
Article:
Lininger, K.B., Rowan, A.V. orcid.org/0000-0002-3715-5554, Livers, B. et al. (4 more authors) (2021) Perspectives on being a field-based geomorphologist during pregnancy and early motherhood. Earth Surface Processes and Landforms, 46 (14). pp. 2767-2772. ISSN 0197-9337

https://doi.org/10.1002/esp.5238

Lininger Katherine (Orcid ID: 0000-0003-0378-9505)
Rowan Ann (Orcid ID: 0000-0002-3715-5554)
Livers Bridget (Orcid ID: 0000-0002-4496-6988)
Kramer Natalie (Orcid ID: 0000-0001-6301-6155)
Ruiz-Villanueva Virginia (Orcid ID: 0000-0002-0196-320X)
Sendrowski Alicia (Orcid ID: 0000-0002-0244-6773)

ARTICLE TITLE

Perspectives on being a field-based geomorphologist during pregnancy and early motherhood

NAMES AND INSTITUTIONS OF ALL AUTHORS

Katherine B. Lininger[1], Ann V. Rowan[2], Bridget Livers[3], Natalie Kramer[4], Virginia Ruiz-Villanueva[5], Alicia Sendrowski[6] and Sallie Burrough[7]

1 Department of Geography, University of Colorado Boulder, Boulder, Colorado 80309, USA
2 Department of Geography, University of Sheffield, Sheffield, UK
3 Department of Natural Resource Ecology and Management, Iowa State University, Ames, Iowa 50010, USA
4 Dipper and Spruce, LLC, White Salmon, Washington 98672, USA
5 Institute of Earth Surface Dynamics (IDYST), Faculty of Geosciences and the Environment, University of Lausanne, CH-1015 Lausanne, Switzerland
6 Department of Civil and Environmental Engineering, Michigan State University, East Lansing, Michigan 48824, USA
7 School of Geography & the Environment, University of Oxford, UK

CONTACT DETAILS OF THE CORRESPONDING AUTHOR

Katherine B. Lininger, katherine.lininger@colorado.edu
260 UCB
Boulder, Colorado 80309

ACKNOWLEDGEMENTS

We would like to acknowledge all of the people who have made it possible for us to do fieldwork, including our partners, children, extended family members, childcare workers, colleagues, and advisors.

AUTHOR CONTRIBUTIONS

Katherine Lininger and Ann Rowan led the development of this commentary, and all authors contributed equally to discussions and writing.

DATA AVAILABILITY STATEMENT

There are no data associated with this commentary.

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1002/esp.5238

Abstract

Many geomorphologists who are mothers find it challenging to balance field research alongside pregnancy and caring for young children. We offer perspectives on the challenges to conducting fieldwork as mothers and possible solutions, as a means of promoting conversations and highlighting issues that are less commonly considered in field-based geomorphic research. Although every mother's experience and needs are different, we discuss strategies for conducting fieldwork, addressing childcare issues, and dealing with financial considerations. We call for our community to support geomorphologists who are pregnant or caring for young children in carrying out fieldwork to help enhance the diversity of voices and perspectives within our discipline.

Keywords: *women in geomorphology, field geomorphology, childcare, pregnancy, motherhood*

1. Introduction

"*The inherent aim of science is to recognize patterns in order to deduce or infer the underlying processes that create those patterns and govern the behavior of natural systems. The ultimate, fundamental source of pattern recognition for geomorphologists is the natural world*" (Wohl, 2013, pg 50).

Geomorphologists often rely on fieldwork to drive their research questions (*ibid*.). An important question for women of child-bearing age is: how can one be pregnant or have young children while continuing to do field-based research? We discuss some of the challenges that women who do fieldwork face. We also highlight possible solutions to provide a resource for mothers[1], prospective parents, and their colleagues who are concerned about the impacts children may have on career progression because they are field-based scientists (Drozdzewski and Robinson, 2015, Jenkins, 2020). Diverse voices and perspectives enhance and advance our collective scientific endeavors (Tooth and Viles, 2020), and we must find ways to support geomorphologists who are also mothers.

