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DYNAMIC OF ANTARCTIC TOURISM AT FARADAY/VERNADSKY STATION (1968-2008)

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Abstract. Few previous site-specific studies have given attention to the development and management issues of Antarctic tourism at operating scientific stations that support non-governmental activities to some degree. This article presents findings from a study that examined the change in visitor patterns at Ukrainian Vernadsky Station (formerly British Faraday Station), one of the most visited tourist destinations in the Antarctic Peninsula area. Data detailing the trends of tourist activities at Faraday/Vernadsky Station have been collected and processed from 195 to 2008. Since 1996 there have been significant changes in governance and policy resulting in the increasing tourist numbers. This study uses a comparative approach to examine regulation patterns at different scientific stations in Antarctica and indicates policies for better visitor management at Vernadsky Station.
Key words: Seaborne Tourism Activities; Visitor Patterns and Trends; Management Policy; Antarctic Peninsula; Faraday/Vernadsky Station

Реферат. У зарубіжній літературі, присвяченій окремим територіям в Антарктиці, порушуються питання розвитку антарктичного туризму та управління ним на діючих наукових станціях, які певною мірою підтримують недержавні відвідування. У цій статті висвітлено результати вивчення змін у структурі відвідувань української станції Академік Вернадський (колишня британська станція Фарадей) – однієї з найбільш популярних серед туристів станцій у районі Антарктичного півострова. Динаміка туристичних відвідувань станції Фарадей/Вернадський репрезентована за даними, зібраними в період 1968–2008 рр. Значні зміни, що сталися в управлінні станцією починаючи з 1996 р., спричинили різке збільшення кількості туристів. За допомогою порівняльного підходу вивчено моделі управління туристичними відвідуваннями на різних антарктичних станціях, а також запропоновано рекомендації щодо покращення практики візитного менеджменту на станції Академік Вернадський.
Ключові слова: туристична діяльність, структура та динаміка відвідувань, візитний менеджмент, Антарктичний півострів, станція Фарадей/Вернадський.

Реферат. В зарубежной литературе, посвященной отдельным территориям в Антарктике, поднимается вопрос развития антарктического туризма и управления им на действующих научных станциях, которые в какой-то мере поддерживают неправительственные посещения. В данной статье освещены результаты изучения перемен в структуре посещений украинской станции Академик Вернадский (бывшая британская станция Фарадей) – одной из наиболее популярных среди туристов станций в районе Антарктического полуострова. Динамика туристических посещений станции Фарадей/Вернадский представлена на основе данных, собранных за период 1968–2008 гг. Значительные перемены, произошедшие в управлении станцией начиная с 1996 г., содействовали резкому увеличению количества туристов. Методом сравнительного подхода изучены модели управления туристическими посещениями на различных антарктических станциях, а также разработаны рекомендации улучшения практики визитного менеджмента на станции Академик Вернадский.
Ключевые слова: туристическая деятельность, структура и динамика посещений, визитный менеджмент, Антарктический полуостров, станция Фарадей/Вернадский.

Introduction

The tourism industry is an increasingly significant factor in Antarctica. In terms of numbers of people and vessels, seaborne tourism is a major commercial activity in Antarctica. Hence, White (1994, p. 248) defined the Antarctic economy as "the tourism period". Rapid expansion of tourism (Stewart, Draper, & Johnston, 2005; Maher, Steel, & McIntosh., 2003), as well as an increase in the number of landing sites (Naveen, 1999, 2003) have been observed in recent years. Ship-borne tourist activities have diversified, and now include scuba diving, kayaking, camping, mountaineering, historic sites and research stations visit. Diversification of tourist activities has exerted some pressure not only on the wilderness, but on the values of the area for scientific research already underway in Antarctica (Cessford, 1997). As there is no established permanent infrastructure for land-based tourism in Antarctica, tour operators, for various reasons, aspire to visit active coastal research stations during their voyages when possible. Furthermore, some easily accessible research stations are being turned into tourist destinations and a visit to one of them has become a usual feature of most tours to Antarctica. Therefore, the visitor pressure on scientific stations has increased with the growth of tourism (Enzenbacher, 1994).

According to the results of a survey conducted by the Council of Managers of National Antarctic Programs (COMNAP) that covered five Antarctic seasons from 1998 to 2003, 76 percent of the operating stations participated in the survey allowed tourist visits to their stations, and 27 percent of respondents provided accommodation at stations (COMNAP, 2004). Moreover, some countries are even actively encouraging tourism and have built new, or converted existing, infrastructure to service tourists (ASOC, 2006a). From one side, the International Association of Antarctica Tour Operators (IAATO) raised a question of consideration in one's capacity of permanent and semi-permanent infrastructure for land-based tourism the following facilities: stations offering visitor accommodation for overnight or extended stays, as well as museums (historic huts) and souvenir shops at research stations (IAATO, 2006a). At the same time, IAATO aims at supporting scientific research by means of logistical support specifically offering transport for scientists (IAATO, 2006b). Forty-three percent of 21 respondents benefited from travel to/from or within Antarctica on tourist-chartered aircraft, ships or other vehicles (COMNAP, 2004).

