Island[20].

In contrast to these sites, old huts from the heroic era of polar research are much easier to identify. Sometimes access is prohibited by surrounding penguin colonies as can be seen in Figure 13.

Fig. 13: Carsten Borchgrevink's winter quarters of 1899 at Cape Adare, Ross Sea, Antarctica.

At other places tourists can enter historic huts like the museum at Port Lockroy or Wordie House established as British Base "F" in 1947 on Winter Island, one or the Argentine Islands at the Antarctic Peninsula close to Ukraine's Vernadsky station (Fig. 14)[21].

Fig. 14: Wordie House on Winter Island (Photo by Cornelia Lüdecke, 1 March 2007).

Today Wordie House is restored and designated under the Antarctic Treaty System as Historic Site and Monument No. 62. Tourist groups can visit on request (Fig. 15)[22].

Fig. 15: Bed and private corner in Wordie House on Winter Island (Photo by Cornelia Lüdecke, 1 March 2007).

Resolution 3/2009 of Antarctic Treaty System provides guidelines for the designation of historic monuments and sites. Referring to tourists it says: "Visitors to Antarctica should be informed of the importance of protecting the historic and cultural heritage of the Antarctic continent and its surrounding islands and of all restrictions applying to artefacts, sites and monuments listed under the Antarctic Treaty system or protected under Resolution 5 (2001). This may include by developing historic site information guidelines and incorporating information about cultural heritage into a range of public education and interpretive materials to be prepared by the Parties, reminding visitors to Antarctica that they must not engage in conduct that results in interference to any scientific stations or environmental protected areas, as well as buildings, historical monuments, sites, artefacts, relics,

commemorative plaques or site markers. The conservation of these features differ from the protection of biological or environmental phenomena but are equally important to the understanding of the values of Antarctica"[23].

VI. TOURISM AND POLAR HERITAGE

The International Polar Heritage Committee (IPHC) was formed to address concerns about the general lack of awareness and recognition of the history of polar regions[24]. An initial aim of the IPHC therefore was to promote the preservation of human heritage in the polar regions. A collaborative project with Antarctic cruises has already yielded encouraging results. During the 2004 –05 season concerns were raised about aspects of conservation work at the Swedish Antarctic Expedition Hut (1901-03) on Snow Hill Island in the Antarctic Peninsula, and the protection of a historic site on Paulet Island that uses a metal fence to keep out penguins and tourists[25].

Around historic sites there is usually a lot of rubbish that has to be left there as part of the local history. However the definition of rubbish varies and can be misused to remove historic material.

According to Paul Chaplin, Secretary General, International Polar Heritage Committee, Oslo, the Antarctic Heritage Trust (AHT) defines polar "rubbish" as any item which:

i. is in such poor condition that it is not reasonably possible to conserve it, and,

ii. has a limited life if left untreated, and,

iii. does not contribute in any significant way to our understanding of the history of the Antarctica region,

iv. does not contribute to the visual qualities of the site or building of which it is a part, and,

v. is not a unique or relatively rare item[26].

Chaplin defines "historic rubbish" as rubbish consisting of items originally disposed of as rubbish during the Heroic Era and all such items are considered artefacts in their own right.[27] They should be maintained and not modified or destroyed as there may be a need at some time to gain information from them (Fig. 16).

Fig. 16: The former whaling station Leith Harbour at South Georgia still seems to be full of rubbish (Photo by Cornelia Lüdecke, 7 March 2007).

The result of such a strict clean up can be seen at the historic whaling station of Grytviken established in 1904 on South Georgia (Fig. 17).

Fig. 17: The former whaling station Grytviken after a clean up (Photo by Cornelia Lüdecke, 7 March 2007).

Despite the discussion about rubbish, tourists should always remember not to remove anything from a site, lest it be an artefact of some kind.

VII. AN ANTARCTIC STATION OR MUSEUM?

When the former research station Base "A" at Port Lockroy was renovated and made into a museum in 1996, its original shape was preserved and repaired from year to year if needed. It is designated as Historic Site and Monument No. 61 under the Antarctic Treaty[28]. However, the interiors of some of the rooms have been modified, one to become a post office and souvenir shop. Other rooms are nicely decorated as a museum (Fig. 18). The museum personnel are in contact with the tourists and

monitor their impact on penguins, which seems to be positive, since tourists decrease the prevalence of skuas, which like to take penguins eggs and chicks[29].

Fig. 18: Kitchen of the old research station in the museum at Port Lockroy (Photo by Wilfried Korth, 2004).

