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Labour mobility and professional trajectories of Antarctic expedition staff:

Evidence from the Ushuaia gateway

Giselle Elizabeth Medina[a]

Mariana Morgavi[b]

Abstract

Antarctic tourism has expanded rapidly over the past decade, intensifying the demand for highly trained expedition staff who play a critical role in interpreting the destination, ensuring safety, and shaping visitor experiences. Despite their centrality, limited empirical research has examined who these professionals are, how they access employment, and to what extent gateway cities provide opportunities for local labour integration. This study analyses the characteristics, recruitment pathways, and professional dynamics of expedition staff working on Antarctic cruise vessels operating from Ushuaia, the principal maritime gateway to Antarctica. Drawing on administrative records from Prefectura Naval Argentina (2013–2024) and survey data collected during the 2023–2024 season, a mixed-methods approach reveals a predominantly international and highly credentialed workforce, structured by professional capital rather than nationality. Logistic regression results show that accumulated certifications and Antarctic experience predict both career consolidation and income differentiation. Findings also highlight the importance of informal, network-based recruitment and demonstrate the emergence of transhemispheric polar careers that span both the Arctic and Antarctic. The study contributes new insights into the labour dynamics of Antarctic expedition cruising and offers implications for workforce development, training policy, and the strengthening of local labour pathways within gateway cities.

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Corresponding author *gmedina@untdf.edu.ar*
[a] Institute of Economic Development and Innovation | The National University of Tierra del Fuego | Argentina
[b] Institute of Economic Development and Innovation | The National University of Tierra del Fuego | Argentina

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Introduction

Antarctic maritime tourism has experienced rapid growth in recent years (Lamers et al., 2024; Liggett et al., 2023; Makanse, 2024; Varnajot et al., 2025), increasing from 33,962 passengers a decade ago to 122,072 visitors during the 2023–2024 summer season across all gateway ports (IAATO, 2014; 2024). Within this context, Ushuaia plays a pivotal role throughout the tourist season, which extends from October to early April. Its geographic proximity to the Antarctic Peninsula—approximately 1,000 km—offers a significant advantage over other gateway cities. This geographic position is supported by extensive infrastructure, including port facilities, an international airport, and a broad array of maritime and tourism services that sustain cruise operations (Bertram et al., 2007; Morgavi et al., 2020; Morgavi & Cohen, 2025; Vereda et al., 2019). Other internationally recognized Antarctic gateways include Punta Arenas (Chile), Christchurch (New Zealand), Hobart (Australia), and Cape Town (South Africa) (Varnajot et al., 2025; Vereda et al., 2016) (Figure 1).

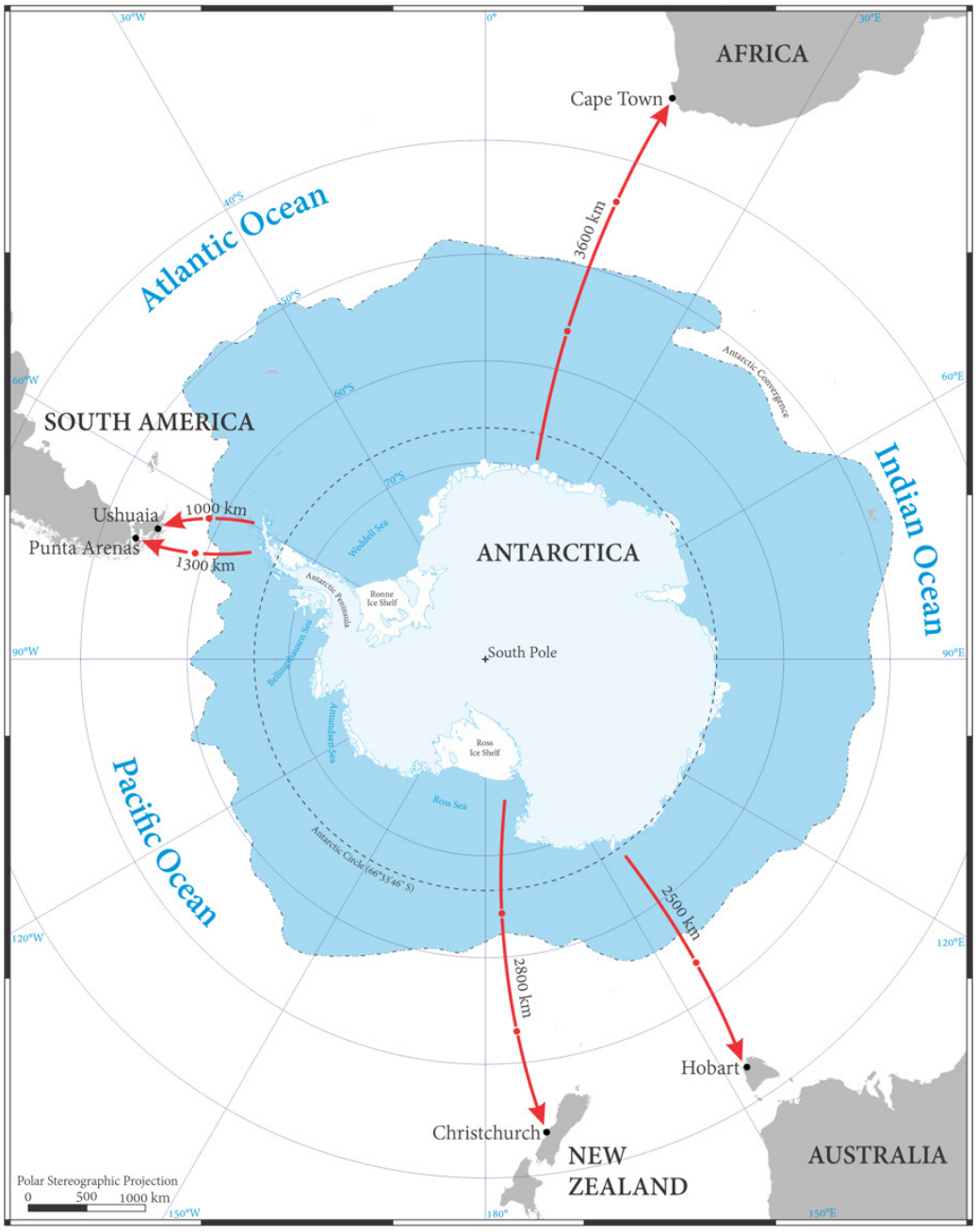


Figure 1. *Location of Antarctic gateways.* Source: Vereda et al., 2022.

The continued expansion of Antarctic tourism, together with the diversification of visitor activities (IAATO, 2019; Makanse, 2024; SCAR, 2024), has intensified the demand for specialized personnel aboard expedition vessels. Within this operational context, an important distinction must be made between two major categories of workers on board. The *general crew* includes officers responsible for navigation and bridge operations, as well as personnel working in departments such as the galley, restaurant and hotel services, housekeeping, wellness facilities, engineering, and deck operations. These roles are primarily oriented toward vessel functioning and hospitality services. In contrast, *expedition staff* constitute a distinct professional group directly responsible for shaping the tourism experience.

Expedition staff perform a wide range of tasks, including delivering lectures, coordinating and supervising embarkation and disembarkation, ensuring compliance with environmental and safety protocols, providing interpretive guidance, and leading educational and recreational activities. Beyond these operational responsibilities, expedition work reflects a broader process of professionalization within Antarctic tourism, as it requires specialized knowledge, formal certifications, and field-based expertise accumulated across multiple seasons.