Thereby, the weak legal arrangements in Antarctica allow states use tourism as a tool for both asserting and undermining sovereignty, and by industry to stall any regulation (ASOC, 2006a). However, with proper coordination and sensitivity to the requirements of each activity, tourism and research can continue to coexist in Antarctica without negatively impacting the Antarctic wilderness, its aesthetic values, or the conduct of scientific research (ATCM, 1996a). In addition to the international law and national legislation, various specialized codes of conduct have been developed to regulate tourism in Antarctica. Regulatory measures have been adopted by Antarctic Treaty Consultative Parties (ATCPs) on those stations where tourism activities are conducted (ATCMs) (ATCM, 2003a; IAATO, 1996). Among them the most important are the following Station Visit Guidelines: US Palmer and McMurdo Station Guidelines and Station Visits (ATCM, 1996a); Procedures for Tourist or Non-Governmental Expeditions Requesting a Visit to a British Antarctic Survey Research Station or Historic Site (ATCM, 1996b); Brazilian Antarctic Station Comandante Ferraz Station Visit Guidelines (ATCM, 1996c); South Pole Operating Procedure for visits to Amundsen-Scott Station (ATCM, 1996b); New Zealand Procedures for Visits to the Ross Sea and Procedures for visits to historic huts and Scott Base (ATCM, 1996d). This implies it is really a question of national policy and on-site management (Davis, 1995).

Despite that the relationship between science and tourism has been recognized as one of the prime polar tourism research needs (Stewart at al., 2005), little data is available on tourist activities at Antarctic research stations and on the relationship between tourism operations and national programs personnel. For the most part, previous studies have given attention to the research stations in the Antarctic Peninsula area. Donachie (1994) described why Henryk Arctowski Station (operated by Polish Academy of Science) on King George Island, South Shetland Islands, has

become popular with tour operators. He noted that the larger tourist ships can have an adverse effect on research programs and protected areas close to stations. Subsequently, on the basis of complete examination of regular visitor records between the seasons 1991-1992 and 1996-1997, Ciaputa and Salwicka (1997) reached the conclusion that Henryk Arctowski Station is one of the most heavily visited sites in Antarctica, and suggested specific proposals for better management at the station in order to meet the main tourist management goals. In a case study of tourism at Faraday Station, Enzebacher (1994) identified issues that challenge station management and policymakers. In her paper she focused on the evolution in British Antarctic Survey (BAS) tourism policy and the success of Faraday's strict tourism policy. The findings obtained by Enzebacher (1994) will be detailed in the following section.

In general, the studies listed above have been based on empirical data and aimed at practical issues of management; however, their lack of theory with regards to tourism research is obvious. The observed trends in the Polar Regions can be explained from the perspective of the existing tourism theories (Stewart at al., 2005). Davis (1995) considers the Limits to Acceptable Change (LAC) model as a possible approach to analyzing challenges of Antarctic tourism. In her study the integrated part of the LAC process, the development of classes based on environmental conditions or Recreational Opportunity Spectrum (ROS), is a theoretical means of compartmentalizing the forms of recreation sought in settings ranging from wilderness to urban. Davis (1995) labels stations with tourism-oriented facilities management by on-site personnel as "urban sites within wilderness".

This article contributes to the wider issues on Antarctic tourism development and regulation at research stations by (1) reviewing key elements of previous discussions on the subjects related to ATCPs and individual researchers and (2) examining some of the approaches that appear to be available and their adaptability for the single most visited station, which requires an improvement of its regulatory tools in tourism policy.

Study Context

According to IAATO's annual reports, 32,042 tourists visited Antarctica in the 2005-2006 season. Of 20,528 passengers who traveled to the Antarctic, 19,289 landed in the Antarctic Peninsula area (IAATO, 2006c). About 6,900 tourists were reported to visit research stations in Antarctica in the 2002/2003 season. On average, the visiting group contained about 50 tourists per visit (COMNAP, 2004). Stations along the western side of the Antarctic Peninsula were hosting the vast majority of the visits due to the easy access and high concentration of attractions on the peninsula. As a result, physical disturbance of operations and scientific programs run at the stations in this region has become particularly acute (Cessford, 1997). In comparison, stations outside peninsula (with the exception of the South Pole) have had only up to five visits per season (COMNAP, 2004).

One of the most visited research stations in the Antarctic is Ukrainian Vernadsky Station (formerly BAS's Faraday Station). The station was transferred to Ukraine according to the bilateral Governmental Agreement between the UK and Ukraine in 1995. On February 6th, 1996 Ukraine took over the full possession of the station. At present, Vernadsky Station is operated by the National Antarctic Scientific Center (NASC), attached to the Ministry of Education and Science of Ukraine. Although Ukraine still does not have any national operators that offer tourism options for the Antarctic region, Vernadsky Station increasingly receives tourist visits by other nationals. Based on visitor statistics provided since the 1967-1968 season, the study analyzes the effects of changes in governance of Faraday/Vernadsky Station on tourism activities in the region.

In this paper, tourists are defined as "visitors who are not affiliated in any capacity with an established National Antarctic Programme" (Enzenbacher, 1992, p. 17). That is, non-governmental travellers who voyage to and from Antarctica by the commercial transport for the purpose of pleasure (Bauer, 2001). Hence, this study does not consider friendly or official visits by

representatives from other stations and government or patrol vessels, as well as recreational activities of Vernadsky Station personnel on their leisure time. The latter case would be a subject for a future research. For example, Gildea (1998) pointed that Vernadsky Station personnel made numerous ascents on peaks close to the station within the bounds of Graham Land. These mountains had been climbed previously, but this was the first time that they were climbed in a single trip via a probable new route (Gildea, 1998).