We acknowledge that the careers of women, men, and people with other gender identities can be impacted by caring for young children. In this commentary, we focus on those who are pregnant, give birth, and are mothers of babies and preschool-age children who carry out field-based research[2]. This life stage presents a unique set of challenges to a mother's career, which are exacerbated by the requirements of fieldwork away from home. We identify as white cis-gender women, and recognize

[1] We refer to women, transgender men, and people with other gender identities who give birth and those who parent children as "mothers". We do not specifically address the unique situations of adoption, fostering or surrogacy but include these mothers who similarly face the challenges of caring for preschool-age (0–4 years old) children.

[2] In the figures that accompany this commentary we give examples of our personal experiences of combining pregnancy and motherhood with fieldwork. Some of our experiences demonstrate that the reality of carrying out fieldwork as a mother can diverge from our plans and indeed medical advice, and we do not provide these examples as recommendations of best practice.

that we have privileges that many people with intersectional identities do not; mothers of color face discrimination and structural barriers that white mothers do not encounter (Dowey et al., 2021; Marín-Spiotta et al., 2020). Some of the authors have experienced miscarriage and infertility issues—something we wish to normalize and highlight as physical and emotional barriers to taking part in fieldwork. We acknowledge that those who have struggled to or cannot have children face distinct challenges (Hughes, 2021), and that the ability to have a child is a gift and a privilege. Here, we offer our experiences and perspectives on how to conduct fieldwork, arrange childcare, and address financial issues as (early-career) geomorphologists and mothers[3]. We would like our perspectives to serve as a catalyst for discussion within the geomorphology community and to promote greater acceptance and support of field geomorphologists who are also mothers.

2. Challenges to carrying out fieldwork as a mother of young children

We are tired of the phrase "it's *never* a good time to have a child", as this places unnecessary stress on women, and believe that it is *always* a good time to try to have a child if you wish to do so. However, as a result of having children, mothers must make multifarious choices about working in the field. Pregnancy, breastfeeding, and caring for young children are embodied experiences, in which external power structures influence and mediate a mother's physical experience (Mountz et al., 2018). Women cannot conceal being pregnant or breastfeeding, and these physical characteristics may result in unconscious and conscious biases regarding the woman's ability to work (Correll and Benard, 2007). In contrast, experiences such as significant sleep deprivation from caring for babies and toddlers, caring for children with chronic health issues, miscarriage, and

[3] Although the COVID pandemic has disproportionately impacted the productivity and careers of women in academia (Fulweiler et al., 2021; Lane, 2020) and impeded every researcher's ability to do fieldwork, we will not focus on pandemic-related challenges.

infertility are unseen but have lasting impacts on a mother's mental and physical health (Hughes, 2021), impacting her ability to carry out fieldwork. All of us have experienced the need to slow down physically and mentally after having children, as there may be no other option, and spending time with the child becomes an important aspect of life.

Some of us experienced a change in our perception of risks associated with fieldwork after having a child. Mothers and pregnant women may not feel as comfortable with remote locations or what they perceive as higher risk fieldwork (Frohlick, 2002; Drozdzewski and Robinson, 2015). Limitations on medical care or employer's insurance can prevent pregnant women travelling to locations such as Antarctica for fieldwork (Nash et al., 2019) and cultural values may cause visitors or residents at the field site to be uncomfortable with children being present (Frohlick, 2002). On the other hand, a mother who engages in field work that others perceive as risky to herself or her child but who is well trained and capable of performing the activities should not be judged harshly by her colleagues for going into the field or bringing a child or baby with her, but instead trusted to judge what is safe for her and her child (Figure 1). Prioritizing individual choice and comfort, hopefully informed by medical advice, supports a culture of inclusion for field-based research.

Fieldwork is often planned several years in advance, particularly as part of a funded project; logistics can be complex and implementation of the work may require a team of researchers. Planning pregnancy around such a structured timeline is often impossible, and delaying pregnancy due to planned fieldwork can exacerbate fertility concerns (Hughes, 2021). Advice about when to travel (e.g., during the second trimester) is not useful if the timing of pregnancy cannot be made to fit. Fertility treatments requiring regular medical care over long periods of time further complicate fieldwork planning. Depending on their health and comfort levels, women can certainly complete fieldwork while pregnant. However, the physical impacts

can vary during and between pregnancies, and leave lasting postpartum effects that may limit a mother's longer-term ability to carry out fieldwork. Once a baby arrives, they remain dependent on their mother for many months. Breastfeeding poses a particular challenge to conducting fieldwork. The authors have pumped milk to provide food for their babies on the trail, in a car, in a boat, and even on a glacier. Others have brought their children to the field and nursed during breaks from work. Colleagues should be aware of the need for privacy during fieldwork as well as the need to normalize these situations so that new mothers do not feel ostracized (Drozdzewski and Robinson, 2015).

