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**Six simple steps towards making GEES fieldwork more accessible and inclusive**

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## **Six simple steps towards making GEES fieldwork more accessible and inclusive**

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**Fieldwork is an essential aspect of Geography, Earth and Environmental Science programme curriculums, and a defining aspect of most geoscience-related degrees. At its best, fieldwork offers students valuable opportunities to develop independent research skills in real-world situations, examine analogues for a range of geoscientific concepts, and socialise with peers. It offers experiences that are challenging to replicate using virtual/remote learning. However, at its worst, traditional fieldwork practice and culture can present barriers to access and hostile environments that epitomise the broader equality, diversity and inclusivity problems faced by the geosciences. With the role of fieldwork increasingly being called into question, here we promote simple adaptations that can make fieldwork more accessible and enjoyable for all.**

### **Keywords**

GEES, fieldwork, equality, diversity, inclusivity, accessibility

## Introduction

Fieldwork is a key aspect of most geoscience degrees. From sampling Caledonian granites in Ireland, to measuring gas emissions on the flanks of a volcano in Vanuatu, to logging sedimentary sequences in Utah, to mapping the geology of Antarctica; fieldwork means so many different things to geoscientists.

Yet the diversity of field environments is not mirrored by the geoscience and wider geography, earth and environmental science (GEES) community itself. Numerous publications have now demonstrated that the discipline has alarmingly poor representation of minority groups (e.g. Stokes et al., 2015; Bernard and Cooperdock, 2018; Dutt, 2020; Dowey et al. 2021). This growing awareness of the need for improved equality, diversity and inclusivity in geoscience, together with the unprecedented travel disruption wrought by COVID-19, has led to the role of fieldwork in geoscience increasingly being the subject of debate (e.g. Dzombak, 2020a; Pickrell, 2020; Giles et al., 2020).

Geoscience fieldwork involves inherent barriers to students from minority groups, including expense, physical exertion, alcohol culture, and access to toilets (Greene et al., 2019; Giles et al., 2020). Even where fieldwork costs are covered, the expense of field equipment and clothing is a problem for students from low socioeconomic upbringings, who are disproportionately from minority ethnic backgrounds in Global North countries like the UK (Office for National Statistics, 2020). For some cultures, residential stays in mixed accommodations, or timing of fieldtrips with regards to the religious calendar, may cause concern. Furthermore, fieldwork traditionally takes place in remote, rural, racially homogenous locations, where ethnic minority students may be more likely to face racism (Anadu et al., 2020). More broadly, fieldwork has

been the subject of significant criticism for its “masculine, eurocentric origins, assumptions and languages” (Bracken and Mawdsley, 2004). In their 2014 survey Clancy et al. found mistreatment of female early career academics in the field to be rampant, with 71% of female respondents having experienced sexual harassment during fieldwork and over a quarter reporting sexual assault. Traditional fieldtrip culture, featuring heavy drinking, partying and ‘banter’, has served to exclude those with markers of difference, especially LGBTQ+ and disabled scientists (Hall et al., 2004; Pickrell, 2020).

Many authors maintain that fieldwork is a defining and indispensable aspect of geoscience, and whilst it may be supplemented through virtual or non-field based activities (particularly during the current conditions of the Covid-19 pandemic), it cannot be substituted by these (Stokes et al., 2019; Giles et al., 2020; Sima, 2020). Fieldwork is an essential part of Earth Science and Physical Geography curriculums; in the UK, the QAA Higher Education Benchmark Statements refer to fieldwork as ‘core’ and ‘essential’ to these subjects (QAA, 2019). We cannot, therefore, make geoscience more inclusive by simply removing outdoors working, or by converting it wholesale into something different. We instead must adapt our pedagogic practice in the field to create more inclusive outdoor working experiences, removing the barriers that fieldwork poses to access, participation and retention of minority students in geoscience.

In this contribution we draw on our lived experiences as a mixed ethnicity, non-binary, autistic early career geoscientist and a white female geoscience lecturer with experience in industry, respectively. We offer straightforward recommendations for removing some frequently overlooked barriers and stressors that occur in the field.

Our hope is that these proposed adaptations to pedagogic practice will help make fieldwork a more accessible and rewarding experience for all.