Understanding this distinction between general crew and expedition staff is essential for analyzing how labour trajectories are structured within a globally mobile cruise industry that relies operationally on gateway ports such as Ushuaia. Expedition staff represent a key category through which local labour insertion, transnational mobility, and professional consolidation intersect. Their role becomes particularly relevant considering the scale and intensity of Antarctic tourism: during the 2023–2024 season, 122,859 visitors travelled to Antarctica via different gateway ports and modalities (IAATO, 2024). Maritime tourism accounted for 99.36% of these visits. Of these, 111,497 tourists travelled via Ushuaia (Argentina, 2024), representing 90.75% of all Antarctic visitors. Operations were carried out by 55 vessels of varying sizes and operational models over a 169-day season (Argentina, 2024). They included expedition cruises conducting landings south of 60° S, in accordance with Antarctic Treaty System (ATS) regulations, and scenic cruises without landings. Measure 15 (2009), adopted at the XXXII Antarctic Treaty Consultative Meeting in Baltimore, prohibits landings from vessels carrying more than 500 passengers.

Despite the availability of administrative data identifying crew and staff on Antarctic voyages, little is known about the characteristics, motivations, and employment experiences of expedition staff, who serve as the primary interface between passengers, vessels, and the Antarctic environment. This paper addresses this gap by analyzing the expedition staff working on cruises departing from Ushuaia, the principal Antarctic gateway. Drawing on Prefectura Naval Argentina ship dispatch records—where crew and staff are often listed together—and a targeted survey conducted during the 2023–2024 season, the study examines who these professionals are, how they access employment, under what conditions they work, and how Ushuaia-based staff navigate opportunities and constraints within a rapidly growing sector.

The study is guided by the following research questions:

- What are the demographic, professional, and employment characteristics of expedition staff working aboard Antarctic cruise vessels operating from Ushuaia?
- Which individual and professional factors are associated with entry into, consolidation within, and economic differentiation in Antarctic expedition work?
- To what extent does Ushuaia function as a site of local labour insertion within a globally mobile cruise industry?

From a gateway perspective, analyzing the labour market insertion of locally based human resources is particularly relevant. As the most active maritime gateway for Antarctic tourism, Ushuaia generates concrete employment opportunities linked to cruise operations. This dimension is further

reinforced by the presence of a public university offering undergraduate, graduate, and postgraduate programs in tourism and Antarctic studies, which has contributed to the development of a locally trained professional cohort. This creates a unique context in which to assess whether the gateway functions not only as a logistical node within a global cruise network, but also as a meaningful site of local labour integration.

However, despite Ushuaia's position as the leading Antarctic gateway, most cruise lines and tour operators offering Antarctic voyages are headquartered outside Argentina, with only one mixed-capital company registered locally. Recruitment patterns largely mirror the transnational structure of the cruise industry, with expedition staff predominantly hired from the company's country of origin.

Drawing on theoretical perspectives on the high mobility of capital and labour in the cruise tourism industry (Lin et al., 2022; Wondirad, 2019; Wood, 2000), this study examines the structure, recruitment pathways, and professional dynamics of the Antarctic expedition staff workforce, with particular attention to the participation of Argentine nationals and Ushuaia-based residents within this globalized labour field. The analytical focus on expedition staff is intentional: by isolating the professional group most directly involved in destination interpretation and visitor engagement, the study avoids conflation with general crew roles and enables a more precise examination of labour trajectories, professional consolidation, and gateway-based labour insertion.

To address these research questions, a mixed-methods approach was adopted. Administrative ship dispatch records from Prefectura Naval Argentina for the period 2013–2014 to 2023–2024 were analyzed to identify expedition staff and their nationalities. Additionally, survey data were collected from expedition staff during the 2023–2024 season.

By integrating administrative records and original survey data, this study provides the first systematic analysis of Antarctic expedition staff as a distinct professional workforce operating from the world's principal gateway. In doing so, it establishes a critical empirical foundation for understanding how global cruise labour markets intersect with local contexts, how professional capital structures polar career trajectories, and how gateway cities such as Ushuaia negotiate the tension between logistical centrality and limited labour integration. This approach positions the research to contribute not only to Antarctic tourism studies, but also to broader debates on labour mobility, workforce professionalization, and tourism development in extreme environments.

The article is structured as follows. The literature review examines Antarctic tourism and the expedition staff workforce, incorporating comparative insights from Arctic guiding. This is followed by the methods section, where the mixed-methods design is outlined in detail. The results section presents the empirical findings, which are then discussed in relation to the theoretical framework. The paper concludes with key insights and final reflections.

Literature review

Antarctic expedition tourism

As Hall and Saarinen (2010) but also Varnajot et al. (2025) note, Antarctic tourism operates "under a polar umbrella," sharing core features with other high-latitude destinations. These include highly seasonal operations and an appeal grounded in remoteness, ice-dominated landscapes, extreme climatic conditions, and the perception of wilderness. Beyond its environmental characteristics, Antarctic tourism is increasingly interpreted through socio-cultural perspectives (Cohen et al. 2023).

From a definitional standpoint, Antarctic tourism encompasses non-governmental activities conducted within the Antarctic Treaty Area, excluding scientific and logistical operations associated with National Antarctic Programs. Instead, it includes private and commercial endeavours (Hall & Saarinen, 2010; Liggett et al., 2023; Varnajot et al., 2025). Operational modalities in Antarctic tourism include land-based programs accessed by air, air–sea itineraries, large cruise vessels that

navigate without conducting landings, and expedition cruises that include shore-based activities (IAATO, 2024).

From 2017 onwards, the industry entered a phase of significant expansion driven by extensive fleet renewal coinciding with the implementation of the International Maritime Organization's Polar Code (Morgavi et al., 2020). The Code introduced stricter requirements regarding vessel ice-class, safety systems, and operational standards in polar waters, as set out in SOLAS Chapter XIV and the mandatory provisions of Polar Code Part I-A, particularly Chapters 1–11, which cover ship categories, structural design, machinery installations, fire safety, navigation, communication, and voyage planning. These regulatory changes encouraged operators to replace older vessels with purpose-built expedition ships capable of complying with the new framework. Additionally, the Polar Code mandates that both crew and expedition staff receive training consistent with Part I-A, Chapter 12 ("Manning and Training"). The provisions outlined in §§12.3–12.4 require competencies in areas such as ice navigation, environmental protection, vessel safety in ice-covered waters, and emergency preparedness in extreme conditions.

This upward trajectory was only temporarily disrupted during the 2020/2021 and 2021/2022 seasons due to the COVID-19 pandemic (IAATO, 2023). Beyond quantitative growth, the expansion of Antarctic tourism has also generated qualitative shifts. The diversification of activities (Rantala et al., 2018; Makanse, 2024), the introduction of specialized outdoor programs, and growing emphasis on educational components have intensified the demand for highly trained expedition staff. As a result, the professional profile of expedition personnel has become increasingly structured around formal certification, technical competence, and destination-specific expertise. Importantly, this demand applies to polar tourism more broadly, encompassing both the Arctic and the Antarctic.

Thomson and Sproull Thomson (2006) describe expedition staff as highly educated professionals—some retired or semi-retired—who often rely on income sources outside the cruise season and dedicate substantial unpaid time to preparing lectures and undertaking training. As they perform multiple roles (e.g., guides, lecturers, Zodiac drivers), their expertise and interpersonal abilities directly shape the visitor experience. Tsaur and Teng (2017) also highlight that the professionalism of expedition staff is closely tied to operator reputation, influencing customer satisfaction and brand strength. Furthermore, guides are key actors in constructing narratives that foster authentic engagement and deepen visitor understanding of Antarctic environments (de la Barre, 2013).