Having clear discussions prior to fieldwork about ways to accommodate pregnant women or breastfeeding mothers is important to enable inclusion. A network of supportive colleagues and flexibility in planning is valuable; research assistants or colleagues could collect the required data if a mother cannot take part in fieldwork herself. Credit should be given for the mother's contribution through the lifetime of the project even if she cannot take part in the field-based elements (Fulweiler et al., 2021). A mother's contribution to a research project should not be dismissed or downgraded if she needs to take time away from fieldwork. Her role may change for a period of time, but her contributions are valuable and should be treated as such.

3. Caring for children during fieldwork

We have experimented with various combinations of fieldwork and childcare and the best choice is a personal one that considers what works for the children and their parents. We have tried four models for combining fieldwork with motherhood; (1) leaving the child to be cared for at home, (2) taking the child into the field without additional support, (3) taking the child into the field with a designated caregiver, and (4) locating fieldwork near home if possible. Fieldwork close to home can be a convenient way to continue work, allowing for day trips and making use of existing childcare

arrangements as opposed to extended periods of time away from young children. The parents' willingness to delegate childcare for a period of days or weeks, the availability of alternative childcare, the mental, physical and emotional effort required, whether the child requires special care, and the suitability of the field site for a young child will shape these decisions.

We have taken our young children with us to carry out fieldwork with varying degrees of success. Some prefer to do so, and for breastfeeding mothers there may be no choice unless they are willing to wean to facilitate the requirements of work. Leaving a child at home may be the most straightforward option but can be a difficult emotional barrier for both mother and child where the cultural expectations of motherhood clash with once-normal work activities (Frohlick, 2002, Farelly 2014); leaving a child at home also may not be possible for a solo parent. Even if the child is happy and well-cared for at home while their mother is away, there remains the parental guilt that the child has been affected in ways that are not possible to discern (Figure 2a) (Gilbert, 2008, Jenkins, 2020). We believe, however, that it is important for our children to experience the reality that mothers are fulfilled by activities beyond motherhood. In our experience, leaving the child at home can be a rejuvenating experience for the mother, and provides time for other caregivers to bond more deeply with the young child and develop their ability to provide care, which has longer-term benefits to the family.

Taking a child to the field site poses a challenge to the mother if she does not have additional support, as the physical and mental requirements of caring for a young child leave little bandwidth to carry out fieldwork (Drozdzewski and Robinson, 2015). A non-mobile breastfed baby can be fairly easy to care for even in conditions that are not ideal, as feeding the baby does not require access to potable water and the baby can be carried out of harm's way. A curious toddler who goes looking for places to get stuck or hurt or to eat non-food items is a different matter! Alternatively,

taking a child to the field site along with someone to provide care while the mother is working makes the working day more similar to home, with the child and mother able to spend time together outside of working hours (Figure 3, Figure 4). This requires finding a suitable adult who is available to travel and additional travel funds, or a caregiver at the field location. Finding a previously unknown caregiver at the site may be difficult, but researchers can reach out to local collaborators and investigate online caregiving sites. An accompanying child can enable better integration into the local community, since researchers who are mothers can connect to local communities over a shared experience of motherhood (Kerr and Stewart, 2021). We have also found that a baby or toddler in the field is often great company and a welcome distraction from work for everyone involved in the fieldwork, and the child enjoys the opportunity to explore a new location and meet new people (Figure 2b).