## **1. Planning is key**

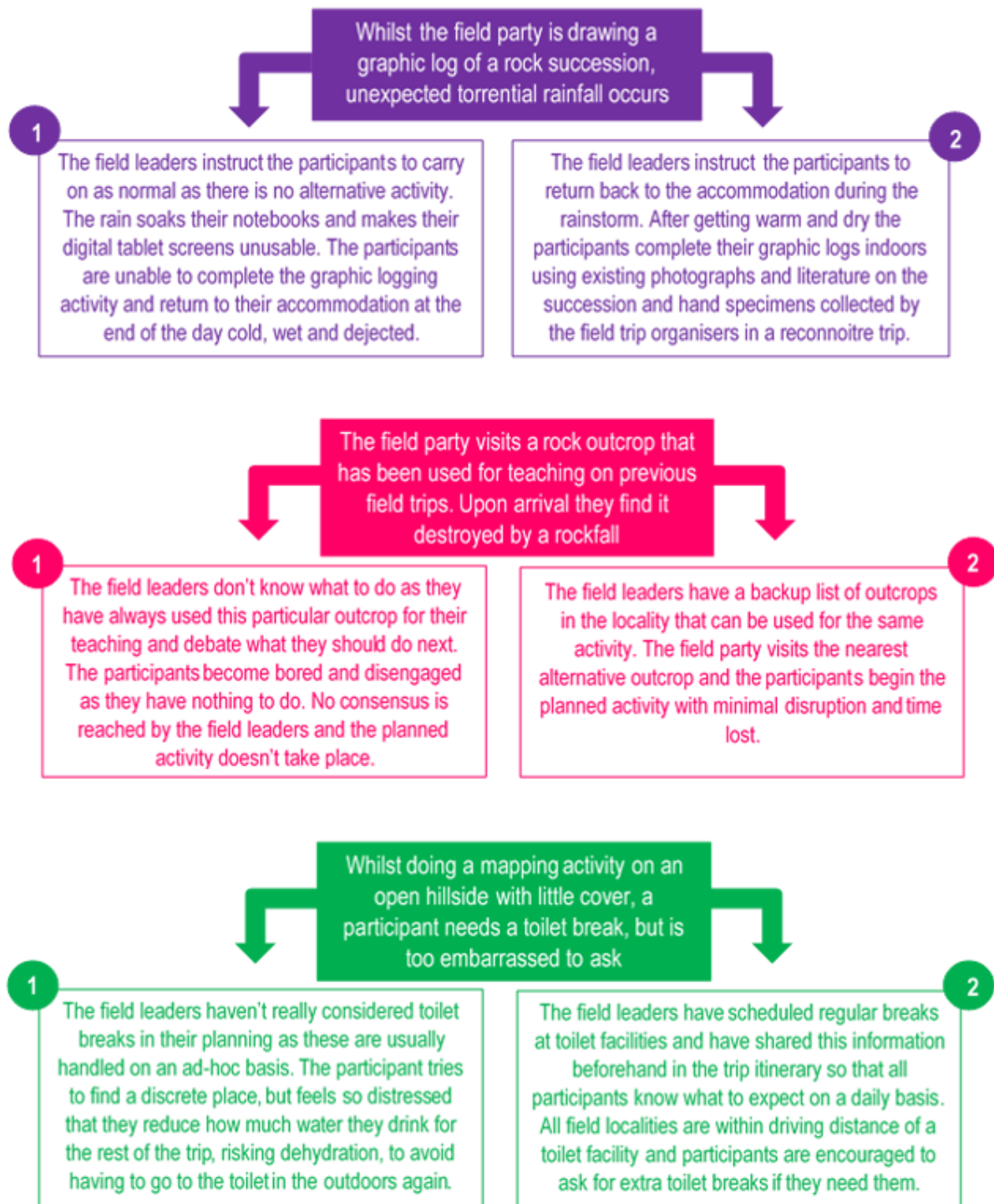
Fieldwork has always been prone to challenges. Poor weather, unexpected lack of access to outcrops, vehicle breakdown, a lack of toilets. Overcoming such setbacks is arguably part of the 'hidden curriculum', building resilience and transferable skills in students. However, for some students, simply participating in a field trip can be challenging, due to pre-existing financial, physical, racial and/or emotional barriers (Stokes et al., 2019). It follows that if participants experience further adversity in the field, it may impact confidence and be a deterrent to undertaking future fieldwork.

Geoscience educators are trained to undertake detailed planning for basic health and safety scenarios in the field. However, more can be done to ensure preparedness for a broad range of other challenging situations, some of which have serious health and safety implications. For example, Anadu et al. (2020) recently detailed recommendations to protect fieldwork participants from racism and prejudice, including racial risk assessments and antidiscrimination training for field leaders. Kingsbury et al. (2020) advocate creating daily schedules which factor in non-academic aspects of working in the field, such as taking breaks from working in groups, to preclude overstimulation and related meltdowns/ shutdowns in autistic individuals.