Expedition staff workforce

A key milestone in the history of Antarctic tourism was the launch of the *Lindblad Explorer* in 1970, which introduced a new model of polar cruising. As Headland (1994, p. 276) notes, the company's operations marked "the beginning of the modern period of Antarctic tourism." Expedition cruising refers to voyages on small or medium-sized vessels travelling to remote destinations far from mainstream markets. These cruises are characterized by strong educational components and close interaction between staff and passengers (Jensen & Vereda, 2016; Vereda et al., 2016). Over time, they have expanded to include wildlife viewing, visits to historic sites, and intensive onboard programming. To work onboard, expedition staff must hold certifications under the IMO's International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) (Vereda et al., 2016). Additional qualifications vary depending on role and may include wilderness first aid, geology, biology, polar history, and Zodiac or kayak operation (Vereda et al., 2016).

According to the International Labour Organization (ILO, 2001), informal hiring practices—such as word-of-mouth referrals, peer recommendations, and prior-season contracts—remain common, rather than recruitment through general crewing agencies.

Proficiency in English is essential for all staff (Morgavi & Cohen, 2025; Vereda et al., 2016). Standard contracts range from six to eight months, with staff typically working seven days a week

for 10 to 14 hours daily—often in split shifts, depending on role (ILO, 2001). Collective agreements establish minimum rest periods, wage structures, and shift lengths, while international organisations advocate for enhanced welfare for maritime workers (Vereda et al., 2016).

IAATO requires annual certification of expedition staff through an online exam based on the Field Operations Manual (FOM), which incorporates IAATO guidelines, operational updates, and protocols agreed at Antarctic Treaty Consultative Meetings (ATCMs). Certification is mandatory for all expedition staff, captains, and expedition leaders (Vereda et al., 2016).

One of the central roles performed by expedition staff is that of polar guide. According to the Polar Tourism Guides Association (PTGA):

> […] professionals who facilitate safe, sustainable, and meaningful polar travel experiences for travellers from around the world. They work across all platforms of polar guiding, from expedition ships and yachts to advanced camps and Arctic communities. *(PTGA, 2024, https://polartourismguides.com/what-is-a-polar-guide).*

The PTGA is a peer-led organization offering training and evaluating competencies through formal certification renewed every four years. Its credential complies with ISO 21102 (2020) for adventure tourism leaders and covers areas such as risk management, ethics, emergency preparedness, planning, and team coordination. Several operators now consider this certification a prerequisite for employment. In synthesis, as Tsaur and Teng (2017) argue, expedition staff and tour leaders play a central role in enhancing visitor satisfaction, promoting repeat travel, and strengthening operator competitiveness.

Recent research emphasizes that guiding in polar regions—both Antarctic and Arctic—requires a sophisticated blend of competencies that span technical expertise, risk management, environmental knowledge, interpretive skills, and relational labour. Arctic studies provide valuable comparative insights that broaden the analytical scope of this paper.

Hild et al. (2023) show that adventure guiding in the Arctic involves complex, high-stakes competencies in which tourist safety depends not only on certifications and operational protocols but also on adaptive judgement, situational awareness, and interpersonal skills—highlighting that "everyone can guide until something goes wrong."

Complementing this view, la Cour (2023) conceptualizes Arctic nature guides in Svalbard as productive actors who mediate human–environment relations, construct meaningful experiences, and perform emotional, cognitive, and interpretive labour in remote landscapes. This aligns with de la Barre's (2013) work demonstrating that wilderness and cultural guides in remote northern regions play essential roles in shaping place identity, linking environmental knowledge with cultural interpretation, and supporting sustainable tourism practices.Emerging scholarship on regenerative nature-based tourism in Arctic settings (Omma, 2024) further underscores the evolving expectations placed on guides as ethical intermediaries navigating fragile ecosystems and community-oriented values.

Collectively, this Arctic scholarship enriches the Antarctic-focused literature by illustrating that guiding across polar regions is embedded in shared professional logics—formal qualifications, environmental stewardship, interpretive competence, affective labour, and ethical responsibility—while also subject to distinct governance regimes and operational realities. Integrating these perspectives positions Antarctic expedition staff within a broader transhemispheric field of polar guiding, where competencies, risks, and professional norms circulate across both hemispheres.

Methods

This study adopts a mixed-methods approach, combining document analysis with surveys administered to expedition staff. Quantitative data were analyzed using descriptive statistics and inferential techniques, including cross-tabulation analysis, Mann–Whitney U tests, and logistic reg-

ression models, to examine differences between groups and identify factors associated with professional trajectories and income differentiation. Data visualisation techniques, such as boxplot comparisons, were used to support the interpretation of distributions. Qualitative responses from open-ended survey questions were analysed through thematic coding. All analyses were conducted using SPSS Statistics (version 31.0.2.0).

First, administrative records held by Prefectura Naval Argentina (Argentine competent authority) were reviewed for the period spanning the 2013–2014 to the 2023–2024 seasons. These records cover all vessels that called at the port of Ushuaia and include information identifying expedition staff, their nationalities, and assigned roles.

The second stage consisted of electronic surveys conducted among expedition staff, both foreign nationals and Argentine/Ushuaia residents, during the 2023–2024 tourist season. A total of 92 valid responses were collected. Survey forms were created using Google Forms and distributed through targeted Facebook groups. To examine the involvement of local human resources, the sample was divided into two groups: foreign nationals and Argentine nationals.

All stages of data collection adhered strictly to ethical research standards. The study protocol was approved by the Ethics Committee of the National University of Tierra del Fuego (UNTDF) as part of a broader research project. Participants were fully informed about the study's objectives and the voluntary nature of their involvement and were assured of the confidentiality and anonymity of their responses.

To clearly delimit the professional group analyzed in this study, a classification of expedition staff roles was developed based on functional responsibilities aboard Antarctic expedition vessels. This classification allows for a more precise understanding of the internal differentiation within the expedition team and provides the analytical basis for the grouping categories used in Table 1.

Expedition staff roles were organized into two broad categories: senior roles and guiding roles, reflecting differences in responsibility, decision-making authority, operational scope, and the degree of interpretive and experiential engagement with passengers. Within the guiding category, expedition guides represent the core and most generalist role, while kayak guides and outdoor activity guides constitute more specialized sub-roles associated with specific technical activities. All three categories are considered analytically comparable in terms of their operational function, although they differ in the type and intensity of interpretive engagement with passengers. This classification framework enables a clearer analytical distinction between hierarchical and operational functions within expedition staff.

Senior roles	
Expedition leader	This role represents the highest-ranking member of the expedition team. Responsibilities include designing the itinerary in coordination with the ship's captain, reserving landing sites on the Antarctic continent, delivering mandatory IAATO briefings in accordance with Antarctic Treaty Consultative Meeting (ATCM) visitor guidelines, and overseeing the expedition staff. The expedition leader works in close coordination with the captain and is ultimately responsible for the conduct of shore operations.
Assistant expedition leader	The second in command. Supports the expedition leader in daily operational management. Duties typically include supervising the expedition team and passengers during activities, coordinating daily briefings, managing schedules for onboard and off-ship operations, and ensuring logistical coherence throughout the voyage.
Lecture/ Scientist	A subject-matter expert who delivers educational presentations as part of the onboard interpretation program. Topics may include history, environmental governance, marine biology, literature, or polar science. In some companies, this role may be combined with guiding or operational responsibilities. Although this role does not necessarily involve operational leadership, it is included within the senior category due to its high level of specialized expertise and its central role in delivering the educational and interpretive program onboard, which is a defining feature of expedition cruising.

