

ARTICLE

Rights-informed mass grave mapping

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(Received 17 January 2024; revised 16 July 2024; accepted 14 October 2024; first published online 27 December 2024)

Abstract

Mapping of human rights abuses and international crimes is an increasingly common tool to evidence, preserve and visualise information. This paper asks, what does rights-informed mapping in the context of mass graves look like? What are the rights concerned and allied goals, and how might these practicably apply during a pilot study? The study offers an analysis of the goals and benefits espoused to accrue to mapping and documentation efforts, as well as an explication of rights arising when engaging with mass graves. Our findings underscore the imperative of understanding the full ramifications of the applicable context, in our case the life-cycle of mass graves. This will bring to the fore the rights engaged with the subject as well as the challenges with data points, collation and reporting as experienced in a pilot (Ukraine) where realities on the ground are not static but remain in flux.

Keywords: International law; mapping; rights; mass graves; data

1 Introduction

Open-source investigations and mapping of their findings are regularly employed in human rights contexts as a protection and justice-monitoring measure (Martinez-Alier 2021). Mapping projects (such as the ‘Environmental Justice Atlas’ (EJAtlas 2023) or mass grave mapping project ‘Bitter Lands’ (BIRN/BalkanInsight 2020)) often seek to address pressing societal challenges, and increasingly principles and guidelines for the good provenance and governance of digital documentation efforts in other human rights contexts are emerging (AAAS 2019; Dubberley and Ivens 2022).

That said, the question of the probity or ‘force for good’ of open-source mapping, where content is made publicly available, may not hold true for all contexts. This question arises acutely in the context of mass graves, as they may be vulnerable crime scenes. When engaging in ongoing criminal investigations, for example, it becomes apparent that sites may best be kept secret to avoid exposing them, the families of the missing and the witnesses to attack, abuse or disturbance.

This fear is not unfounded: mass graves, the focus of our study, have evidential content that make them extremely vulnerable to destruction or relocation (Van Schaack 2020; Stover *et al.* 1998). They are sites where international crimes may have occurred. And in the experience of forensic practitioners, it is not uncommon for perpetrators to hide and destroy evidence, including the mass grave itself (Wright and Hanson 2016). Indeed, the practice of mass grave disturbance or destruction, including the relocation of bodies to secondary and tertiary sites as a means of avoiding detection, is evidenced in Srebrenica, amply documented in the judgment of *Prosecutor v.*

Karadžić (24 March 2016, Vol IV, summary forensic findings at paras 2303–41) and later confirmed in the *Mladić* case (22 November 2017, Vol III discusses Srebrenica at 1210–1583).

Understandably, for families of the missing – who need to know the fate and whereabouts of loved ones and to receive mortal remains for burial and dignified commemoration – the effects can be devastating: many are confronted with the prospect that a body will never be found, or they receive incomplete remains for reburial. Other justice efforts may be hampered too, as a result.

The aim of our research is to better understand the potential and risks of mass grave mapping. To test the now seemingly accepted conventional wisdom that mapping projects are a force for good, we ask: how can mass grave mapping be safely conducted and how can the results be safely displayed?

Through our research method and comprehensive analysis of rights and goals we are making important contributions to theory and practice: first, conceptually to knowledge and literature in the area of mapping generally and rights-informed mass grave mapping specifically; second, to practice, by offering guidance on the ways in which mass grave mapping may safely be advanced in the future and an illustration of what mapping challenges arose during the conduct of a pilot mapping exercise. Our audience therefore goes beyond academia to include civil society actors, governmental departments and international entities.

The Mass Grave Mapping (MaGMap) project entails an examination of the fundamental underlying assumptions of mapping, associated methods and applicable human rights considerations in relation to data collation and presentation. Through our research, we have produced an open-access tool to support and enable decision-making in relation to when and under what conditions a mass grave site might be included in a publicly available map. In this paper, we present MaGMap's method and findings, assisted by a diagrammatic and qualitative exposition in the form of a flowchart (Figure 1), to assist in the identification of mass grave mapping challenges. We focus on five discrete elements:

- (1) an outline approach and definitions employed as part of the study;
- (2) an appraisal of the various goals allied to mass grave mapping specifically and human rights documenting and mapping exercises more generally;
- (3) an overview of the various steps involved in planning and realising a mapping project;
- (4) an examination of the question 'what are the rights that would underpin rights-informed mapping of mass graves?'; followed by
- (5) a discussion on a pilot study on Ukraine designed to tease out both data points and associated challenges to help develop a cohesive, rights-informed mass grave mapping strategy.

We conclude with reflections on our core findings, namely the importance of accuracy as a continuous overarching principle; the (persistent) challenge that accessibility presents; and the importance of understanding what (and whose) rights become engaged. Fundamentally, though, we highlight how understanding the life-cycle of a mass grave (i.e. the subject of the mapping exercise) will enable a balanced assessment of how to ensure that benefits of mapping will outweigh associated risks.