Considered logistical preparation, involving lists of alternative accessible outcrops, digital resources and plans B, C and D, may be crucial in avoiding demoralisation and disengagement, particularly for students with disabilities (Figure 1). Although devising backup plans may require creativity and additional effort on the trip

organiser's part, Houghton et al. (2020) suggest that having alternatives such as wet-weather activities (see also Figure 1) can be beneficial for entire student cohorts and can easily be 'reused' for each presentation of the field course.

Furthermore, field leaders can give clearer guidance on how to problem-solve and troubleshoot when in the field, to demystify the experience and make it more accessible for the participants.



**Figure 1** Example problems in the field and outcomes. Outcome 1 results from rudimentary fieldwork planning whilst outcome 2 reflects more considered planning.

## **2. Fun not fear**

Experiences shared on social media in recent years have revealed a glimpse of the discrimination faced by minority geoscientists in the field (e.g. Larson, 2020; Litchfield, 2020; Anadu, 2020). Such experiences could understandably discourage some to forgo fieldwork altogether because of fear. For LGBTQ+ geoscientists, fear of travelling to countries where their status is criminalized (Olcott and Downen, 2020); for BAME geoscientists, fear of experiencing racism (Anadu et al., 2020); for disabled geoscientists, fear of being in unfamiliar and poorly accessible areas far from the safety net of home and professional healthcare support (Tucker and Horton, 2019; Stokes et al., 2019).

Although these concerns may be difficult to fully address, a good first step towards minority geoscientists feeling safer and finding fun in their field experiences is to ensure that they are offered a complete package of support that goes beyond the standard field trip leader, health and safety officer, or informal buddy schemes.

Assigning personal assistants or mentors to vulnerable individuals can enhance inclusion and access in field environments, especially if the mentor is someone with shared experiences that allow them to relate well to their mentees (Olcott and Downen, 2020). This mentor/assistant can liaise with their mentees prior to the fieldtrip, to gain understanding of their personal and cultural circumstances and abilities. Institutions must adopt a flexible approach to fieldtrip mentoring, working on a case-by-case basis. Institutional disability service providers may not have the pedagogic experience or familiarity with geoscience required to provide appropriate mentoring support for students outside of traditional classroom settings (Feig et al. 2019). For example, the first author of this study is provided assistance by their



parents in the field as, being full-time carers, they have the greatest insight into the author's disability, including how it affects them on a day-to-day basis and their specific needs in the context of geoscience fieldwork.

Upon arrival at the field locality, mentors could offer a meet-and-greet service for their mentees to replace any initial feelings of trepidation and anxiety with a sense of welcome and belonging. During the fieldwork itself, mentors should maintain regular communication with their mentees to assess how much support they require to feel comfortable and effectively engage in the learning experience (Hendricks et al., 2018).

Whilst universities and colleges may not consider it their responsibility to provide off-campus support (Anadu et al., 2020), they do have a duty of care to ensure the safety and wellbeing of all staff and students, and it is important that individuals who need it have the safety net of a designated person that can listen and respond to their concerns as they arise.

### **3. Skills over hills**

A key aim of field training is to allow geoscientists to gain practical, transferable skills that they can reuse in the future when independently gathering primary data.

However, skills development can be undermined by a machismo, Mallory-esque culture of 'we must visit that outcrop because it's there' that pervades fieldwork in many physical science disciplines (e.g. Hall et al., 2004; Fitzpatrick, 2020). This may lead to a focus on who can 'bag' the most exposures, rather than who can accurately measure the strike and dip of the rocks or identify the unconformable boundary between strata. Where fieldwork grades into adventure tourism rather than a

purposeful, educative experience, it reinforces casual ableism and excludes people with disabilities (Tucker and Horton, 2018; Pickrell, 2020).

To create more inclusive instructional environments and equitable access to the field, these traditional attitudes and hostile climates must be dismantled. Part of this effort involves institutions reviewing materials used to promote fieldwork, which routinely depict white, physically fit geoscientists in rugged outdoor settings (Hall et al., 2004; Atchison and Libarkin, 2016; Dowey et al., 2021).