Guiding roles:	
Expedition guide	This is one of the most versatile roles within the expedition team. Guides may deliver short interpretive talks, operate zodiac boats, assist with camping activities, and provide logistical support during landings, depending on their training and certifications.
Kayak guide	Manages the passenger list including equipment allocation, safety assessments, weather evaluation, and supervision of the activity throughout its duration. In addition to technical supervision, this role may also involve interpretive interaction with passengers in small-group settings, depending on the operator.
Outdoor activities guide	Oversees specialized activities that may include mountaineering, diving, skiing, snowshoeing, ice climbing, or other adventure-based components depending on the itinerary and company offering. These roles may also include elements of environmental interpretation and visitor engagement, particularly in activities that involve close interaction with Antarctic landscapes.

Table 1. *Expedition staff grouping categories of roles* Source: Authors' own elaboration.

Results

Expedition staff profile

A total of 92 valid responses were included in the analysis. Most respondents were international (80.4%, n = 74), while 19.6% (n = 18) were Argentine nationals. Regarding place of residence, 8.7% (n = 8) reported living in Ushuaia, 12.0% (n = 11) elsewhere in Argentina, and 79.3% (n = 73) in other countries. Western Europe (34.8%) and North America (28.3%) were the most represented regions, followed by Latin America (22.8%), while Oceania and other regions accounted for smaller proportions. These figures confirm the highly international composition of the expedition workforce operating from Ushuaia.

Among Ushuaia-based staff, 52.6% reported living in the city for more than 21 years, and 15.8% were born there. Although the workforce is predominantly international, these data indicate the presence of a locally rooted group that has sustained participation in Antarctic cruise operations.

Age distribution was similar across groups: the majority fell within the 25–44 range, followed by 45–64. Only 2.2% of respondents were over 65. No Argentine respondent reported being over 65. This indicates a workforce concentrated in the 25–64 age range, with a predominance of respondents between 25 and 44 years old. In this study, this distribution is interpreted as broadly corresponding to a mid-career profile, understood as a stage characterized by prior professional experience and ongoing career consolidation. While the definition of "mid-career" may vary across national and professional contexts, the observed age structure suggests a workforce that is neither early-entry nor nearing retirement. This indicates a predominantly mid-career profile.

Educational attainment was generally high. Among foreign staff, 58.9% held undergraduate degrees and 25.6% postgraduate qualifications, while among Argentine respondents, 79% had completed undergraduate studies and 10.5% held postgraduate degrees. Most Argentine staff had studied at regional institutions, particularly the National University of Patagonia San Juan Bosco and the National University of Tierra del Fuego. A significant proportion of Ushuaia-trained staff held a three-year tourism guiding degree and reported substantial experience guiding visitors in Tierra del Fuego. Other backgrounds represented in the sample included photography, medicine, architecture, biology, and skiing. Only a minority of respondents (14%) lacked higher education although they had completed secondary education.

Respondents reported an average of 4.47 professional certifications (SD = 1.58), ranging from 1 to 8, illustrating a highly formalized and credential-intensive field. This finding is further contextualized in Table 2, which outlines the structured framework of certifications, qualifications, and knowledge areas associated with expedition staff positions.

Regarding income, 43% of respondents reported earning between USD 200 and 250 per day, with no statistically significant differences by nationality. This suggests that wage structures within

Antarctic expedition cruising are primarily determined by professional role and level of responsibility rather than by national origin. In this context, remuneration appears to be standardized across international staff performing similar roles, suggesting that compensation structures are primarily aligned with position-specific responsibilities and levels of experience rather than national origin. This pattern may reflect the structured nature of expedition cruise operations, where roles are defined by operational requirements and safety responsibilities, leading to relatively standardized remuneration frameworks across multinational staff.

Taken together, these patterns reveal an internationally recruited, highly credentialed workforce, but also the emergence of a locally trained group integrated into the sector. Two broader trends emerge: (1) a steady increase in the number of expedition staff employed in Antarctic operations, and (2) a growing participation of locally based professionals. In recent seasons, most foreign staff—classified under "other nationalities"—originated from the United Kingdom, Canada, and the United States, while Argentina occupied the fourth position (Figure 2).

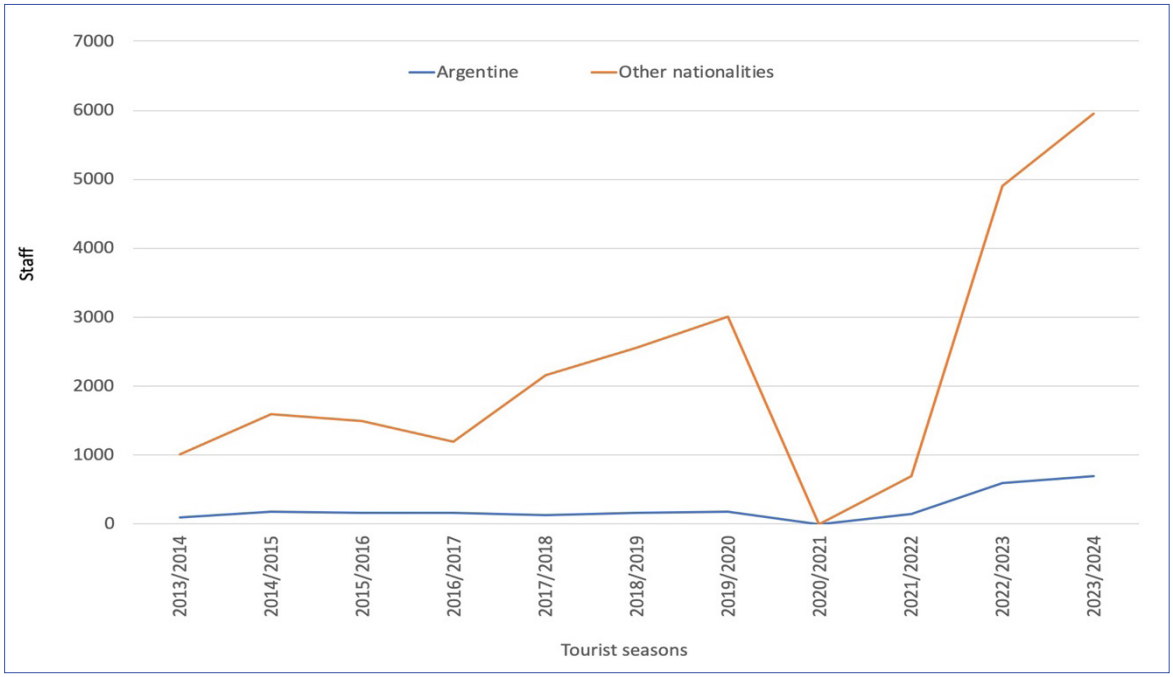


Figure 2: *Staff nationalities*

Source: Authors' own elaboration.

Professional qualifications and knowledge requirements

Table 2 presents the structured framework of the certifications, qualifications, and knowledge areas as required for expedition staff positions. Four broad categories emerge:

1. Mandatory pre-boarding certifications required by international maritime regulations (medical clearance, STCW, safety training, seaman's book, etc).
2. Role-specific technical qualifications, such as kayaking, mountaineering, skiing, wildlife observation, or photography.
3. General interdisciplinary knowledge, including history, geography, glaciology, ecology, and navigation, reflecting the interpretive and educational aspects of expedition work.
4. Locally recommended training in Ushuaia**,** based on open-ended responses (e.g., zodiac operations, polar psychology, Antarctic legislation, glacier transit).