4. Financial considerations

Negotiating childcare around fieldwork has a financial cost to the family. When a mother chooses to leave her child at home while she is in the field, the routine childcare balancing act can become unbalanced in her absence, requiring additional short-term childcare support. Unexpected problems can occur when a child is ill and cannot attend a childcare setting outside the home, requiring the caregiver at home to either take (unpaid) leave from work or find someone to care for the child at short notice. Finding dependable unpaid childcare support is likely only realistic in situations where a mother has already developed a trusted network of nearby friends and family. In academia, women often have children at the same time as moving to new locations for their jobs, away from family and friends, and thus have to rely more heavily on paid childcare. Taking a child to the field incurs the costs of travel and accommodation for the child, transporting their additional baggage and possibly bringing an additional caregiver. If these costs must be met from the mother's salary, they can pose a barrier to taking part in fieldwork at a time when family finances are in recovery

from maternity leave and the cost of childcare. For women in the early stages of their career, single mothers, and those on fixed-term contracts, these costs can be particularly onerous, but many times women in these early career stages feel particular pressure to conduct fieldwork and advance new projects.

Some research funders recognize the additional costs of work travel for parents and allow researchers applying for grants to include the cost of dependents' care (see supplementary material). For example, the Swiss National Science Foundation offers a flexibility grant to finance childcare and postdocs can use the grant to employ research staff. The US National Science Foundation (NSF) has a policy that their funds can be used to hire replacement project personnel to continue work when dependent care is necessary, including childbirth, but NSF funds can only be used for dependent-care costs (e.g., childcare costs, paid leaves) through fringe benefits, subject to whether a university allows this or not. Funders may suggest that mothers should approach their institutions for support. However, although many institutions recognize the challenges of returning to work as a mother and provide small grants to restart or progress research projects, university financial regulations may not allow funds to be spent on dependent care to facilitate travel. Some universities help parent employees find short-term, subsidized childcare, but it is unclear whether this type of support is common. Women who are employed on fixed-term contracts or in adjunct positions are in more tenuous positions than women who have tenure-track faculty jobs, as financial policies are often unclear, and support is limited or non-existent for those in precarious employment. Scientific societies and other organizations can provide support for fieldwork-related childcare costs directly to individual researchers. For example, the British Society for Geomorphology offers a Caregiver Support Grant that can be used for childcare costs to support fieldwork. This type of external funding can be useful when employers'

financial regulations impose restrictions on the costs of additional dependent care.

5. Making room for field geomorphologists who are mothers

Being pregnant and having young children as a field-based geomorphologist results in a unique set of challenges that requires making decisions combining many professional and personal factors. We hope this commentary provides some useful suggestions for mothers, their families, their colleagues, and university administrators and highlights issues that aren't frequently considered. We acknowledge that every mother has a different experience and may or may not find the suggestions in this commentary useful. We believe it is possible to continue with substantial field-based research during pregnancy and early motherhood with the provision of appropriate support at work and at home as part of an adaptive and inclusive community effort.

Other geomorphologists can work to support mothers by being flexible, advocating for safety and comfort in the field, and providing space for conversations ahead of fieldwork to avoid awkward situations for mothers. This is particularly important for department heads, managers, and principal investigators, since these people have significant power over how money is spent, timelines for project goals, and the general culture of a research project. Institutions can support their researchers in carrying out fieldwork as mothers of young children by providing managerial support, such as flexibility around the scheduling of teaching and the expected timelines for outputs for a research project, as well as financial support to fund the costs of additional childcare. These institutional supports may require changes to university policies.

We know that finding flexible collaborators and an adequate support network can be transformative at a point in a mother's career where she is most likely to leave academia (Correll et al., 2007). These valuable

networks ideally include other mothers who understand the lived experiences of childbirth and childcare and are able to implement change to support new parents. We have persuaded our institutions and scientific societies to make changes to support mothers of young children based on our experience of trying to combine motherhood with a career in research. We recognize that often new mothers do not have the capacity to drive forward such changes when they are likely to be physically and mentally overwhelmed and suffering a potential reduction in confidence in their professional abilities. We therefore encourage you to advocate for your colleagues and wider research community to make fieldwork more accessible to pregnant women and mothers of young children, and through doing so to support them in their careers during this short-lived but challenging stage of life. As the poet Merall Sherif states, "*We do not apologize for taking up space, instead, we make room for company*" (Sherif, 2019).

Supplementary material

A spreadsheet listing some examples of funders that provide support for the costs of childcare and dependents' travel to facilitate fieldwork is included as supplementary information.

