

Discussions and interventions

Science–tourism intersections onboard Arctic expedition cruise ships: Reflective insights from a fieldwork at the geographic North Pole

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Abstract

In August 2023, we both embarked on an icebreaker cruise ship in order to conduct fieldwork with and among cruise passengers and together with four other scientists. Departing from Longyearbyen, Svalbard, this two-week ship-time fieldwork took us to the geographic North Pole, across the Arctic Ocean sea ice, and to several locations in northern Svalbard. While cruise vessels operating as platforms of opportunity for researchers are not new, cruise tourism in the polar regions has raised ethical and sustainable concerns in times of increasing awareness regarding climate change. In addition, cruises bringing together tourists and scientists are currently objects of vivid discussions both in academia and the media. Drawing from our ship-time fieldwork experience, we aim to contribute to these recent debates. Building on the work of Lamers et al. (2024), we argue that misunderstanding on the concept of platform of opportunity can lead to potentially poor data collection, scientists' disappointment, and detrimental reputation for both science and tourism actors. We argue that carefully selecting research projects that align with the specificities of expedition cruise tourism, and facilitating nighttime research are effective strategies to avoid these misunderstandings. This may also enhance the credibility of cruise companies that may often be accused of science- and greenwashing.

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Introduction

Seaborne tourism is regarded as the fastest-growing segment of polar tourism (Bystrowska & Dawson 2017), with expedition cruise tourism rapidly growing in terms of newly commissioned passenger vessels, of ports of call, or of sailed kilometers by passenger ship (Dawson *et al.* 2018). In the Arctic, new itineraries are explored every year by cruise operators, reaching increasingly remote locations, such as the central Arctic Ocean, Greenland's East coast, or the Northwest Passage (Palma *et al.* 2019). As opposed to conventional cruises, expedition cruise tourism is characterized by smaller vessels of a capacity of 20 to 500 passengers; involving (relatively) flexible itineraries, shore landings (with dinghies), and environmental, geographical, historical onboard lectures and ashore interpretations (van Bets *et al.* 2017). In this context, increasing expedition cruise vessel traffic becomes an opportunity for facilitating research on the many challenges facing the polar regions.

Indeed, due to higher expenses of travel and shipping, conducting fieldwork in the high Arctic is particularly cost-prohibitive for researchers. Mallory *et al.* (2018) showed that conducting research in the Arctic is on average eight times more expensive than pursuing studies at a more accessible location. In line with this, expedition cruise companies have stepped in and have put forward the meaningful role they may have in such situations, as their ships will be traveling to these remote regions regardless (Taylor *et al.* 2020). Therefore, expedition cruise vessels have quickly become platforms of opportunity for researchers to be able to access remote fieldwork locations and to collect data (Löf *et al.* 2023). While using cruise ships as platforms for fieldwork is not a recent strategy (Graham *et al.* 2024), cruise tourism – particularly in polar regions – has raised ethical and sustainable concerns in times of increasing awareness regarding climate change, carbon footprint, and more generally our anthropogenic impacts on planet Earth (see Eijgelaar *et al.* 2010). Therefore, conducting fieldwork onboard cruise vessels merits careful considerations, especially when we, as scientists, are faced with credibility gaps in advocating for others to reduce their carbon footprint (Favaro 2014).

In August 2023, we embarked on an Arctic expedition cruise ship for our fieldwork. Departing from Longyearbyen, Svalbard, we embarked on a two-week journey across the Arctic Ocean sea ice, to the geographic North Pole, before heading back to Svalbard. Drawing from our personal experiences, we aim to contribute to recent and ongoing discussions in academia (see Graham *et al.* 2024; Lamers *et al.* 2024; Löf *et al.* 2023; van Soest 2023) and in the media (see Martinussen 2024; Øien 2024) on conducting fieldwork onboard expedition cruise vessels operating in remote and fragile destinations. More so, in times of warming Arctic (see Rantanen *et al.* 2022) and of sea ice retreat (IPCC 2019), human activities (e.g., military, tourism, shipping, etc.) are increasingly present and diversifying in the Arctic Ocean (Palma *et al.* 2019), and as such, this discussion on the science-tourism collaboration becomes particularly timely.