These categories suggest a layered professional structure that combines regulatory compliance, technical specialization, destination-specific knowledge, and experiential capital.

Required Pre-boarding Certifications	IAATO exam Medical certificate Basic STCW and crowd management Powerboat licence (RYA Level 2) English proficiency certificate Seaman's book Wilderness First Responder (WFR) certificate VHF radio licence Personal insurance COVID-19 and yellow fever vaccinations[1]
Role-Specific Certifications	Mountain guide degree or certification in mountain activities Birdwatching specialist certification Degree in geology Ice climbing certification Skiing certification
General knowledge areas	History Birdlife Geography Glaciology Geology Science Navigation Outdoor activities Vegetation
Recommended in Ushuaia	Navigation (Zodiac operation) Wilderness First Responder (WFR) course Glacier transit History Birdlife Psychology in polar environments Communication in polar regions Antarctic legislation

Table 2. *Structured framework of certifications, qualifications, and knowledge areas associated with Antarctic expedition staff positions.* Source: Authors' own elaboration.

Professional Consolidation and Income Differentiation

Daily income was reported in ranges, with the largest proportion of respondents earning between USD 201 and 250 (45.2%), followed by those earning USD 301 or more (32.3%). No statistically significant differences were observed by nationality (Mann–Whitney U = 612, p = 0.569), reinforcing the interpretation that income variation is more closely associated with position and experience than with national origin. While the data do not allow for a detailed explanation of these patterns, they are consistent with a professional structure in which remuneration appears to be standardized across international staff performing similar roles.

Likewise, no significant differences were found in the distribution of hierarchical positions (leadership, guide, specialist, other) by nationality ($\chi^2(3) =. 600$, p = .896), suggesting no evidence of vertical segmentation.

1 The requirement for COVID-19 and yellow fever vaccination applied specifically to the 2023–2024 season and is no longer in force.

Regarding Antarctic experience, 43.5% of respondents had worked 1–3 seasons, 28.3% were employed for 4–6 seasons, and 28.3% for 7 seasons or more. Grouping respondents into 1–3 versus 4 or more seasons revealed no significant association with nationality (p = .140), although Argentine respondents were more represented among those who had worked for fewer seasons.

A boxplot comparison of the number of spoken languages by nationality indicates a similar median value for Argentine and international staff (median = 2 in both groups). However, greater dispersion is observed among international respondents, whose distribution extends to higher maximum values (Figure 3). A Mann–Whitney U test was conducted to examine differences in the number of spoken languages between Argentine and international staff. The results indicate a statistically significant difference in linguistic profiles (U = 383.50, Z = −2.904, p = .004). International expedition staff reported a higher number of spoken languages compared to their Argentine counterparts. The effect size was moderate (r ≈ .30), suggesting that linguistic capital constitutes a meaningful differentiating characteristic between locally based and internationally recruited personnel.

Meanwhile, no statistically significant differences were observed in the certification index between groups (t(90) = 0.43, p = .669), indicating comparable levels of formal professional credentials.

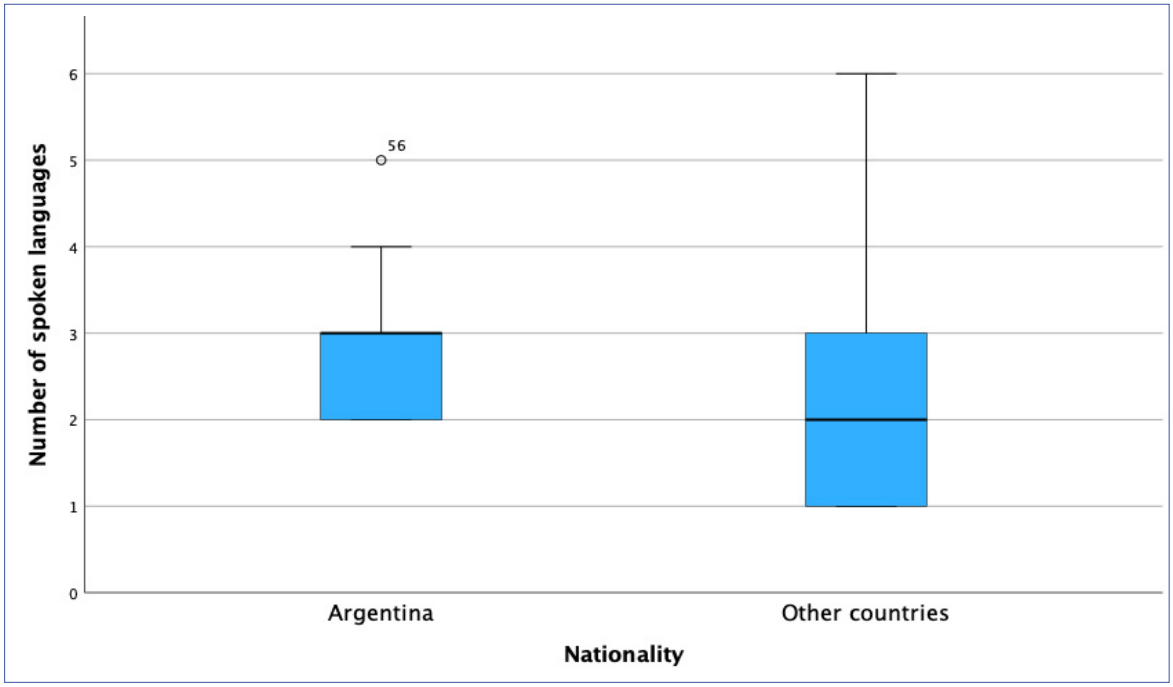


Figure 3. *Boxplot of the number of spoken languages reported by expedition staff, disaggregated by nationality.*[2]
Source: Authors' own elaboration.

Additionally, a binary logistic regression model was conducted to examine predictors of higher Antarctic experience (four or more seasons). The model was statistically significant (χ^2 = 16.59, p = .002), explaining 22.1% of the variance (Nagelkerke R^2). Age was a significant positive predictor (OR = 2.58, p = .034), indicating that each increase in age category more than doubled the odds of belonging to the higher-experience group. The certification index was also significant (OR = 1.56, p = .006), suggesting that accumulated professional credentials are closely associated with sustained participation in Antarctic voyages. Conversely, number of spoken languages and nationality were not significant predictors. These findings indicate that accumulated Antarctic experience is primar-

2 Boxes represent the interquartile range, horizontal lines indicate medians, and whiskers show the range of observed values.

ily structured by professional capital rather than national origin.

A second logistic regression model examined predictors of higher income (USD 251 or more per day). The model was statistically significant ($\chi^2 = 13.15$, $p = .004$), explaining 19.3% of the variance (Nagelkerke R^2). Higher Antarctic experience significantly increased the odds of reporting higher income (OR = 3.02, p = .024). Position also played a significant role, with senior roles being associated with higher earnings. Nationality was not a significant predictor once experience and position were controlled.

Taken together, the two models reveal a sequential pattern: accumulated professional capital predicts sustained Antarctic participation, which in turn translates into economic differentiation within the sector. A synthesis of these results is presented in Table 3.