Study Approach and Materials

The data submitted were compiled in Commander Reports of the Vernadsky Station for the 1st-13th Ukrainian Antarctic Expeditions (UAE) which provide regular records of visits at Vernadsky Station for the period since 1995. These baseline data of tourist activity were recorded in terms of the number of visitors, the name of the ship/yacht, the date of the visit, the arrival and departure time, and the overall characteristics of the groups' behavior (if registered). The 1998/1999 season could not be included in the detailed analysis, because the Vernadsky Station Commander's Report for that season was incomplete. The findings continue the longitudinal data collected earlier on cruise ship and yacht visits to Faraday Station for the period between 1967-1968 and 1992-1993 (Enzenbacher, 1994). Additionally, the two seasons 1993-1994 and 1994-1995 include the data compiled by US National Science Foundation on the basis of information provided by IAATO (the data does not include commercial yacht activity for these seasons) (IAATO, 2006b). The dataset used in this study represent the longest time series data on non-governmental activity at any scientific station in Antarctica from 1968 up to 2006.

This study is based on a comparative approach developed by Hall and Johnston (1995) who used it in the first comprehensive overview across Polar Regions. Subsequently, Stewart at al. (2005) used the same approach for studying patterns, scale and scope of tourist research on Polar Regions. In this study the comparative method used for analyzing models of tourism development at research stations in Antarctica.

Results and Discussion

Description of the Vernadsky Station Area and Local Tourist Activity

The relative distribution of tourist activity along the north-west part of the Antarctic Peninsula has changed during the last decade. One of the areas with the highest concentration of attractions along the Peninsula shoreline is to the North of Vernadsky Station. Popular destinations in this area can be categorized in terms of their recreational attractiveness as the following: (1) site of exceptional wilderness and aesthetic value (scenic landscape); (2) coastal site with the wildlife diversity; (3) historic site of "heroic age"; and (4) an active research station.

The map (Figure 1) shows that the most attractive site of exceptional wilderness and aesthetic value in the studied area is Lemaire Channel. It is located between the Antarctic Peninsula and Booth Island and is characterized by ice-cliffs, glaciers scenery and panorama of floating icebergs. This site accounts for more than one third of all area visits (13,906 tourists or 38 percent).

The most popular type of sea based Antarctic tourism is by cruise vessel. The following activities are common during the cruise: a small boat cruise (zodiacs) near the larger cruise vessels, kayaking, and scuba diving. The five islands (Petermann Island, Pleneau Island, Booth Island, the Argentine Islands, and Yalour Island) with the wildlife diversity hosted over 62 percent of all tourist visits in the area. The most visited site is Petermann Island, which was visited by 9,110 tourists in 112 groups during 2005-2006 season, making Petermann Island the fifth most visited site in Antarctica (IAATO, 2006b). Tourists land here to walk in the ice-free areas, wildlife photography, and video shooting. They also climb the highest places of the islands to have a

spectacular view of the mountains on the Graham Coast. Of those who visit the area, less than one percent visit the Mainland. In general, activities include camping and climbing Mt. Demaria, Mt. Mill, Mt. Scott, and Mt. Shackleton (Figure 1).

Figure 1: Map of the Vernadsky Station area, showing the location of main visitor destinations and structure of sea-borne tourist activities at each individual site in 2005-2006 season (in percent of all tourist activities in the studies area). Source: IAATO (2006c).

Type of activities: SC – Ship Cruise, SBC – Small Boat Cruise, SBL – Small Boat Landing, SV – Station Visit, SD – Scuba Diving, K – Kayaking, C – Camping, MC – Mountain Climbing, EX – Extended Walk, RUV – Remote Underwater Vehicle.

Each of the five most visited islands is located in the southern part of the Wilhelm Archipelago, south of the Lemaire Channel. Each of them is 1 to 2,5 kilometres long and rises up to approximately 50-150 meters above sea level (except for the Yalour Islands, which are a group of scattered and low lying rocks). The deep Penola Strait allows for cruise ship navigation in this area. Many small cobbled bays are indented in the island's coastline, with rocky outcrops along the shore. They are convenient for yacht anchorage. Ice-caps cover the majority of the island's surface. For example, about 80 percent of the Argentine Islands are covered by ice cap; its average thickness is 40 meters. The terrain consists of exposed rocky knolls, curly rocks and erratic blocks covered with moss and lichens beds. The confirmed breeders are Adelie penguin (Pygoscelis adeliae), gentoo penguin (Pygoscelis papua), and blue-eyed shag (Phalacrocorax atriceps) (Naveen, 2003).

Petermann Island is one of the principal sites of the "heroic age" of Antarctic exploration, with features of the relics of the British, Argentine and French Antarctic Expeditions. On Megalestris Hill there is a cairn with a plaque erected in 1909 by the Second French Antarctic Expedition led by Capt. Jean-Baptiste Charcot. The British Antarctic Survey (BAS) restored the plaque in 1958 and it is officially designated as an Antarctic Historic Site and Monument No.27. On adjacent Booth Island a rock cairn was installed at Port Charcot, with a wooden pillar and plaque inscribed with the names of the First French Antarctic Expedition led by Jean-Baptiste Charcot who wintered here in 1904 aboard Le Français.

Permanent British occupation on Winter Island started at the end of 1940's. At present here is situated the relic of the British Argentine Islands Station (Base F), the Historic Site and Monument No. 62 Wordie Hut. It has historic importance as an example of an early British scientific research station. It was established in January 1947 and closed in May 1954 on the site of the previous hut used by the British Graham Land Expedition 1935-1936. In 1953 the research base was relocated to the rocky ground at Marina Point, the north west corner of Galindez Island. This island has a small surface area (approximately 1x1,5 km) and is mainly covered with the ice cap. There were two major periods of construction at the station on Galindez Island: in 1953-1954 and in 1978-1979. The present-day station complex consists of the main double-stored working and accommodation block, and of nine auxiliary buildings. Hence, as Enzenbacher (1994) sumed up, this research station on Argentine Islands is the oldest operational station in the Antarctic Peninsula area.