Setting the scene: our fieldwork to the geographic North Pole

Although the first ice-free summer could occur as early as the 2030–2050s (Kim *et al.* 2023), the geographic North Pole is still, at the moment, surrounded by perennial sea ice. Thus, the most common and comfortable way to get there is onboard an icebreaker.

In order to reach the North Pole, we embarked onboard M/V *Le Commandant Charcot*, a cruise vessel built with a Polar Class 2 icebreaking hull. She is operated by the French luxury cruise company Ponant, has been commissioned in 2021 specifically to bring tourists in ice-infested waters, and can host up to 245 passengers (plus 235 crew members). Generally, every year from May to September, *Le Commandant Charcot* operates in the Arctic (Greenland's East Coast, the geographic North Pole, the Northwest Passage), while she offers itineraries around Antarctica from November to March. As such, like many expedition cruise vessels, *Le Commandant Charcot* offers the same cruise routes multiple times within seasons and across years (see Taylor *et al.* 2020).

Le Commandant Charcot is also designed as a research platform with two permanent laboratories, including a 'wet lab' with direct sea access for deploying sensors or collecting samples below the hull. As such, she can host scientists from various disciplines (e.g., climatology, oceanography, marine biology, sea ice physics, as well as psychology, geography, etc.). In the summer of 2023, *Le Commandant Charcot* conducted 4 cruises to the North Pole, using the same route over the summer, and together with a team of two oceanographers from the University of Washington (UW) (USA) and of two sea ice physicists from the Alfred Wegener Institute (AWI) and the Hamburg University of Technology (TUHH) (Germany), we joined the third leg of these North Pole trips. For our German colleagues, these repeated voyages proved valuable for several reasons, such as for measuring sea ice thickness changes due to rising temperatures or shifting winds over the summer; better tracking monthly ice melt; and ultimately better improving Arctic Ocean sea ice modelling, prediction, and satellite data validation. They conducted a series of ice corings and deployed snow buoys measuring snow depth and surface atmospheric conditions, and thermistor string sea ice mass balance buoys to measure temperature profiles of air, snow, sea ice, and ocean over the course of four ice stations. They in addition conducted a series of drone flights in order to capture sea ice properties like ridged ice, melt ponds, open-water areas, floe sizes and shapes, and surface roughness. Collected images have then been used to generate Digital Elevation Models and orthomosaics. Lastly, they were in charge of the maintenance of the onboard Sea Ice Monitoring System (SIMS, Fig. 1), located at the bow and designed to continuously measure sea ice thickness, as well as of various temperature sensors that are constantly surveying temperature changes in the hull's structure (see von Albedyll *et al.* 2024).

Our colleagues from UW, however, had deployed in 2022 an Arctic Bottom Pressure Recorder (ABPR) on the Arctic Ocean floor. This device, developed to measure ocean bottom pressure variations in the perennial ice-covered Arctic Ocean, currently lies about 4000 m deep, in the vicinity of the geographic North Pole. It is equipped with acoustic modem technology and has been programmed to store and transmit data acoustically, without the need to recover the instrument (see Peralta-Ferriz *et al.* 2014). Thus, the team was onboard to collect uninterrupted data of ocean bottom pressure variability recorded from summer 2022 to summer 2023, with the goal of comparing their data with those collected by NASA's satellites.

Additionally, *Le Commandant Charcot* is equipped with devices and sensors that continuously measure water salinity, temperature, as well as sea ice thickness – via the SIMS – and is able to share this data with institutes like AWI. Onboard, a science officer oversees the research teams; coordinates data collection, ensuring each team returns home with valuable data; and assists with duties like ice coring, and installing buoys. The science officer's role also includes liaising with the ship's captain if, for example, a team



Figure 1. The SIMS consists of two measuring instruments: a sonar recording the distance to the air/snow interface and an EM31 recording the distance to the ice/ocean interface (von Albedyll *et al.* 2024). Photo: Alix Varnajot.

needs to reach specific coordinates for ABPR acoustic transmission or to immobilize the ship for capturing drone images. Overall, by facilitating long-term observations, expanding international buoy networks, and contributing to the validation of satellite data, Le Commandant Charcot provides a modern and reliable research platform, participating in international Arctic marine-based research.