Predictor	Model 1: Higher Experience (4+ seasons)			Model 2: Higher Income (USD 251+)		
	OR	95% CI	p	OR	95% CI	p
Age (ordinal)	2.58	1.07-6.20	.034	---	---	---
Certification index	1.56	1.14-2.14	.006	---	---	---
Experience (4 + seasons)	---	---	---	3.02	1.15-7.90	.024
Position (Senior vs operational)	---	---	---	0.37	0.14-0.99	.048
Nationality (international)	2.51	0.79-7.96	.118	2.18	0.58-8.20	.250

Model Fit Statistics

	Model 1	Model 2
χ^2	16.59**	13.15**
Nagelkerke R^2	.221	.193
Classification accuracy	66.3%	69.2%

**p < .01

Table 3: *Sequential Logistic Regression Models of Professional Consolidation and Income Differentiation*[3]
Source: Author's own elaboration based on SPSS 31.0.2.0 (126).

Recruitment pathways

Given the importance of academic and professional training for fulfilling staff roles, participants were asked whether they had received any form of training from the company. A total of 84.2% of respondents reported not receiving any prior training from the company, indicating that formal preparation is largely external to employer-based training processes. In the few cases where training was provided, it was described as a basic familiarisation process involving an introduction to the ship, internal procedures, safety protocols, and the emergency card system.

Most respondents (56.5%) reported obtaining their position through personal recommendation, followed by social media (22.4%) and company websites (15.3%). This distribution suggests that expedition employment operates largely through relational recruitment mechanisms.

Cross-tabulation analysis revealed a significant association between recruitment pathway and accumulated Antarctic experience ($\chi^2 = 12.19$, $p = .016$). Staff with experience of four or more seasons were likelier to have entered the sector through personal recommendation, indicating that relational networks gain importance as professional trajectories consolidate. No significant association was found between recruitment pathway and nationality, suggesting similar access mechanisms for Argentine and international staff.

3 OR = Odds Ratio. CI = Confidence Interval. Model 1 predicts higher Antarctic experience (four or more seasons). Model 2 predicts higher income (USD 251 and above per day). Reference category for nationality = Argentina. Senior positions include leadership and specialist roles.

Motivational orientations and professional trajectory

Understanding the motivations behind individuals' decisions to work aboard Antarctic cruises offers important insight into workforce dynamics. As shown in Figure 4, both Argentine and foreign respondents cited similar drivers, including professional development, the opportunity to travel to the Antarctic continent, the pursuit of new knowledge, and financial compensation. Nevertheless, some differences were observed. Ushuaia-based staff, for instance, often expressed a desire to "learn more about my province," underscoring the symbolic significance of Antarctic proximity and territorial identity for residents of Tierra del Fuego. Another recurring theme was the commitment to educating visitors about the values and global relevance of Antarctica. As one respondent stated, "It is our duty as residents of the gateway to Antarctica." Descriptive results indicate that the most frequently cited motivation was "to work in remote/polar regions", followed by "to know/learn about Antarctica".

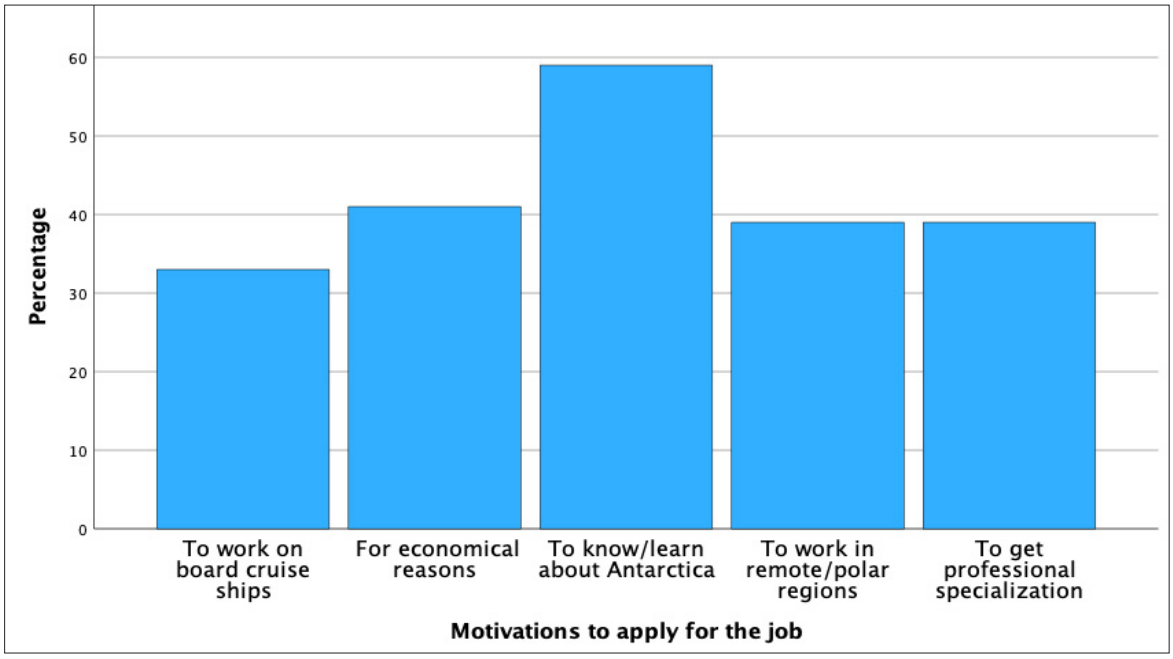


Figure 4. *Motivations to apply for a job as an expedition staff member*[4] Source: Authors' own elaboration

A significant association was found between accumulated experience and the motivation "to know/learn about Antarctica" ($\chi^2 = 5.50$, $p = .019$). Among those who did not identify this as a motivation, a higher proportion belonged to the group with four or more seasons of experience. No significant associations were found between accumulated experience and economic motivations, professional specialization, or other motivational factors.

These findings indicate that exploratory or territorial curiosity may play a stronger role in earlier career stages, whereas long-term participation appears increasingly structured by professional integration. In addition to these general motivations, some responses—particularly among Ushuaia-based and Argentine participants—suggest the presence of place-based and identity-related drivers. These include references to a sense of responsibility towards the territory, an interest in representing the region, and engagement with Antarctica as part of a broader regional identity. Although these responses were not dominant across the sample, they point to a distinct motivational dimension that differentiates locally based staff from internationally recruited personnel. This suggests that motivations are not homogeneous. Instead, they combine general professional and experiential drivers with more context-specific, place-based dimensions.

4 Percentages may exceed 100% as respondents were allowed to give more than one option.

Polar mobility and transhemispheric careers

Given the strong interconnection between the two polar regions—Antarctica and the Arctic—respondents were also asked whether they had work experience in the Arctic. A total of 70.7% reported having worked in the Arctic. This finding indicates that expedition employment operates within a broader transhemispheric labour circuit. Among those with Arctic experience, nearly half had worked one to three seasons, while a notable minority reported ten or more seasons, suggesting long-term and sustained polar career trajectories. Although staff with greater Antarctic experience tended to report a higher average number of Arctic seasons, this difference did not reach statistical significance. Overall, the data point to the existence of integrated polar careers in which professional capital is accumulated across both hemispheres rather than within a single regional context.

Areas for improvement in a globally mobile industry

To further assess perceived shortcomings within the sector, expedition staff were invited to identify areas where changes would enhance their professional experience. The results, summarized in Figure 5, reveal the key domains in which respondents consider improvements necessary. Based on qualitative coding of the open-ended responses, four analytical categories were constructed. A synthesis of the principal concerns expressed within each category is outlined below.