Tourism in the Faraday/Vernadsky Station Area and Regional Climate Warming

Topological review of the routes of most of the cruise vessels and yachts shows that Argentina Islands are generally the southernmost landing sites. The condition of sea ice worsens considerably further South, increasing risks due to difficulties with navigation, especially for non-ice-strengthened vessels. Over a long period the relative inaccessibility of the station helped to reduce visitor pressure to some extent (Enzenbacher, 1994). During the last half-century a reduction in sea-ice coincided with climate warming on the west of the Antarctic Peninsula (David at al., 2003). Based on the Faraday/Vernadsky Station meteorological reports, annual mean temperature increased by 2,5°C between 1947 and 2000 (Turner at al., 2005; Krakovskaya, 1999). In turn, in the 1940-1950's fast ice was not melted in summer seasons (as it was perennial), while since 1996 the ice-free water was observed frequently, except for particularly cold years (Timofeev & Skripnik, 2004). As a result, the accessibility of the Argentine Islands has been significantly improved due to the southward deviation of fast ice edges and the reduced sea ice cover duration. The delayed freezing of the ice-pack extends the season for cruise-ship tourism and benefits tourism in the region (Krakovskaya, 1999). How warming will affect most visited sites in the Vernadsky Station is an important and pressing question for the tourism industry and it can only be answered by further detailed site-specific studies (see Johnston, 2006). Thus new research

needs to focus on the costs and benefits to polar travel associated with changing global climate patterns, as well as the resulting adaptations required by the travel industry (Stewart at al., 2005).

Faraday/Vernadsky Tourism Policy: Governance Change and Current Regulation

Visitor numbers to Faraday Station demonstrated the consistent policy BAS has maintained in granting permission to a limited number of tour ships desiring to visit the station (Enzenbacher, 1994). In 1992 BAS formulated a revised Code of Conduct for tourist and non-governmental visits to BAS research stations. The revised code builds upon previous policy and incorporates experience gained over past years, resulting in a more stringent code of conduct applied to tourist visits (Enzenbacher, 1994). In July 2002, the UK released a revision of its policy regarding tourist visits to British research stations and historic sites in Antarctica. The major requirement of the UK policy is that BAS will only accept visits to its stations and historic bases by bona fide members of IAATO (ATCM, 2002). In the period when Faraday Station was operated by BAS, the tour ship visits were strictly limited up to four per season. The limitations were imposed to reduce potential threats to the Antarctic environment, especially in the areas where research stations are concentrated; threats to the station's science programs (such as disruption of planned research activity and/or station work schedules); and improve safety of those involved in supporting tourism activities (search and rescue or other emergency resources may be requested or required by tour parties, leaving station personnel without an established safety net).

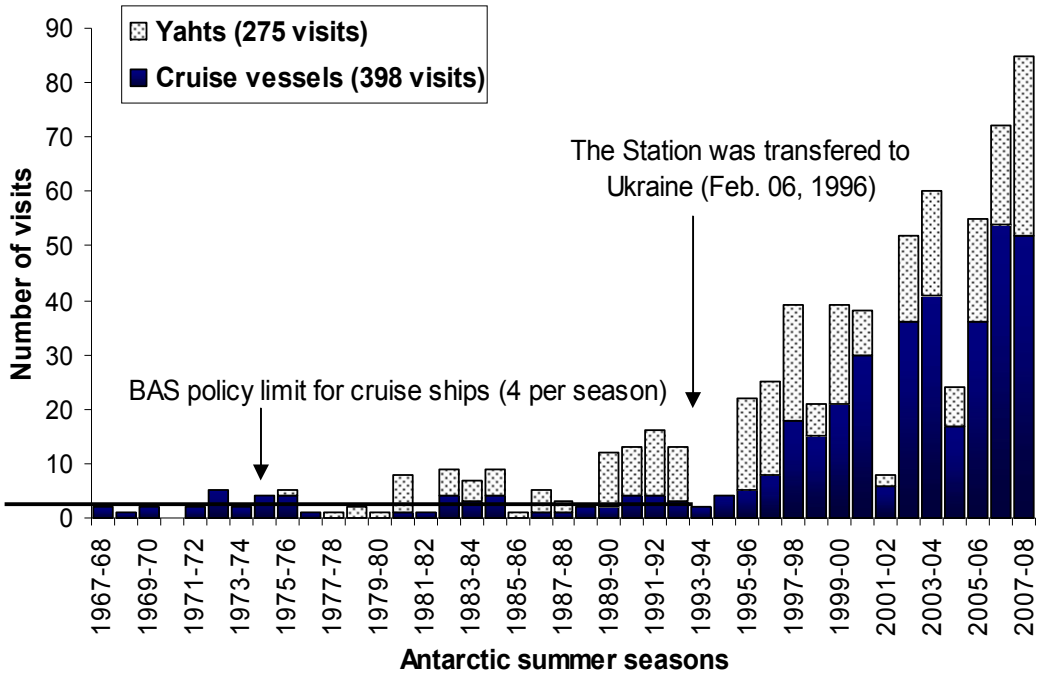

Figure 2: Summary of cruise vessels and yacht visits to Faraday/Vernadsky Station (1967–2006). Sources: Enzenbacher (1994); IAATO (2006a) (data from 1993–1994 and 1994–1995 did not include commercial yachts activity); Vernadsky Station Commanders' Reports (1996–2008).

