Item number	Title/reference *(academic style)* name initials *(year) title, publisher, volume, pages*	Name of reviewer
8	Hicks, A., Barclay, J., Chilvers, J., Armijos, M.T., Oven, K., Simmons, P. and Haklay, M., 2019. Global mapping of citizen science projects for disaster risk reduction. Frontiers in Earth Science, 7, p.226.	Cuiablue OÜ

Review of findings / main outcome

This paper aims to present a systematic global mapping of citizen science used for Disaster risk reduction (DRR) in order to draw out broader insights across diverse methods, initiatives, hazards and country contexts. The systematic mapping analyzed a total of 106 cases of citizen science applied to DRR across all continents.

To understand where practice and advances in citizen science might be most effective in this context it is necessary to consider the context of the DRR agenda. DRR broadly aims to anticipate and reduce the damage caused by natural hazards. This is typically achieved through disaster risk management (DRM) which is the implementation of measures that create an ethic of prevention, and can involve systematic efforts to analyze and reduce the causal factors of disaster risk. More recently, these risks are understood to be socially and culturally constructed in hazard-prone areas (**e.gDesai and Lavell, 2015).** In comparison to projects that overtly label themselves as citizen science, participatory approaches to DRR typically focus more squarely on empowering people to foster longer-term preparedness development of their own mitigation strategies, and influence on decision-making processes at multiple scales collaboration between citizens at risk and those responsible for scientific information gathering or emergency response. This could benefit both participants and scientists, which should generate sustained involvement in community based risk reduction projects.

In this paper, which attempts to understand how citizen science is and could be applied to DRR, we begin by providing some context to our suite of citizen science techniques followed by a description of the approach to our global mapping, and the interdisciplinary workshop that informed it. Secondly we present our global mapping results and analysis followed by a discussion of the challenges that DRR poses to citizen science and the benefits of taking a broader approach by 'opening up' citizen science initiatives to diverse disciplines. Developing the idea that citizen science in the context of DRR is the generation of any relevant new knowledge, there is mounting evidence that narrative (social and/or historical) has a role to play in preparedness and recovery. In fact, narrative could have a number of functions related to citizen science and not just for DRR: (1) as a data source from which information can be extracted **(Stone et al., 2014);** (2) as a data object, e.g., for bonding and social connection (social capital) **(ChamleeWright, 2017)**; (3) as a tool for communication e.g., storytelling **(Hicks et al., 2017)**; (4) as a resource to challenge dominant narratives; and (5) as a tool to evaluate a project or intervention **(Constant and Roberts, 2017).**

To sum up, we conducted a global systematic mapping of citizen science for DRR projects in the academic literature, but 'opened up' our review to include projects that apply ideas and techniques that might more normally be associated with the social sciences and humanities as well as the traditional sciences. The mapping shows that most citizen science projects initiated before an event are participatory and collaborative in nature and in general tend to be focused around community-centered activities such as hazard mapping, monitoring or mitigation. Those projects concurrent

with disaster are almost all associated with more traditional technology-driven citizen science, mostly using crowdsourcing via online mapping to support humanitarian efforts. Moreover, the mapping shows that there is a need to consider the application of citizen science for DRR in a more multi-dimensional way, particularly the connections and interrelations of methods throughout the disaster continuum.

Quotes / very useful statements

(1) A large evidence base exists of the positive contribution of people from all walks of life to diverse scientific fields from, for example, improving understanding of avian biological patterns (e.g., Sullivan et al., 2009)

(2) Hazard-centered, technology-led citizen science for DRR (e.g., utilizing sensors to collect data about hazards) are the most conventional initiatives and have been very effective in many disaster contexts. Yet, the use of Information and Communication Technologies (ICT) does not always guarantee high data quality and participant engagement (Wiggins, 2013)

3) It is already recognized that the integration of 'local' peoplecentered DRR with risk management plans and processes at other scales could lead to a 'sustainable reduction in disaster risks over time' (Maskrey, 2011).

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