These various actions in favor of science are also increasingly promoted by expedition cruise companies on their respective websites and marketing campaigns (Varnajot *et al.* 2024). Expedition cruise companies, together with industry associations like the International Association Antarctica Tour Operators (IAATO) and the Association of Arctic Expedition Cruise Operators (AECO) argue that this type of collaboration between tourism and science leads to many benefits for tourists, including increasing passengers' knowledge and understanding of the Arctic (or Antarctic); thus positively impacting tourists' attitudes and triggering pro-environmental behavior changes after they return home (Øien 2024; Taylor *et al.* 2020). In this context, our objective was to investigate passengers' motivations to visit the most remote parts of the Arctic and to situate and assess citizen science in the span of travel motivations. Therefore, for us and as opposed to our colleagues from UW, AWI, and TUHH, Le Commandant Charcot was not a platform of opportunity allowing us to reach a remote location. Rather, the vessel itself and the passengers were our objects of study. In line with this, our fieldwork included surveys with passengers, semi-structured interviews with passengers, guides, and fellow scientists, as well as participant observation. Specifically, the participant observation consisted of spending time with passengers (e.g., during

lectures, science-related activities, excursions, dinners, etc.), with the guides in charge of delivering the science education program, and with our colleagues during their fieldwork to better grasp their respective projects, objectives, and methods.

Some reflections: expedition cruise ships as platforms of opportunity

Following their participation in two cruises (in 2015 and 2022) combining scientific and tourism purposes around Svalbard, Lamers *et al.* (2024) brought new light on this relatively recent form of cruise tourism wherein scientists, tourists, and guests from the media coexist on an expedition cruise ship. Interestingly, drawing from the same cruises – organized by the Netherlands and called the Scientific Expedition Edgeøya Svalbard – other participating scientists recently shared thoughts and perspectives on this type of science-tourism expedition (see Löff *et al.* 2023; van Soest 2023). In a nutshell, van Soest (2023: 4) questioned the goals of such expeditions, raising issues related to “the politics of knowledge, the commercialization of science, how science is reported in the media, and the relationship between science and tourism.” van Soest (2023) also raised the imbalances between the amount of data collected during the cruise on the one hand, and the luxury, the carbon footprint, and the visibility in the media promoting the benefits of such expedition on the other hand. In fact, van Soest (2023: 1) even warned us as she considered these expeditions “a supposedly useful thing [she’ll] never do again”.

Similarly to van Soest (2023), Löff *et al.* (2023) also questioned the sustainable nature of these cruises, although *sustainability* was the main motive of such operation, which raises ethical issues including science- and greenwashing (see Varnajot *et al.* 2024). Moreover, Löff *et al.* (2023) highlighted the conflicting nature of such expeditions between the needs for fulfilling tourists’ experiences of Svalbard and the Arctic and scientists’ needs for landing in order to collect data. In a similar vein, Lamers *et al.* (2024) raised the organizing challenges of which of science or tourism is given priority. While they identify benefits of such expedition in terms of visitor experience, diversification of tourism practices, networking opportunities and scientific outreach, they in parallel highlight several limitations that may hinder the success of these specific cruises. These limitations include, among others, surprises due to regulatory complexities; flexibilities in the itinerary specific to expedition cruises potentially impacting data collection; and lack of communication between the tourism and science parts (Lamers *et al.* 2024). Lastly, Lamers *et al.* (2024: 11-12) also raise misunderstandings as a potential conflict between tourism and science, which require “careful preparation and communication, continuous on-board reflection [...] and ensuring that the roles and expectations of groups of carriers of practices are clear before, during and after a combined performance.”