References

Correll, S.J., Benard, S. and Paik, I., 2007. Getting a job: Is there a motherhood penalty?. American Journal of Sociology, 112(5), pp.1297-1338. https://doi.org/10.1086/511799

Dowey, N., Barclay, J., Fernando, B. et al. A UK perspective on tackling the geoscience racial diversity crisis in the Global North. Nat. Geosci. 14, 256–259 (2021). https://doi.org/10.1038/s41561-021-00737-w

Drozdzewski, D. and Robinson, D.F., 2015. Care-work on fieldwork: Taking your own children into the field. Children's Geographies, 13(3), pp.372-378 https://doi.org/10.1080/14733285.2015.1026210

Farelly, T., Stewar-Withers, R. Dombrowski, K. (2014) 'Being There': Mothering and Absence/Presence in the field. Sites 11(2) 1-32 http://dx.doi.org/10.11157/sites-vol11iss2id281

Fulweiler, R. W., Davies, S. W., Biddle, J. F., Burgin, A. J., Cooperdock, E. H. G., Hanley, T. C., et al. (2021). Rebuild the Academy: Supporting academic mothers during COVID-19 and beyond. PLOS Biology, 19(3), e3001100. https://doi.org/10.1371/journal.pbio.3001100

Frohlick, S.E., 2002. "You brought your baby to base camp?" Families and field sites. The Great Lakes Geographer, 9(1), pp.49-58.

Gilbert, J. (2008) Why I Feel Guilty All the Time: Performing Academic Motherhood, Women's Studies in Communication, 31:2, 203-208, DOI: 10.1080/07491409.2008.10162533

Hughes SM. "Wait for a permanent contract": The temporal politics of (in)fertility as an early career researcher. Environment and Planning C: Politics and Space. February 2021. doi:10.1177/2399654421994852

Jenkins, K. (2020) Academic motherhood and fieldwork: Juggling time, emotions, and competing demands. *Trans Inst Br Geogr*. 45: 693– 704. https://doi.org/10.1111/tran.12376

Kerr, R. and Stewart, E.J. (2021) 'Motherhood capital' in tourism fieldwork: experiences from Arctic Canada, Tourism Geographies, 23:1-2, 33-52, DOI: 10.1080/14616688.2018.1558455

Lane, S. N. (2020). Editorial: Equality, diversity and the challenges for ESPL. Earth Surface Processes and Landforms. https://doi.org/10.1002/esp.5038

Levey, Hilary. (2009). '"Which one is Yours?": Children and Anthropology'. Qualitative
Sociology 32 (3): 311–331.

Marín-Spiotta, E., Barnes, R. T., Berhe, A. A., Hastings, M. G., Mattheis, A., Schneider, B., & Williams, B. M. (2020). Hostile climates are barriers to diversifying the geosciences. Advances in Geosciences, 53, 117–127. https://doi.org/10.5194/adgeo-53-117-2020

Mountz, A. (2018). Political geography III: Bodies. Progress in Human Geography, 42(5), 759–769. https://doi.org/10.1177/0309132517718642

Nash M, Nielsen HEF, Shaw J, King M, Lea M-A, Bax N (2019) "Antarctica just has this hero factor…": Gendered barriers to Australian Antarctic research and remote fieldwork. PLoS ONE 14(1): e0209983. https://doi.org/10.1371/journal.pone.0209983

Sherif, M., 2019. Building a World. Available online at https://www.youtube.com/watch?v=sjVSjjIa8kg.

Tooth, S. and Viles, H.A., 2021. Equality, diversity, inclusion: ensuring a resilient future for geomorphology. Earth Surface Processes and Landforms. https://doi.org/10.1002/esp.5026

Wohl E. 2013. The complexity of the real world in the context of the field tradition in geomorphology. Geomorphology **200** : 50–58. DOI: 10.1016/j.geomorph.2012.12.016