As Figure 2 shows, visits to the station have not been restricted and limited since the station was transferred to Ukraine in 1996. Consequently, the new NASC tourism policy is favorable for non-government activity and promotes:

- work in partnership with the tourism industry to support scientific research activities;
- popularizing and provide firsthand experience of the national programs and their progress, especially provided by Ukraine as a "new Antarctic state"; and
- developing understanding and appreciation by the general public of the intrinsic values and importance of Antarctica as a natural reserve, devoted to peace and science.

Station visitors are offered a guided tour around the station, including visits to offices and science laboratories. When time permits the guide describes work and life of the station personnel. Furthermore, visitors can use post office facilities, look around the library, and have drinks at the Faraday bar. In addition, at the Vernadsky Station it is possible to purchase a range of souvenirs (e.g., postcards, cloth patches, pin badges, T-shirts). Generally, station personnel provide meteorological information, updates on sea ice condition, communication support for commercial vessels if needed, as well as emergency assistance such as medical care and yacht support.

Currently, there are no written guidelines, policies or operating procedures governing interaction between Vernadsky Station personnel and tourism operations. However, NASC Vernadsky Station tourism policy is based mainly on procedures for tourist expeditions requesting a visit to the BAS station or historic site (ATCM, 2002). Thus, expedition leaders or the captain of the ship have to arrange with the base commander the dates and time of the visit to the station, objectives and conditions of the visit, and the approximate number of visitors. The final decision is at the discretion of the base commander who is free to decline the request on the basis of unfavourable weather conditions or possible disruption of station activities. If granted access to the station, visitors are divided into small groups up to 30 people each. The station tours are approximately 30-45 minutes long. In order to reduce the disturbance to scientific work schedules, tourists generally visit the station in the evening. According to the bilateral Governmental Agreement, the maintenance of Wordie Hut is conducted by the Vernadsky Station personnel. At present Vernadsky Station personnel manages all visits to the hut. Thus, those who wish to go inside the hut have to contact the Vernadsky base commander and ask for permission. All visits to Wordie Hut are supervised by personnel of Vernadsky Station.

The Antarctic Treaty Parties noted that effectively only a limited number of sites allow for and support land-based tourism in Antarctica (ASOC, 2006a). Thus, developing site-specific guidelines, which were proposed at the XXIX Antarctic Treaty Consultative Meetings (ATCM), would be the primary means of managing tourism in the region. Two of the twelve rule sets for managing on-land tourism in Antarctica included in the Site Guidelines were specifically developed for the area around the Vernadsky Station that includes Petermann Island and Pleneau Island (ASOC, 2006a). The include the following:

- proposed zoning system, which includes closed zones, and zones where specific requirements are applied (the landing areas and guided walking areas);
- landing requirements for ships and for visitors; and
- limiting the number of visits to the site to assure rest periods for wildlife and for other reasons.

At the same time, Petermann Island, Pleneau Island and Yalour Islands are included in the IAATO guide-certification program, which sets limitations on the ship size (IAATO, 2005, 2006d). In general, the two site guidelines are similar in aim and approach with the exception of the introduction of the time limitations imposed in the Antarctic Parties Site Guidelines version. As for the others islands, no tourism regulations have been developed so far.

Tourism at Vernadsky Station 1995–2008: Numbers and Trends

One of the dominant types of tourist activity, especially on Argentine Islands, is visiting the Vernadsky Station and the historic site Wordie Hut (Figure 1). Faraday Station has provided attractions to tourists since the 1967-1968 season and is one of the most visited sites by tourists annually (Enzenbacher, 1994). All Antarctic tours are seaborne, involving cruise ships carrying 30

to 300 passengers, depending on the ship and the tourist operator. There was remarkably little variation in the statistics of visits while the station was operated by the British. Typically the cruise ships use ports in South America, Ushuaia (Terra del Fuego, Argentina) or Punta-Arenas (Chile). In general, visits are divided into two distinct categories: (1) brief visits by large groups from cruise ships for 0.5 to 3.5 hours and (2) visits by small groups from sailing vessels and private yachts for a two- to three-day period. Visits also can last for several days when weather conditions prevent departure and the tourists groups set up their own camp.

Figure 2 demonstrates that the number of cruise ship visits, which was limited until 1995, have remained constant over time (except during bad sea ice or weather conditions), while the number of yacht visits to the station increased up to 10 visits in summer season 1992–1993 (Enzenbacher, 1994). On the contrary, in recent years (since 1995) a considerable increase in the number of both cruise ships and yacht visits has been observed. Of the 673 total visits (275 by yachts and 398 by ships) during 1967–2008, 540 visits or 80 percent were made to the station since 1995–1996. Between seasons 1995–1996 and 2005–2008, 28, 294 tourists landed in the area. Figure 3 demonstrates that in the period when the station was run by Ukraine the number of tourists has increased eleven-fold. The highest number of tourists was recorded during 2003–2004 season, with 4,780 visitors. The share of the Antarctic seaborne tourists, visited the station, has increased from 4.5 percent in 1995–1996 up to 24 percent in 2003–2004.