While we agree with all points, issues and limitations raised by van Soest (2023), Löff *et al.* (2023) and Lamers *et al.* (2024), *misunderstanding* seem to be central to the ongoing discussions about tourism-science expeditions. Based on our experience, it seemed passengers’ experiences, activities, and schedules were not disturbed by the presence of scientists working on their respective research projects, including us and our significant and extensive presence among them. On the contrary, passengers seemed pleased, positively intrigued and interested in our work. The misunderstanding

highlighted implicitly by van Soest (2023) and Löff *et al.* (2023) and explicitly by Lamers *et al.* (2024), however, seems to stem from the scientific side of these expeditions. Indeed, as raised earlier, these cruises are platforms of opportunity, and in other words, are first and foremost tourism products. As such, they are designed to please and fulfill tourist experiences and to meet passengers' expectations. Thus, of course they come with luxury amenities and services for which they pay a substantial fare. In the context of our discussion, platforms of opportunity aim to take advantage of an existing (and growing) traffic of vessels, including cruise vessels and cargo ships (see Graham *et al.* 2024). When cargo ships serve as platforms of opportunity for marine biologists, for example (see Correia *et al.* 2020), the priority remains the route and the schedule they need to follow to be on time at the next harbor. They do not stop along the way or make detours to please the scientific protocol. Rather, scientists design their protocol and adapt their methodology to the cargo ships' priorities.

One main difference with cargo ships remains, however. As opposed to expedition cruise operators, shipping companies do not promote their connections with science or embark journalists for promotional purposes. Nevertheless, scientists must understand that not all scientific protocols can be adapted to the specific conditions of expedition cruise tourism, with the need for flexibility in data collection being the most challenging requirement for researchers. In addition, as van Soest (2023) noted, scientists are also drawn to the polar regions for various reasons, including the desire and longing to visit these vulnerable places – just like tourists. We, too, had little hesitation when we were offered the opportunity to reach the North Pole onboard *Le Commandant Charcot*. This eagerness can lure and lead many to expect meaningful research opportunities and successful data collection, only to face misunderstandings and disappointment when passengers' experiences and schedules take priority. This supports the need for beforehand and continuous clear communication raised by Lamers *et al.* (2024). It is worth noting that these conditions apply to those scientists using expedition cruise ships as platforms of opportunity. For those, like us, studying passengers, these considerations do not apply since we share the ship's premises 24/7 with our objects of study (Hardy *et al.*, in press). While the need for flexibility is also critical for conducting our ethnographically-oriented fieldwork, it is always possible to catch up with passengers before the cruise ends.

On a side note, while van Soest (2023), Löff *et al.* (2023) and Lamers *et al.* (2024) have rightly raised the conflicting aims between tourism and science, it is also important to highlight that onboard research vessels too, there are competition and conflicts between research projects over the use of given equipment or facilities. Scientific projects and data collection are also dependent on the variable weather and the sea ice conditions. On these missions, researchers can frequently compete for the use of the helicopter, for example, which might be needed by different teams at the same time during a favorable weather window. These priorities and considerations seem less problematic even though research vessels are not, by definition, platforms of opportunity. This reflects on a general level the priority given to science, scientific knowledge as opposed to accounts from those associated with tourism, which are held less valuable, less authentic, and less legitimate (Saville 2019). For the sake of the ongoing discussion on science–tourism collaborations, we feel it was necessary to bring that issue up.

Besides the imperative need for scientific protocols to be able to adapt to tourism priorities, some scientific operations may be conducted at night. Indeed, in the high latitudes, cruises take place in the summer, when the midnight sun provides constant daylight. Tourists' activities typically end in the late afternoon for dinner, evening

festivities and sleep. This leaves the night open for researchers to work. For instance, on our return to Svalbard after leaving the sea ice, our colleagues from UW needed to deploy a series of buoys at specific coordinates (Fig. 2). In practice, they were communicating with the bridge via the science officer, to inform the captain of the exact locations and timing for stops. Although these maneuvers involved several stops and slight detours from the direct route to northern Svalbard, they went largely unnoticed by passengers as they occurred between 11pm and 2am. In the end, carefully selecting research projects that align with the specificities of expedition cruises, rather than inviting numerous researchers for marketing purposes, and facilitating nighttime research are effective strategies to avoid misunderstandings. This may also enhance the credibility of cruise companies that may often be accused of science- and greenwashing.