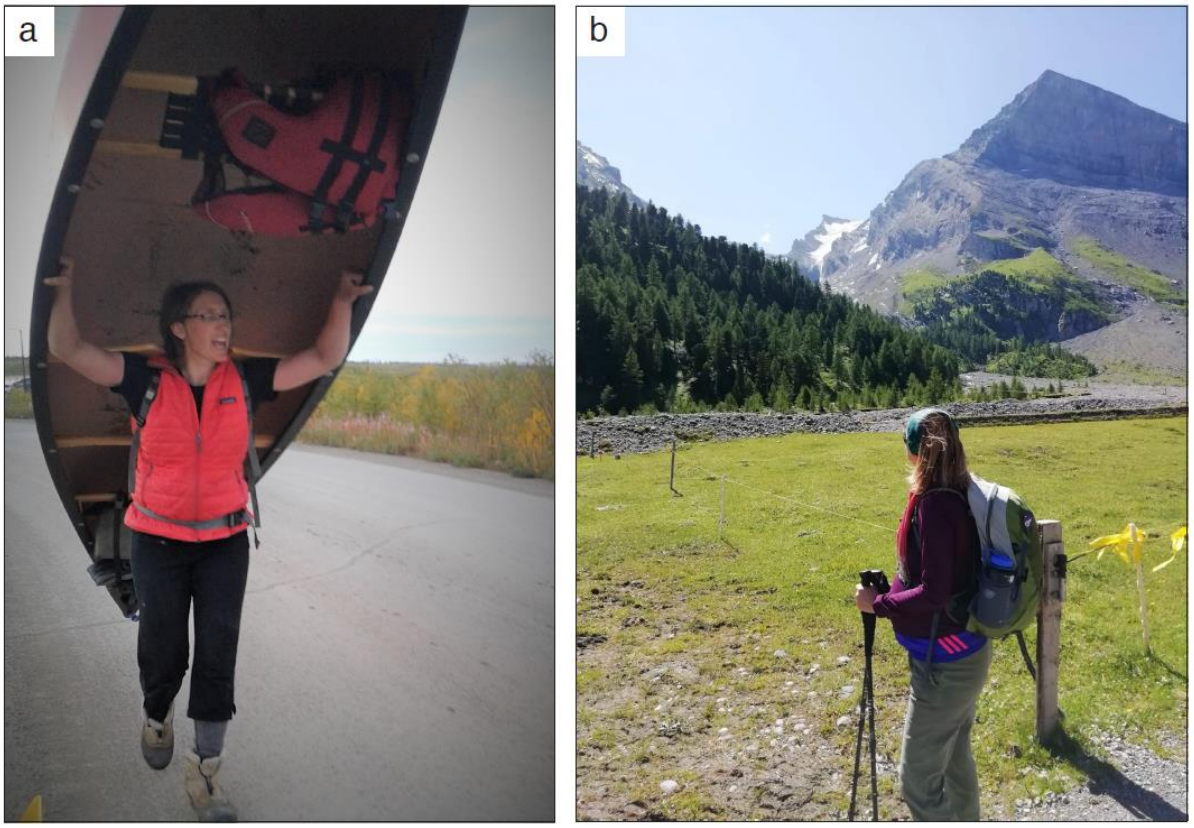

Figure 1. a). During her second trimester with her second child, one of the authors felt fit enough to carry a canoe while doing field work near towns in the Mackenzie Delta. She came into field work after spending a very active summer kayaking. During her third trimester, she stepped it back and wasn't as active, although she continued to kayak lightly until the day before she gave birth. She left her two-year-old at home with his father during the Mackenzie Delta fieldwork trip. While it was tough on them, they both came out of it with a closer relationship, and she had a much-needed mental vacation from providing for her family. Doing field work without the child felt liberating and rejuvenating. She has since stepped away from academic research to attend to her family's needs. b). One of the authors during her third trimester hiking in the Swiss Alps (over 2000 m above sea level). She did fieldwork until three weeks before birth; during her third trimester she spent 10 days in a field trip also in the Alps and did fieldwork several days in locations near her home. After childbirth, mother and daughter continue to enjoy hiking and the mountains together, and she resumed (only partly due to the Covid-19 pandemic) her field activities. To date, she has not yet had the experience of working in the field with her daughter or being away for a long work-related trip.

