



Short communication

## Safe working environments are key to improving inclusion in open-ocean, deep-ocean, and high-seas science

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## ABSTRACT

With growing acknowledgement of the need to address disparities in capacities to undertake open-ocean, deep-ocean, and high-seas scientific research, numerous global initiatives have been launched to make ocean science more inclusive, equitable, and accessible. Participation in offshore research cruises has emerged as a primary activity to achieve this. While admirable, the experiences of underrepresented groups in offshore science show that there needs to be a step change in approaches to ensure safety and inclusion. Instances where discrimination, bullying, harassment, and assault occur do not build capacity; instead, they perpetuate the fundamental inequities that should be addressed. Yet we do not hear about these experiences, and there is a need for conversations about how to ensure safe working spaces at sea. We propose steps to support inclusion and safety for underrepresented groups within offshore science.

Safety at sea for scientists, especially those from underrepresented groups, is a hidden issue that demands urgent attention. Addressing this is key to humankind achieving truly global ocean science in pursuit of more sustainable and equitable ocean management.

There is growing global acknowledgement of the importance of the ocean and its biodiversity in supporting the planet through climate regulation, providing food to millions of people, supporting livelihoods and industries that contribute billions of dollars to the global economy, and providing cultural links that range from spiritual connection to a place of relaxation [1,2]. There is also heightened awareness of growing biodiversity loss and impacts (including through climate change) [3], and increasing interest in the Blue Economy [4]; all of which are driving an increase in open-ocean, deep-ocean, and high-seas exploration and scientific research over 65% of the Earth's surface. Unfortunately, there are significant disparities in the capacities to undertake these types of ocean science worldwide [5–7]. This is due to the high level of resources needed and that these types of ocean research have and continue to largely occur in non-inclusive and inequitable ways.

Companies, intergovernmental, governmental, and non-governmental organisations, along with academic institutions have launched numerous global initiatives, including the United Nations

Decade of Ocean Science for Sustainable Development, to make ocean exploration and science more inclusive, equitable, and accessible at various levels (e.g., [7–9]). Participation in research cruises has emerged as a key focus for training, for example, in relation to exploring and sharing the benefits of deep-seabed mining by the International Seabed Authority (ISA) (<https://www.isa.org.jm/index.php/training/contract-or-training>), as well as conserving biodiversity beyond and within national jurisdictions (e.g., [10]).

However, the lack of a corresponding rise in measures to ensure that such opportunities are safe, especially for underrepresented groups, hinders the advancement of open-ocean, deep-ocean, and high-seas science globally. This is especially the case for individuals with one or more intersectional identities with histories of marginalisation or disenfranchisement (e.g., black, indigenous, and other people of colour, LGBTQIA+, religious minorities, and those at early-career stages, and/or from developing nations). Research cruises require participants to spend continuous weeks to months on ships at sea, often great distances from the nearest landmass, manifesting in inevitable isolation. These cruises can be rich and rewarding experiences that build collaborations, teach new skills, facilitate further research, etc. [11]. However, these can also be disturbing or even harmful experiences as harassment,

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bullying, and discrimination are rife during scientific fieldwork [12–15] and at sea generally [16].

A lack of representation, combined with discrimination, bullying, racial and sexual harassment, as well as assault, pose a constant physical and emotional threat during ship-based fieldwork [17]. A starting place for negative experiences includes microaggressions (e.g., remarks about how “exotic” or “hard to pronounce” one’s name is) and having one’s opinions and experiences disregarded. This can extend into stalking, sexualising or aggressive comments, or unwanted physical contact that violate participants’ boundaries and safety. A staggering 78% of respondents to a recent survey of women in ocean science had experienced sexual harassment. Of these, more than 30% did not report the harassment and over 50% did not know how [15]. The most common reasons respondents gave for not reporting sexual harassment were that the harasser’s position of power may influence the outcome of reporting and that it might harm the witness’ or victim’s career [15]. The hostile environment created by these actions is further compounded by other individuals’ wilful or casual ignorance of these dynamics or incidents.

Furthermore, participants can also be entangled in tokenism on research cruises, such as when they are used as a ‘poster person’ for a capacity-building programme. This is a form of exploitation that reduces underrepresented individuals, while participating, to the social and political contexts that they live within and the potential associated traumas. Participants may be even more vulnerable to these aggressions due to a lack of mentorship, role models, and like-minded figures in authority while in the field [18]. Additionally, these experiences are not limited to individuals in early career stages - principal investigators and senior scientists from underrepresented groups also encounter situations where they feel unsafe and disrespected. Thus, at every level, harassment and a lack of representation exacerbates isolation and pressure, and increases the struggle to be safe and valued while conducting offshore fieldwork.