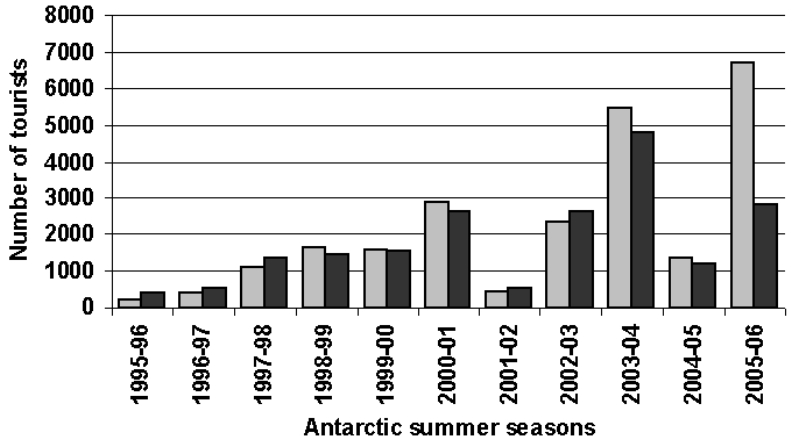

Figure 3: Summary of total visitors landed in the Vernadsky area (1995–2006). Data comparison from two sources: Vernadsky Station records – black bars, and US National Science Foundation, compiled from data provided by IAATO (including visits to other sites of Argentine Islands with staff and crew landed) – grey bars.

Vernadsky Station is usually visited from late November until early March each Antarctic summer. Most visits occur in January and February, totaling about 70 percent (Figure 4). The average duration of tourist season at Vernadsky Station is 30–33 visitor days. The shortest season lasted 8 days in 2001–2002 and the longest season was recorded in 2007–2008, when there were 55 visitor days. The number of visits at the stations has varied considerably. Since 1996 the station was visited more than 20 times annually. The smallest number of visits was recorded in 2001-2002 season when only 6 cruise ships and 2 yachts visited the station. In 2007–2008 the greatest number of visits per season was recorded – 85 visits (33 yacht visits and 52 ship visits).

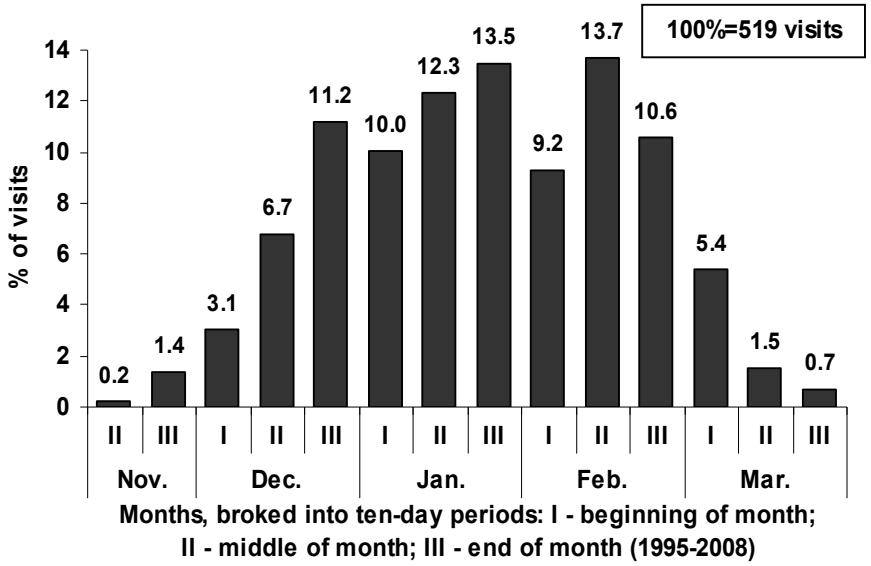

Figure 4: Distribution of the level of activity at Vernadsky Station between the months of November and March (1995–2008).

The fluctuation in annual numbers of visitors relates to sea ice conditions in corresponding years. Summer season 2001–2002 was characterized by unusually high concentration of sea ice observed in the Argentine Island area as well as in Bransfield Strait and in the north of Weddell Sea and Scotia Sea (Timofeyev & Skripnik, 2004). While usually small boats are used to reach Antarctica, in that season tourists were transported by helicopters from the board of the ice-breaker Kapitan Khlebnikov. As Figure 5 illustrates daily activity patterns shows that 76 percent of visits took place on a day when only one ship or yacht made landing at the station, 17 percent of visits took place on a day when two ships or yachts visited the station, and about 5 percent took place on a day when three or more ships or yachts visited. Almost half of all visits occurred in small groups up to 20 people (Figure 6). However, the average number of tourist groups from cruise vessels is 80 persons per visit. Figure 5 and Figure 6 illustrate why tourist visits to the station cause minimal impact to the station infrastructure. The number of Ukrainian Antarctic Expeditions winterers varies from 11 to 15 persons. So the non-restricted number of tourist visits to Vernadsky Station each season is currently high enough, and can pose problems for station staff.

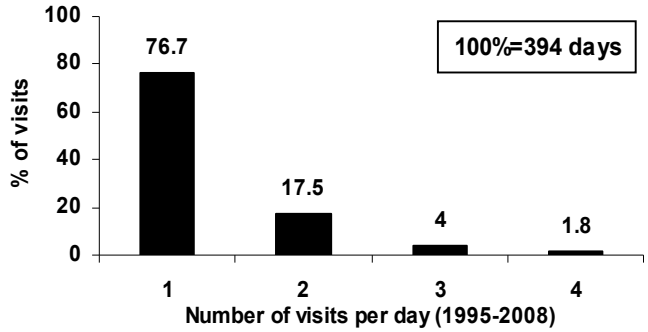

Figure 5: Distribution of tourist presence on the Vernadsky Station (1995–2008).