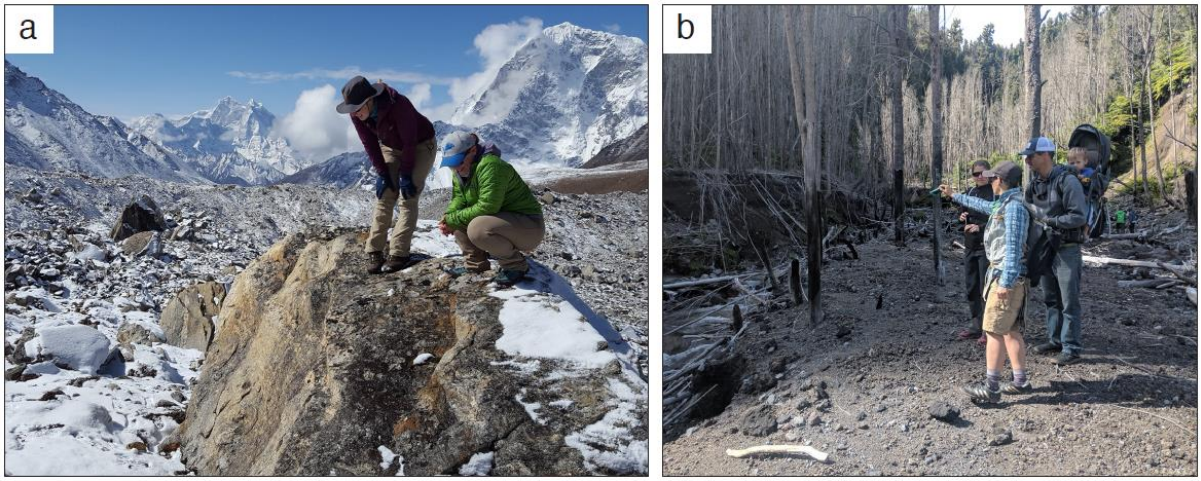

Figure 2. a). One of the authors during fieldwork in the Nepal Himalaya 5,200 meters above sea level in temperatures below −10°C. She left her 18-month-old daughter at home with her father during this four-week trip and would have rushed home several times if it hadn't been six days' journey to get there. Despite trying to plan fieldwork around having children, she discovered when she returned home that she was pregnant during this field season, which raised concerns about the possibility of problems arising from exposure to high altitude, low oxygen levels (70–80% SpO_2 for two weeks) and off-prescription altitude medication during pregnancy. Her son was born seven months later in perfect health and of Himalayan size (10 lb 2 oz). b). One of the authors took her 22-month-old son to an international conference and field trip in Chile. The kids' hiking backpack was an invaluable tool as well as the kind help from all the other field trip participants, colleagues, and strangers they met along the way. Rather than being a burden, almost everyone found having a toddler around to be a joy and didn't mind helping out, carrying him around, and engaging with him. In the absence of having her partner along, it helped to have a friend and colleague step up and help the solo mom as a 'second parent' throughout the trip.