- Sustainability and responsible tourism practices: Respondents called for greater responsibility in tourism operations, expressing concern about the growing number of visitors, environmental pressures, and the sector's carbon footprint.
- Training and professional development: Participants highlighted the need for more comprehensive and specialized training, particularly prior preparation in polar-related issues and destination-specific knowledge.
- Contractual and working conditions: This category encompasses concerns regarding accommodation arrangements (e.g., cabin sharing, especially among senior staff; allocation to passenger versus crew cabins; cabin sharing with expedition team members or general crew), as well as access to internet services, shore leave opportunities, food quality, and working hours.
- Workplace relationships and organisational culture: This dimension includes concerns related to onboard atmosphere, communication practices, interpersonal dynamics, and overall organizational culture.

Across all four categories, respondents from other countries consistently reported higher levels of concern than Argentine staff. Training and professional development emerged as the most frequently identified area for improvement in both groups, followed by contractual and working conditions. Sustainability practices and organizational culture were mentioned less frequently overall. However, in every dimension, internationally recruited staff expressed comparatively higher levels of perceived need for improvement.

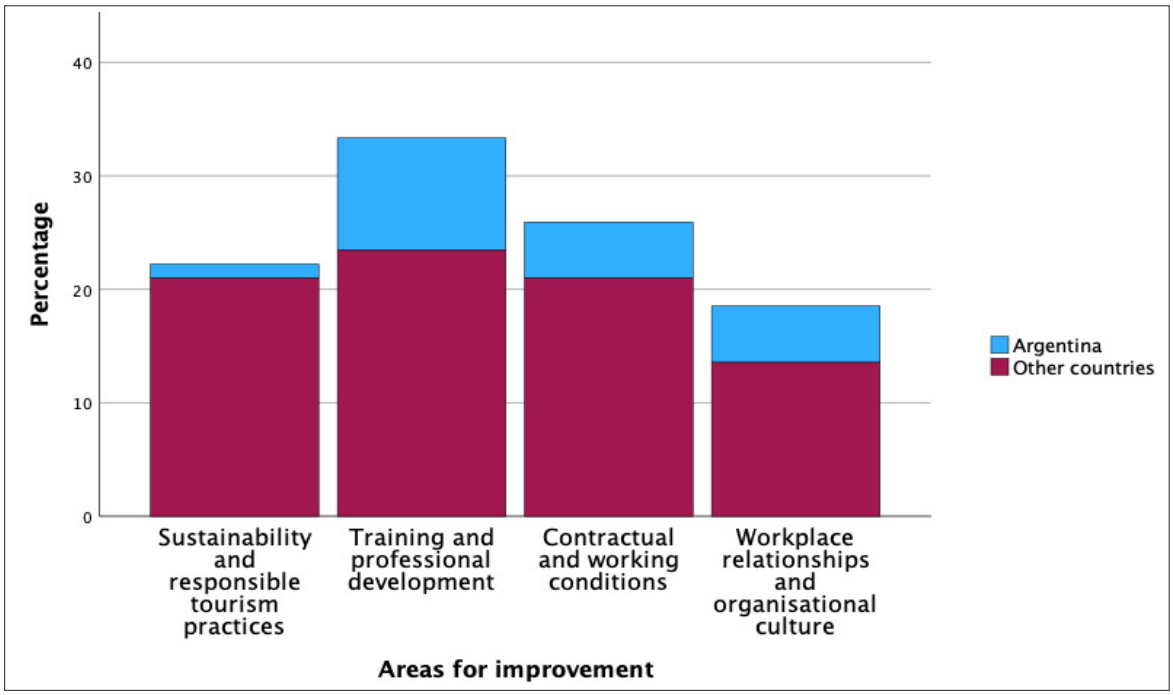


Figure 5. *Reported areas for improvement in Antarctic expedition work by nationality (Argentina vs. other countries). Percentages represent respondents identifying each category as an area requiring improvement.*[5]
Source: Authors' own elaboration

Advantages and disadvantages of living in a gateway city

Although respondents reported a wide range of places of residence, it is noteworthy that the Ushuaia residents account for 9.8% of the total sample. This proportion is considerably lower than that of Western Europe (39.1%) and North America (27.2%) and is comparable to respondents residing in the rest of Argentina (12%) and other regions (12%).

Regarding the roles occupied by Ushuaia-based staff, the data indicate a clear concentration in operational positions. The majority serve as expedition guides (77.8%), while only 22.2% hold senior roles (Figure 6). This distribution suggests that, while Ushuaia functions as the principal logistical gateway for Antarctic tourism, its role as a site of local labour integration appears more limited and structurally oriented towards operational rather than leadership positions within the expedition hierarchy.

5 Percentages may exceed 100% as respondents were allowed to give more than one option.

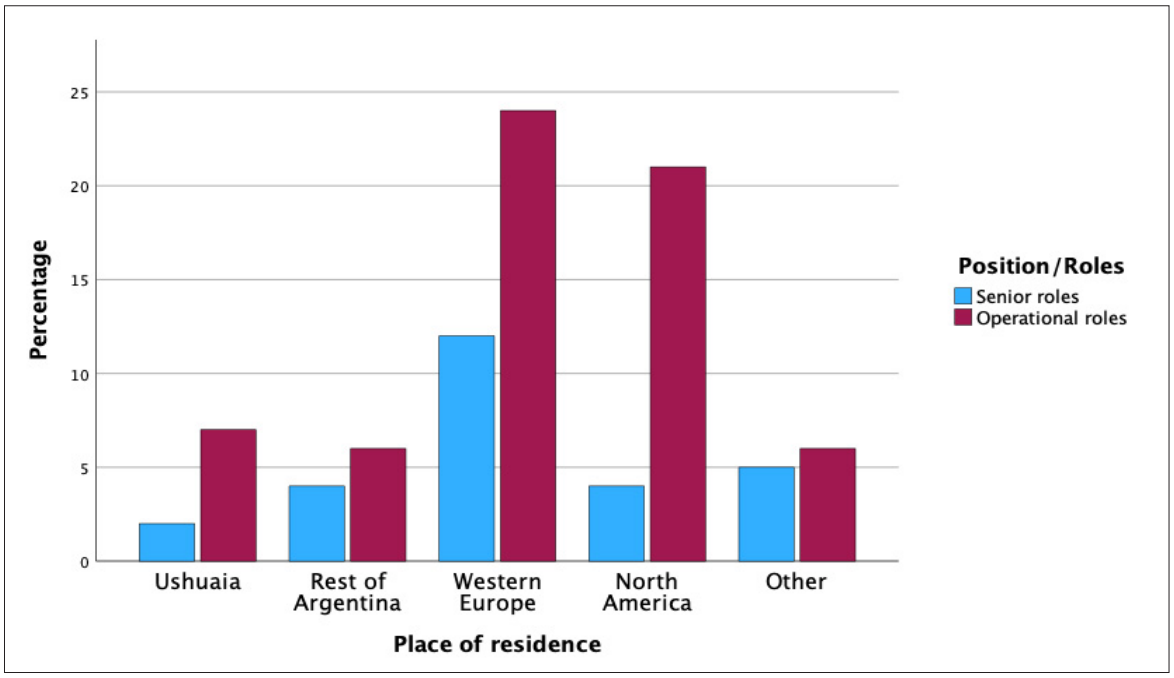


Figure 6. *Positions occupied by expedition staff according to place of residence.* Source: Authors' own elaboration

Among locally based respondents, economic considerations and opportunities for professional specialization appear as the primary motivations for engaging in expedition work. The desire to learn about and gain deeper knowledge of Antarctica also represents a significant driver. Companies often regard the locally based respondents' expertise as both cost-effective and high-quality, since this eliminates the need for expenses related to international travel, accommodation, and logistical coordination. Additionally, respondents reported benefiting from professional networks with experienced colleagues who offer guidance on training opportunities and facilitate job referrals.