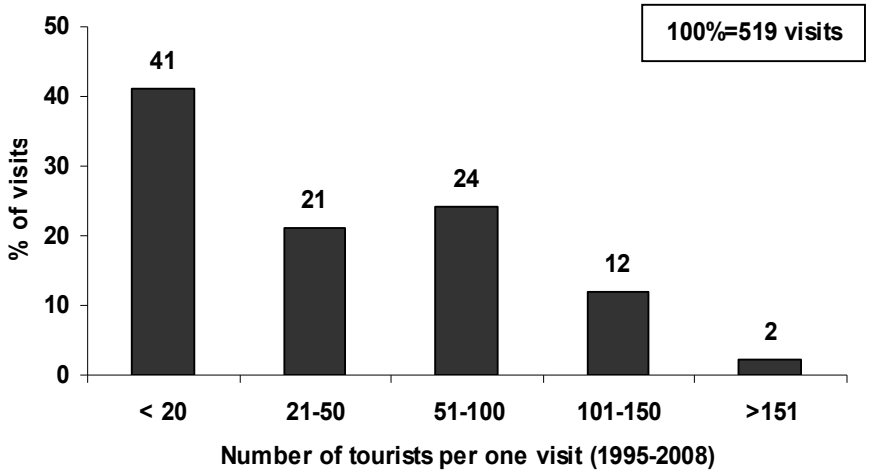

Figure 6: Distribution of tourist groups' activity during thirteen seasons at Vernadsky Station (1995–2008).

Management Policies Some Other Stations

At present, as Enzenbacher (1994) noted, there is no uniformly applied tourism policy in the Antarctic or a centralized authority empowered to enforce current tourism guidelines or direct tour operator behavior. The number of visits at stations varied considerably as well the impact of tourism on scientific activities and their environment varies with location (ATCM, 1996a). For example, visits to McMurdo Station, the largest of the US research stations, cause minimal disruption and minimal impact. Tours of the station are conducted by volunteers, and scientists working in the lab discuss their work as time permits. Activities of the tourists are coordinated by a National Science Foundation representative who is on station during the research season (ATCM, 1996a). Because US Palmer Station is smaller and has fewer personnel than McMurdo Station, tourism has a more significant impact on science, including unannounced visits to nearby penguin rookeries when scientific observations are being conducted and interference with ongoing laboratory studies when tours enter the laboratory area. In both instances, work is suspended while the tourists are present. The 72-hour advance notification required by Palmer Station has helped ease the problem experienced at the field sites and minimized the interference in the laboratory. Each tour ship visit to Palmer Station requires an average of 40 person-hours to support (400 person-hours per season are reserved in the station's schedule to accommodate the visits, thereby limiting the total number of ship visits to ten). This requires stricter coordination of tour operators, but it seems to be effective in minimizing the impact on both science and the environment (ATCM, 1996a).

Donachie (1994) suggested that tour operators pay a fee for each client, and that the revenue be used to establish specific areas for tourists and coordinate their activities. For that reason a more detailed method of collecting visitor data was launched and a special trail for visitors was designed. The trail provides an interesting educational experience for all tourists and draws attention to the research on the station. The trail heads tourists away from the station, which minimizes the disturbance of the station life (Ciaputa & Salwicka, 1997).

In order to minimize possible environmental impacts, the Brazilian Antarctic Program distributes to the tourists who visit the Brazilian Antarctic Comandante Ferraz Station a Visitor's Guide to the Antarctic. A visit to the Station follows a pre-established route and is preceded by a brief explanation to the visitors on the care required with the Antarctic environment and ecosystems (ATCM, 1996a).

Recommendations for Improvement to Vernadsky Station Tourism Policy

It is clear that the effective management and monitoring of tourism and non-governmental activities in Antarctica can only be achieved by comparing systematically collected data. Therefore, to improve Vernadsky Station tourism policy it is necessary to establish more detailed methods of collecting visitor data. It would be useful to collect demographic characteristics, description of tours operators and cruise ships, and more detailed explanation of tourist activity. Ssimilar data have been collected at Arctowski Station. As noted by Ciaputa and Salwicka (1997), the primary data at the Arctowski Station were collected using forms (report forms, questionnaires) which were completed by the visitors.

In spite of the above mentioned positive effects of tourism in Antarctica, some restrictions for non-governmental visiting parties are inevitable. This is because season attendance of about 5000 visitors is near the critical level. Any further increases in visitor numbers may cause considerable problems for station staff such as disturbance in work schedules, research and various logistical operations (personal communication with members of the 9th UAE, 2003–2004).

As the Galindez Island has a small surface area and covered with the ice cap, it is important to establish a special tourist route to divert visitors away from the station buildings toward alternative attractions, as it was established at the Polish station (Ciaputa & Salwicka, 1997). Therefore, there is no choice but to introduce the limitations on tourist visits directly at the station.

Taking into consideration the above-mentioned NASC tourism policy, the author proposes a basic tourist management plan to improve tourism at Vernadsky Station. In addition to existing requirements to advance notification of visits the following is suggested:

- thorough explanation of codes of conduct to visitors before coming ashore;
- allowing visits to IAATO members only;
- limiting the number of ship visits to one per day. As the average duration of tourist season is 30 days and average number of visitors is 80 persons, the total number of visitors is up to 2,500 persons per season. However, limiting the number of tourist to 50 persons per visit will lead to a drop in the number of visitors to 1500 per season;
- imposing a maximum number of visitors up to 20 persons per visit at one time;
- imposing a time limit spent at the station to no longer than 3 hours;
- requiring completion of a visit-form.