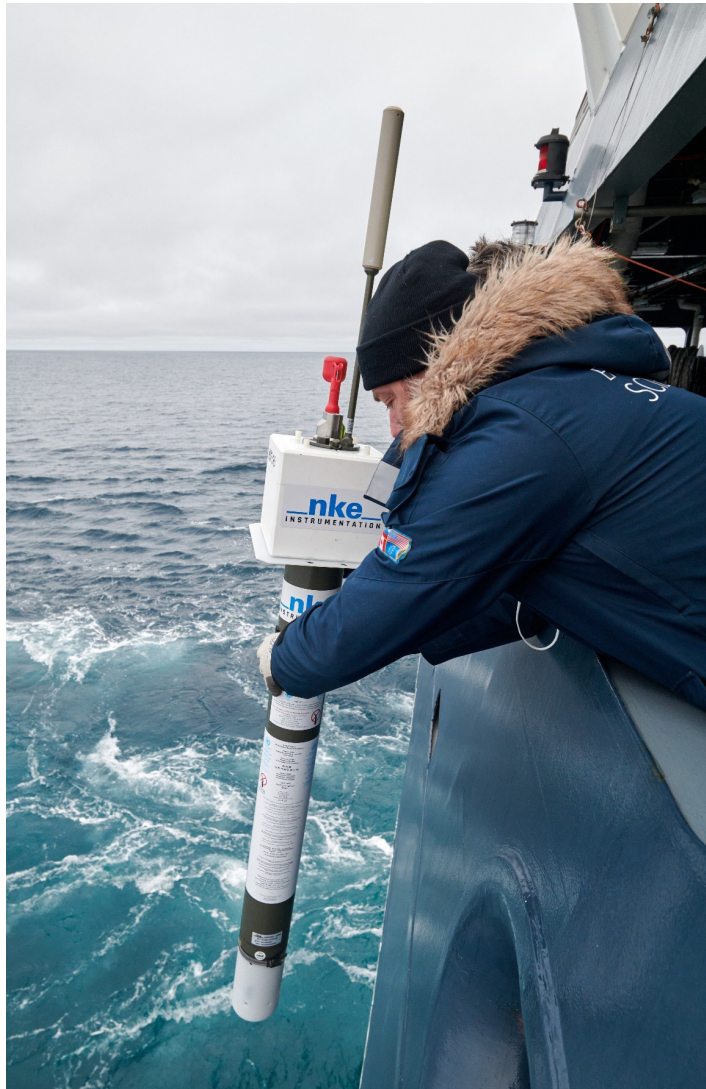


Figure 2. Deployment of a series of buoys, from the stern of *Le Commandant Charcot*, in the middle of the night and following specific coordinates. Photo courtesy: Mike Louagie.

Conclusion

Platforms of opportunity like expedition cruise ships can become key tools to address global change in polar environments. These cruise ships largely follow the same routes over the summer, year after year, and as such, may play a critical and favorable role in further monitoring and understanding environmental changes in the Arctic (and Antarctic). Nevertheless, while these science–tourism initiatives also come with ethical, sustainable, and practical limitations, it seems that misunderstanding – particularly on the role and definition of platforms of opportunity – might be the main source of conflict between the science and tourism sides, as identified by Lamers *et al.* (2024). As long as scientists will think cruise ships should act at the service of science as soon as a bunch of researchers are allowed to embark on them, this will lead to poor data collection, disappointment among onboard scientists, and a lack of credibility for cruise companies, which in the end is detrimental for both science and tourism actors. A more careful selection of research projects, together with clear communication between the cruise company and research teams beforehand may allow scientists to tailor their scientific protocol to the specific cruises they will join.

It is often said that tourism does not take place in a vacuum, it is connected to historical, cultural, political and socio-economic dimensions (Saarinen & Varnajot 2019) and the same can be argued about science. Indeed, overall, this ongoing discussion on science–tourism collaborations in the context of expedition cruise tourism in polar regions offers the opportunity to reflect on the role of science in our society. Scientists are perceived as more legitimate than tourists in fragile ecosystems (see Saville 2019), even if it has been shown that scientists regularly break environmental and safety rules for recreational purposes during their fieldwork (see Braun *et al.* 2017). Nevertheless, critics like environmental NGOs have promptly raised concerns on these collaborations and have incriminated the tourism industry of using science for commercial purposes in fragile and remote areas, reflecting this legitimacy imbalance. We contend that there is a need for nuances in these too-often polarized activist debates. Under some conditions, some research projects can be perfectly suitable with expedition cruises and serve our need for knowledge regarding climate change; and in such cases, wouldn't it be science taking advantage of the tourism industry?

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