Nevertheless, significant disadvantages were also identified. Unlike their international counterparts, local staff are seldom offered contracts in advance. Most employment opportunities are short-term and arise on short notice, often due to last-minute cancellations or situations in which other staff members fail to arrive before the ship's scheduled departure. Disadvantages included irregular employment, short-notice contracts, and limited access to Arctic or other international itineraries.

Discussion

This section discusses the main findings of the study in relation to the research questions, focusing on workforce composition, professional trajectories, and the role of Ushuaia as a gateway for Antarctic tourism. Particular attention is given to patterns of labour insertion, differentiation within the expedition workforce, and the implications of these dynamics for the organization and sustainability of Antarctic tourism.

A globally mobile workforce shaped by professional capital rather than nationality

The findings of this study confirm that Antarctic expedition staff constitute a highly international and heterogeneous workforce, reflecting the strong mobility of labour identified in the cruise tourism literature (Lin et al., 2022; Wondirad 2019; Wood, 2000). The predominance of foreign nationals, combined with the high number of languages spoken and diverse educational backgrounds, aligns with previous studies describing polar expedition teams as globally recruited, highly skilled professionals (Thomson & Sproull Thomson, 2006; Vereda et al., 2016).

However, the present research advances existing knowledge by demonstrating that professional capital—rather than national origin—is the primary factor shaping expedition careers. Logistic regression analyses show that accumulated certifications and age (a proxy for career stage) significantly increase the likelihood of belonging to the higher-experience group, while nationality has no predictive effect. This suggests that Antarctic expedition work operates as a meritocratic field in which formal credentials and accumulated field experience play a key role, confirming patterns also noted in research on Arctic expedition guiding (PTGA, 2024).

Relational recruitment and informal access pathways

Consistent with ILO (2001), most respondents obtained their positions through personal recommendation rather than formal recruitment channels. This reinforces the notion that Antarctic expedition work is embedded in network-based labour markets, where social ties—particularly with experienced staff—act as gateways to employment. The statistical association between personal recommendation and higher Antarctic experience indicates that relational capital becomes increasingly important as careers progress, enabling workers to access better opportunities and greater continuity of employment. In this respect, Antarctic expedition staff exemplify what Wood (2000) describes as transnational labour circuits shaped by trust, reputation, and informal hiring networks.

Gateway cities as uneven sites of labour integration

Although Ushuaia is the world's most active maritime gateway to Antarctica, its role as a labour gateway remains limited. This finding reinforces the argument that gateway cities may function as logistical nodes without necessarily enabling robust local labour participation (Bertram et al., 2007; Jensen & Vereda, 2016). The structural dominance of internationally recruited personnel—together with the reliance on foreign operators based outside Argentina—constrains local integration despite favorable geographical and operational conditions.

In this context, the concentration of locally based staff in operational roles, combined with the predominance of international personnel in senior and expedition leadership positions, points to a segmented labour structure within Antarctic cruise operations. These dynamics may also reflect broader asymmetries within global tourism labour markets, where access to higher-status positions is unevenly distributed across national and regional contexts. However, a gradual increase in Argentine and Ushuaia-based staff over the decade suggests emerging opportunities for territorial labor insertion, particularly when aligned with local educational initiatives (e.g. UNTDF programs and the development of a diploma in Antarctic guiding). This pattern suggests differentiated positionalities within the labour structure of Antarctic expedition work. While Ushuaia functions as a key operational gateway, locally based staff appear to articulate fewer explicit institutional demands compared to internationally mobile personnel. These differences may reflect distinct career trajectories, comparative employment benchmarks, or varying degrees of integration into the global cruise labour market.

Polar mobility and integrated bi-hemispheric careers

The finding that 70.7% of respondents have worked in the Arctic indicates that Antarctic expedition work is part of a transhemispheric labour circuit, consistent with the "polar umbrella" concept (Hall & Saarinen, 2010; Varnajot et al., 2025). This contributes to the literature by empirically demonstrating that expedition careers are built across both hemispheres, where professional expertise is accumulated through repeated polar seasons rather than within a single region.

Professional expectations and areas for improvement

The analysis of areas for improvement reveals that training and professional development are the most frequently identified needs, echoing the literature's emphasis on the increasing profession-

alization of expedition roles (Thomson & Sproull Thomson, 2006; Vereda et al., 2016). Interestingly, foreign staff consistently report higher levels of dissatisfaction across all categories—training, working conditions, organizational culture, and sustainability practices—suggesting differentiated positionalities within the expedition workforce. This contrast may reflect different benchmarks of professional expectations, divergent career trajectories, or varying degrees of institutional support within the global cruise labour market.

Motivational orientations and territorial identity

Both foreign and Argentine staff share key motivations—professional development, the opportunity to work in remote regions, and interest in Antarctica. Yet Ushuaia-based respondents underscore motivations linked to territorial identity, such as learning about their province or assuming responsibility as residents of a gateway city. This symbolic dimension adds a new layer to the literature, reconnecting Antarctic labour trajectories with local senses of place and engagement with the Antarctic region (Cohen et al., 2023). These findings suggest that locally embedded workers may bring distinct perspectives to Antarctic tourism, potentially influencing how environmental responsibility and sustainability are understood and enacted within expedition contexts.

Conclusions

This study contributes a comprehensive analysis of the Antarctic expedition staff workforce operating from Ushuaia, revealing the interplay between global labour mobility, professional capital, and local labour insertion within the world's leading Antarctic gateway.

First, the findings demonstrate that the expedition workforce is predominantly international, highly educated, and characterized by extensive formal certification. Crucially, the determinants of career consolidation are shaped by professional profiles—such as accumulated certifications and field experience—rather than nationality. This indicates a merit-based professional field and challenges assumptions about nationality-based segmentation within polar tourism labour markets. Second, recruitment processes rely heavily on informal networks and personal recommendations, highlighting the importance of relational capital in gaining access to and progressing within the industry. These dynamics reflect broader transnational labour structures characteristic of expedition cruising.

Third, although Ushuaia's geographic position and tourism infrastructure position it as the dominant Antarctic gateway, its role in facilitating local labour integration remains partial. The presence of educated local professionals—many trained at regional universities—signals potential for stronger participation. Yet structural barriers, including short-notice contracts and limited access to senior roles, continue to constrain their advancement. Fourth, the strong overlap between Antarctic and Arctic experience indicates the emergence of integrated polar careers, whereby expedition personnel accumulate expertise across both hemispheres. This bi-hemispheric mobility constitutes a defining feature of professional development within the sector. Finally, the study identifies training and working conditions as the primary areas for improvement, pointing to the need for specialized training programs, coordinated policy efforts, and mechanisms that strengthen local workforce pathways—particularly in gateway contexts such as Ushuaia.

Overall, these findings enhance understanding of a key professional group whose expertise shapes both the visitor experience and the governance of Antarctic tourism activities. They also underscore the potential of Ushuaia to consolidate itself not only as a logistical gateway, but as a labour and knowledge hub for the Antarctic tourism sector.

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