To address this problem, an integrated framework should be developed to support inclusion and safety for underrepresented groups within open-ocean, deep-ocean, and high-seas science – especially as at-sea capacity-building projects emerge. The need for such a framework has also been highlighted by the Consortium for Ocean Leadership and California State University Desert Studies [13]. Stamping out antisocial behaviour and ensuring equality of well-being during the time spent at sea is the responsibility of the ocean community at large. Actions can be taken at different levels: personal, institutional, national, and international.

A starting place should be reflection on our individual positionality and the power dynamics present in our working environments. This can help each of us to prevent harmful occurrences from continuing and to ensure that they do not stay hidden when they do. Bystander intervention, although more common amongst extroverts, empaths, and people with higher social status and moral engagement, can prove a valuable tool. However, each of us working towards creating a positive culture through social and emotional learning (self-awareness, self-management, social awareness, responsible decision making, and relationships management) can promote critical reflection and discussion on this important topic. Diversity training could also be considered for all participants (not just scientific) prior to sailing.

Second, there is a need for robust Codes of Conduct that set standards and include unambiguous harassment and bullying policies to protect underrepresented scientists, who are especially vulnerable, at sea (e.g., [13]). Such Codes should be evidence-based (i.e. incorporating experiences of historically marginalised groups as a frame of development). Additionally, these codes should be mandated for all ships, research institutions, industry operators, and regulating bodies (including inter-governmental organisations), circulated to all participants prior to a research cruise, enforced for the duration, and reported on upon completion. International bodies have a particularly important role in setting and upholding standards to address harassment and bullying at sea, given the highly international nature of vessels [16]. For

open-ocean, deep-ocean, and high-seas science, where a research vessel might be flagged, funded, operated, and staffed by individuals and organisations from different nationalities and with differing cultural backgrounds at any one time, the potential role of international organisations, such as the Intergovernmental Oceanographic Commission of UNESCO, the ISA, and/or the International Maritime Organisation (IMO), in setting standards for the safety of scientists at sea should be recognised. These organisations are particularly well positioned to advance safety at sea for ocean scientists through the cooperation framework presented by the United Nations Decade of Ocean Science for Sustainable Development. Lessons in guiding State and business practice can perhaps be learned from the United Nations Office of the High Commissioner for Human Rights [19] as well as Carballo Piñeiro and Kitada [16].

Third, there is a need for mandatory, safe, and confidential mechanisms for the reporting and handling of incidents, resulting in all participants being held accountable for their actions. Despite some operators having existing reporting systems, as well as growing awareness of these issues and commensurate calls for change, discrimination, bullying, harassment, and assault are still pervasive. This indicates that existing measures need to be better implemented and are not sufficient at creating safe working environments at sea. It should also be noted that if a person experiences discrimination, bullying, harassment, and/or assault on a research cruise, especially one from an underrepresented group, that is not a “capacity-building opportunity” – it is trauma. Yet that individual, regardless of the reality of their experience, will be treated as a successful outcome, because of a lack of safe reporting mechanisms, as well as ones that are holistic and consider participants’ wellbeing rather than the ‘number of participants’ and their ‘country of origin’. There is a need for mechanisms for their voices to be heard. International organisations also have a role in ensuring that capacity-building targets include transparent and safe monitoring structures and incentivise honest feedback from participants. Experiences of initiatives under the IMO to address safety at sea, such as procedures for reporting and best practice guides, could offer useful insights to this end, although ultimately best practice guidelines alone are unlikely to be sufficient and some mandatory measures are needed [16].

Ensuring safe and respectful at-sea research environments will not only require an integrated framework for actions from all stakeholders and networks, but also champions for reflexive processes that challenge pre-conceptions of capacity building and international collaboration. It will also require a critical conversation about whether at-sea opportunities, present in strategic plans and frameworks to monitor global human capital within open-ocean, deep-ocean, and high-seas sciences, are effective as a means of capacity building [20]. These conversations should also extend to if and how these opportunities create meaningful engagement and lasting outcomes (e.g., the retention of underrepresented people in ocean science), and whether reporting metrics reflect effectiveness and equity [20].

As we are at the start of the UN Decade of Ocean Science for Sustainable Development, the time to develop this framework is now. This will ensure that, through the Decade and beyond, the problems of safety and dignity at sea are addressed, not perpetuated, and research cruises are safe and productive spaces for international collaboration. The Decade is well positioned to advance this agenda as a tangible way of operationalising the Decade’s guiding approaches of equity, inclusiveness and respect. We hope that this short communication will ignite vital global conversations pertaining to ensuring safe and inclusive working spaces at sea.

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## CRediT authorship contribution statement

**Diva J. Amon:** Conceptualisation, Writing. **Zoleka Filander:** Conceptualisation, Writing. **Lindsey Harris:** Conceptualisation, Writing. **Harriet Harden-Davies:** Writing.

## Competing interests

Authors declare that they have no competing interests.

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