Careful and considered field work design is also needed (Gilley et al., 2015). For example, where a field locality presents accessibility issues, the trip organisers should endeavour to find an alternative that is easily reachable for those with mobility issues or lower levels of physical fitness. Where this isn't feasible, portable Wi-fi networks and mobile technology can provide students remote access to the inaccessible field site and thereby create an environment conducive to active participation and social inclusion, as demonstrated through the Enabling Remote Activity (ERA) approach pioneered by the Open University (Collins et al., 2016).

In this way, no student would miss out on experiencing the field or having the opportunities to build skills just because they are unable to reach the outcrop at the end of a slippery, rocky beach or atop the highest, most difficult hill.

#### **4. One size never fits all**

The prospect of spending many days or even weeks in the field can be a complete deterrent not just for students but for geoscientists at various different levels within the academic hierarchy (Tucker and Horton, 2018).

Whereas postgraduates and more senior academics often have independence to determine the duration of their fieldwork, undergraduates and teaching staff seldom have the autonomy to decide.

Therefore, institutions (and accrediting bodies if relevant) should be open to creating more flexible fieldwork timetables that allow for several shorter fieldtrips or daytrips. This may be preferable to the concentrated social environment, long working hours and intense nature of a multiday residential trip, which for some is an “ordeal” rather than a constructive experience (Tucker and Horton, 2018). This has the added advantage of providing thinking and planning time in between field trips; students and staff can reflect on what worked well for them on a trip and whether this can be replicated during their next field visit. Likewise, they can consider what didn’t work so well and how this could be improved next time.

Another consideration here is financial (Abeyta et al., 2021). Field skills training in overseas locations, where not fully subsidised, is an expensive and inaccessible option for many students. The feasibility of offering equally worthwhile and relevant domestic trips should be considered, for those on a restricted budget and/or not wanting to stray too far from home (Figure 2).



**Figure 2** *Different destinations, same aims; The authors of this study photographing field exposures of igneous rocks in overseas (left) and domestic (right) destinations*

## **5. Embracing diversity – and being actively anti-prejudice**

When working with geoscientists from diverse backgrounds it is important to show open-mindedness and acceptance towards personal different needs and requirements.

For example, autistic individuals may need to carry a tactile object like a blanket, engage in stimming or use toys such as fidget spinners, to help maintain focus and cope with the myriad of external sensory stimuli in field environments (Kingsbury et al., 2020).

Researchers who are practising religious fasting may have eating patterns that differ from the traditional meal times that many fieldtrips are structured around. In these cases, leaders should avoid scheduling trips during religious fasting periods such as Ramadan where possible. If this is unavoidable, and students practising fasting are on the trip, leaders must ensure that suitable food is available at the appropriate times (including satisfactory gluten-free, vegetarian, vegan, halal and kosher options), and that the trip does not involve an unnecessarily high level of strenuous

physical exertion. The risk assessment of the trip must also be adapted to include the possibility of students experiencing acute dehydration or fainting.

Research indicates that 40% of trans and 52% of non-binary people in the UK feel they must adjust the way they dress to avoid discrimination or harassment (Stonewall, 2017). Being given the freedom to dress in outdoor gear and clothing that they feel comfortable and confident wearing is essential for trans and non-binary individuals (Dzombak, 2020b). Furthermore, careful consideration of toilet and changing facilities on fieldtrips is necessary to ensure that everyone can safely use these spaces. Fieldtrip leaders should avoid unnecessary gender divisions (e.g. girls queue on the left), ensure that there is universal provision available at the accommodation, and bear in mind that not all trans people feel comfortable using public conveniences (Gendered Intelligence, 2020).

Whatever the difference, tolerance must be extended towards those from underrepresented groups to make the field a more welcoming and diverse place.

## **6. Carry on the conversation**

It is imperative that the critical thought provoked by the coronavirus pandemic about fieldwork accessibility and inclusion remains at the forefront of our minds long after lockdowns and travel restrictions have ceased. The momentum must continue in order to improve equality, diversity and accessibility within geosciences and associated fieldwork (Sima, 2020).

To see positive, lasting change take effect, those who have been previously excluded should be included in the dialogue and lead the conversation going forward (Scarpelli, 2017). Social media, focus groups and workshops (Pickrell, 2020) are

powerful forums through which academics, fieldwork leaders and those in management roles can be educated on the challenges faced by minority groups. Conferences, such as those held on accessible virtual platforms during the pandemic, can enable solution-focussed discussions to take place within the wider geoscience community and provide opportunities for disseminating information on best practice to broad, international audiences.

If we fail to listen to underrepresented groups and action their thoughts, ideas and concerns, we risk losing unique and irreplaceable geoscientists not only from the field, but from our discipline altogether.

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