Another example is the current Vernadsky Research Base on Galindez Island adjacent to Wordie House on one of the Argentine Islands[30]. Ukraine took over the former British Faraday Station in 1996, which was built to replace Wordie House in 1954. Tourists can visit the station on tours guided by the Ukrainian personnel (Fig. 19).

Fig. 19: Approaching Ukraine's Vernadsky station (Photo by Cornelia Lüdecke, 1 March 2007).

Due to the design of a typical research station with narrow corridors and small rooms, it is not easy to organize a tour of the building with 90 to 100 people at a time. The benefit for visitors is rather limited except for the possibility of buying souvenirs at a small gift shop or having a vodka at the bar. Some scientists view tourist groups as interrupting their scientific work, which they believe should be given priority.

VIII. OUTLOOK

The majority of non-IAATO tourism and landings at Antarctic sites are reported by private or commercial yachts. Approximately half of them are not authorized by Antarctic Treaty parties, which rarely protest their activities. However, some non-IAATO tour operators or visitors simply lack awareness of the ATCM requirements, recommendations, and guidelines for visitors. Each season there are also reports of difficult encounters, especially when the conduct of non-IAATO members is "resulting in actual harm to the environment, wildlife disturbance or damage to historic artefacts" [31]. Due to such experiences, IAATO launched an Antarctic yacht outreach campaign in 2010[32]. Other efforts were made regarding large cruise ships and ice-breakers. From 2012 onward ships that use heavy oil will no longer be allowed to enter Antarctic waters[33]. Ships larger than 10,000 tons will also be restricted and eventually prohibited.

How can Antarctic tourism be handled in the future? Analysis of the possibilities can help policy makers and other stakeholders appreciate the uncertainties of one of the most expensive segments of tourism[34]. During a workshop at The Hague in 2005 three case studies were investigated. The "polar profit" group of the cruise market is a cooperative industry that will reach a million tourists by 2030 and allow them to stay in hotels in the Antarctica. The "negotiation" group is also a cooperative industry, but it acts with the consensus of the Antarctic Treaty Consultative Parties. The high number of tourists will cause a breakdown of the self-regulatory regime by 2015, while global water and energy shortages will encourage governments to industrialize Antarctica by harvesting icebergs or even exploiting minerals. Such activities will lead to a decrease in Antarctic tourism. The "SOS Antarctica" group represents an uncooperative industry with a shift from ship-based to land-based tourism. In this scenario hotels and airstrips will be available in Antarctica in 2010, which fortunately is not the case today. Cruises will no longer be exclusive in the future and by 2020 small Antarctic airports will have grown into hubs. In 2030 penguins are predicted to be extinct due to the spread of a bird virus. These scenarios may sound far-fetched, but they offer some ideas about future land-based Antarctic tourism and the need for specific policies and legal mechanisms.

Due to global warming, the extension of sea ice around the Antarctic coast in summer is likely to decrease, which would make the continent much more accessible for cruise ships. Consequently Antarctic tourism may increase (Fig. 20).

Fig. 20: Landing in Half Moon Bay, Antarctic Peninsula (Photo by Cornelia Lüdecke, 27 February 2007).

However, decreasing numbers of tourists landing in Antarctica indicate that tourists are unlikely to overflow Antarctica any time soon (Tab. 2).

Season	2006–07	2007–08	2008–09	2009–10	2010–11 estimate
Seaborne tourism with landings	28,448	31,941	26,648	21,277	18,385
Seaborne tourism, no landings	6,930	13,015	10,652	15,026	14,350
Air & cruise combination, with landings	174	257	285	345	558
Air & land-based tourism	908	439	273	233	375
Over-flights, no landings	1,046	613	0	0	0
Total	**37,506**	**46,265**	**37,858**	**36,881**	**33,668**

Table 2: Varying numbers of Antarctic tourists from 2006–07 to 2010–11.

The greatest number of Antarctic tourists appeared during the 2007–8 season. Since the number is predicted to decrease by approximately 27 percent in the current 2010–11season.

The Antarctic Treaty System and IAATO have to face the challenge of continuing tourist activity and do everything necessary to preserve the continent as a natural reserve devoted to peaceful scientific research. Antarctic tourists have first-hand experience of the continent and through their personal interaction with others, as well as by publishing blogs, for example, they can enhance public awareness of the need to protect the Antarctic environment and its associated ecosystems. In this way they can serve as a corps of ambassadors[35].

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