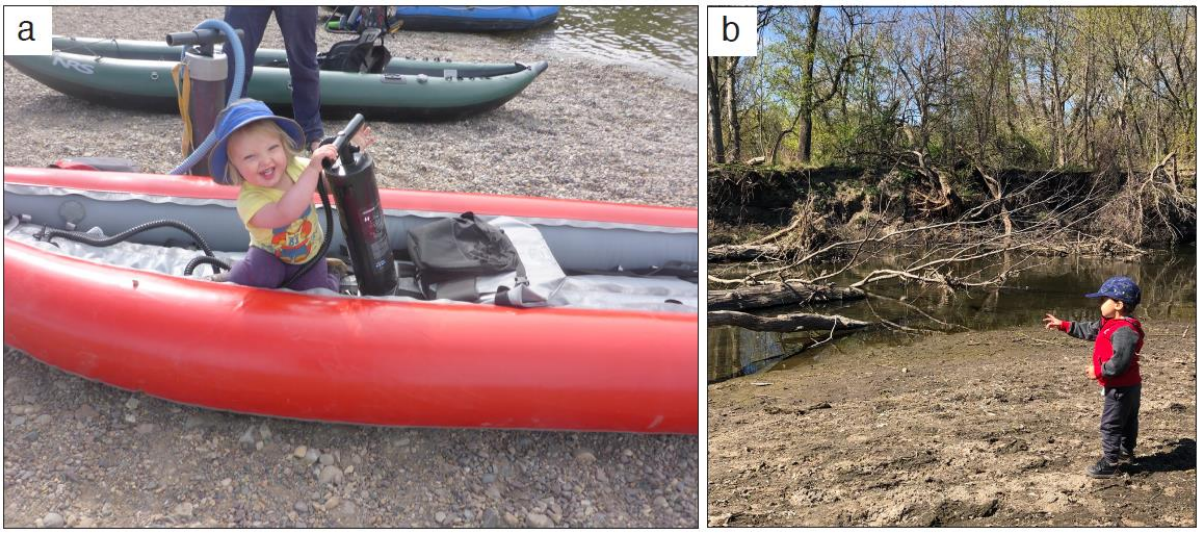

Figure 3. a). A daughter of one of the authors "helping" get the boats ready prior to fieldwork. This was an example of taking a small child to the field location but having another caregiver look after the child while fieldwork was actually being done. Although this author prefers to have her children at the same location of fieldwork to spend some time with them each day once fieldwork is done, it does create more logistical and financial challenges and requires more planning to bring children to the field location. b). Son of one of the authors "helping" with finding a local site for an in-stream wood study. This author had many birth complications, and her son has chronic health issues that have delayed her full return to field activities. Because of this, and the limitations of being employed as a fixed-term academic with a spouse in a tenure-track position, she has had to adapt fieldwork plans to localities that only require day trips, for now. This has led to a surprisingly interesting new area of research that is balanced with family needs. Weekend outdoor family excursions are opportunities to identify local field sites and instill a love for nature in a child. However, the author's son is far too mischievous to trust in the field and the author much prefers field work without her child to feel fully immersed and focused on data collection.

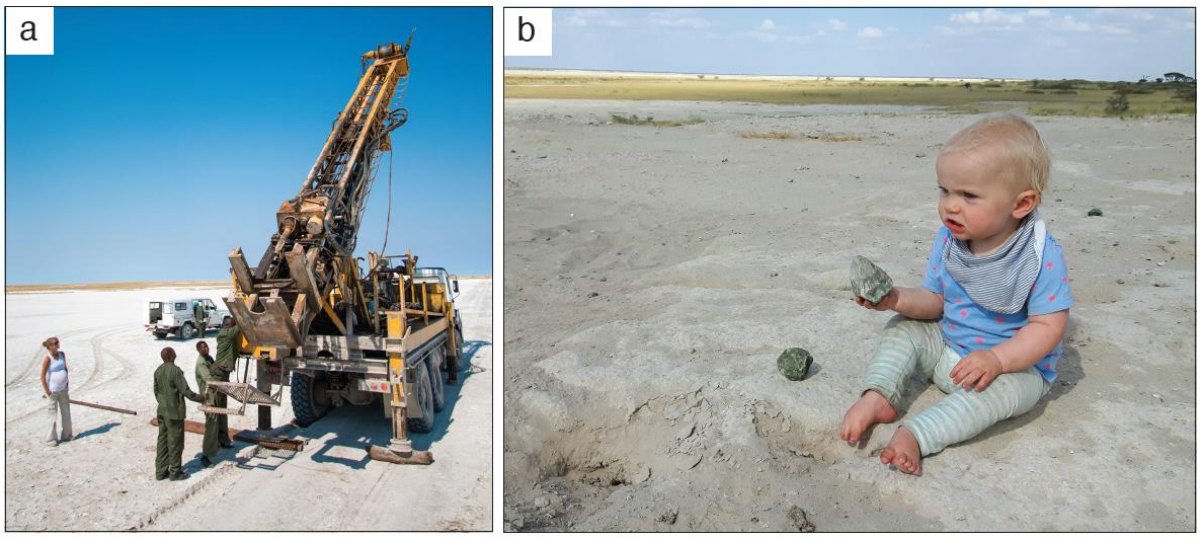

Figure 4. a). One of the authors 7 months pregnant supervising a lake drilling programme in the Makgadikgadi pans, Botswana. b). An author's daughter, aged 10 months, supervising an archaeological site excavation the following year. This author found expert medical advice to be invaluable in mitigating culturally normative judgements of risk by her family, friends and employer. Unable to always leave her daughter at home as her partner works shifts, she twice took her into the field, recruiting a local nanny to help with childcare. She found that while this approach initially met with some resistance, her daughter genuinely improved team motivation and morale and helped build trust between the field team and the local community, as documented by numerous fieldworkers in the social sciences (e.g. Levey, 2009). During her second pregnancy, her partner was able to take unpaid leave so that she could leave her daughter at home while undertaking fieldwork in Etosha Pan, Namibia. She found this fieldwork to be a restorative break from the daily challenge of managing both caring and academic responsibilities.