Thus, the tourism policies of the NASC should be based on the requirement that tourism to Antarctica is operated only through travel agencies that are members of IAATO as this association is known for its commitment to eco-friendly practices and it also provides adequate logistics and insurance. As NASC does not currently have its own vessel, it is looking for support of IAATO travel agencies to transport Ukrainian scholars (1-2 persons per season) to and from Vernadsky station. Reduced rates or other forms of collaboration (support) are possible. This collaboration can be of mutual benefit, because in that case NASC partially solves its problems with winterers conveying to the station and some support operations, and it also gives IAATO great opportunity to have an experienced lecturer on the board of tour vessels.

NASC Representative

Tourist activity at the station should be coordinated by a NASC representative appointed by Ukrainian Party as a contact officer responsible for information about tourist and non-governmental activities according to ATCM Resolution 3 (2004) “Tourism and non-governmental activities: develop cooperation between Parties”. The representatives’ responsibilities could include:

- coordination of visits to Vernadsky Station in order to limit the impact on scientific research and station operations;
- completion of inspection and observation activities in accordance with regulatory measures of tourist activity management;

- coordination of tourist activity monitoring including tourism impact on vegetation, animal life and other environmental features;
- escorting tourists through the station ensuring codes of conduct are adhered to;
- providing opportunities for educating tourists about research conducted by the Ukrainian Antarctic program.

The presence of NASC representative at Vernadsky Station is necessary especially during January-February in the peak of tourist season.

NASC Tourism Policy Regarding Other Visitor Sites in the Area

NASC tourism policy could extend to other visitor sites in the area. For example, BAS and NASC could develop jointly a Management Plan, including visitor guidelines for Wordie Hut, as required by the bilateral Governmental Agreement between the UK and Ukraine (1995). Visitor impact on Petermann Island and Pleneau Island is unknown, but potential impacts may include disturbance of wildlife and trampling of islands vegetation (ATCM, 2006). Therefore, it is necessary to identify cumulative impacts of tourism activities and to assess usefulness and effectiveness of the existing Site Guidelines for Peterman Island.

ASOC (2006a) noted that site-specific guidelines were a non-binding tactical response to tourism developments, whereas there was a need for strategic approaches to manage tourism. Annex V of the Protocol on Environmental Protection to the Antarctic Treaty provides mechanism to regulate or manage tourism activities. In 2004 a Ukrainian representative conducted informal consultations with representatives of the USA and Argentina concerning potential Antarctic Specially Managed Area (ASMA) for the Petermann Island, as it is intensively used for scientific, environmental, logistic and tourism-related activities. According to Annex V, the main reason for Petermann Island ASMA designation is its features as a small size and the unique combination of Antarctic history and species biodiversity; there also is the southernmost breeding colony of gentoo penguins (ATCM, 2005). The ASMA approach could be used with zones carefully selected to recognize sustainable management and safety, as well as limiting passenger numbers.

Conclusions

Due to differences in sea ice conditions, as well as differences in tourism policies and regulations, operating Antarctic stations differ in terms of number and nature of tourist visits (Enzenbacher, 1994). Some stations impose limits on visits, or at least require considerable advance notice and visitor adherence to strictly enforced codes of conduct (Cessford, 1997). In general, regulation approaches towards tourist visits fall into two distinct categories: 1) a combination of restrictions or limitations on such visits at the station, and 2) establishment of a specific tourist trail to divert visitors from stations toward alternative attractions (a territorial approach). Acceptance of the on-site presence management authority by both tourists and tour operators provides the control required to ensure that such non-governmental activity can obtain the benefits of station visits without seriously compromising station operations (Cessford, 1997). Parties whose stations are commonly visited by tourists have developed measures for regulating tourism activities and conduct bi-lateral consolations with corresponding travel agencies. As it was raised by one of the ATCM, Parties that have not yet regulated tourism in Antarctica have to ensure that national regulations are developed (ATCM, 2003a).

In view of this, Faraday/Vernadsky Station is the oldest operational station in the Antarctic Peninsula area and, in tourist terms, may be considered representative of other stations in the vicinity in that it has been regularly visited by seaborne tourists since 1968 (Enzenbacher, 1994). The visitor sites in the station area became tourist destinations as a result of a combination of factors, including its natural and cultural attractions, access and proximity to other sites and attractions, annual sea ice conditions with the trend to improve accessibility of the Argentine

Islands due to regional climate warming. The increase in the number of visitors is also due to the fact that the station has change its government jurisdiction since 1996. The current Ukrainian policy towards the Antarctic tourism was undertaken with the aim to maximize positive effects from tourist visits of this scientific station. As a result, in the period 1995-2008, when the station was managed by NASC, both visits of cruise ships and yachts have increased considerably.

Consequently, the findings of this paper suggest that the situation existing at Faraday/Vernadsky Station (namely station visits growth) may serve as an example that represents a possible interrelation between the tourist visit patterns at Antarctic operational stations and on-site regulatory policy provided by national Antarctic programs. The study suggests that the absence of strict limits on the number of the visitors to the stations should be revised, given the high number of visits. The study argues for the regulatory approach increasingly favored by the Antarctic Treaty System and Ukrainian National Program and contributes to developing a tourist management plan/or site-specific guidelines for the station and its vicinity that would provide for sustainable development of seaborne tourism in the Antarctic Treaty Area.

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