2 Establishing the basics: significance, method and definition

It is scarcely necessary to emphasise the proliferation of mass graves across the globe. Indeed, as pointed out by the then Special Rapporteur on extrajudicial, summary or arbitrary executions, '[t] here is not one region in the world, not one historical period, that has not seen mass graves' (UNGA 2020, para. 6). Moreover, news from Sudan (UNOHCHR 2023), Ukraine (Harding, for *The Guardian*, 2022) and Gaza (Massud and Victor 2023) amply underscore the topicality of the subject.

Over the past decades, strides have been made in the way that mass graves, together with their ramifications for victims, families and communities, are approached and understood. Forensic organisations have been instrumental in shaping scientific approaches taken to mass graves. Civil society organisations across the globe (e.g. Journalists for Democracy in Sri Lanka (JDS), the International Truth and Justice Project (ITJP), Center for Human Rights and Development (CHRD) and the Families of the Disappeared (FoD) 2023) engage with mass graves; international organisations advocate for and facilitate the resolution of missing persons cases (such as the International Commission on Missing Persons (ICMP) and the International Committee of the Red Cross (ICRC)); and legally informed, standard-setting scholarship to protect and investigate mass graves is readily available (Klinkner and Smith 2020).

It is against this background that we sought to understand the benefits and risks of mass grave mapping, since mapping has the propensity to capture the magnitude and ubiquity of the existence of mass graves across the world. In other words: under what circumstances can mass grave mapping contribute to much needed sustainable engagement with the myriad of mass graves embedded in the earth's surface? Such an enquiry will also lay the foundation for a fully reasoned response and approach to the Special Rapporteur on extrajudicial, summary or arbitrary executions' call for global regularised mapping (UNGA 2020). Producing rights-informed mapping guidance will assist in realising this ambitious goal for a global mass grave map, designed to capture and recognise the magnitude and significance of mass graves internationally.

The project findings presented here stem from an investigation of real-world practice and experience that is grounded in turn in academic literature. At a foundational level, the research team conducted a detailed review of existing mapping projects, to identify the human rights agendas and assumptions that underpin them (see Section 3 for a full discussion). The review also encompassed the growing body of literature on the use and role of mapping, digital evidence and documentation for accountability and justice purposes (for example Freeman 2018 and Gillett and Fan 2023), including in relation to their purported benefits to the solving of missing persons cases (Sarkin 2021).

This desk-based literature and legal material review was complemented by and tested through country case-studies. The chosen countries were Bosnia, Cambodia, Rwanda, Guatemala and Iraq. They reflect geographical diversity as well as different time periods, enabling analysis of shifting sociocultural, political and economic contexts and varying destruction experiences and risks. In all countries, mass graves are testimony to the unimaginable crimes committed there, with Bosnia, Cambodia and Guatemala having bespoke mass grave mapping projects (BIRN 2020; DC-Cam n.d.; and FAFG 2013), whereas Iraq has made some efforts (Yazda's mass grave reports (Yazda 2018)) and Rwanda sees a focus on memorial sites that often are mass grave sites (ARCIGS n.d.). The selection of country case-studies also reflects differing levels and forms of mass grave destruction, expert and non-expert excavations, identification success rates and accountability mechanisms as well as local and international investigation efforts, thus offering a rich substrate to analyse the rights of all actors and affected communities. In all country settings, multiple missing persons cases remain unresolved, with many victims believed to rest in as yet unknown or uninvestigated mass graves.

For the purposes of the study and this paper, we operate with the following definitions:

Mass grave is as yet undefined in international law. However, the definition proffered in the Bournemouth Protocol on Mass Grave Protection and Investigation (Klinkner and Smith 2020) has since been adopted in a number of UN documents (UNGA 2020; UNHRC 2022). For this study, we operate with the same definition:

[A] site or defined area containing a multitude (more than one) of buried, submerged or surface scattered human remains (including skeletonised, commingled and fragmented remains), where the circumstances surrounding the death and/or the body-disposal method warrant an investigation as to their lawfulness. (Klinkner and Smith 2020, 4)

By **victim**, we mean:

[P]ersons who, individually or collectively, have suffered harm, including physical or mental injury, emotional suffering, economic loss or substantial impairment of their fundamental rights, through acts or omissions that are in violation of criminal laws operative in the State or as a result of acts which constitute gross violations of international human rights law or serious violations of international humanitarian law. (Ibid., 4)

In the context of mass graves, having a definition that recognises secondary victims (i.e. families of the dead) is crucial; furthermore, the longevity of harm suffered by secondary victims, often across generations, deserves explicit recognition.

Open-source information is used here to mean ‘publicly available information that anyone can obtain by request, purchase, or observation without requiring special legal status or unauthorized access’ (Dubberley *et al.* 2020, 9. See also Dubberley and Ivens 2022). In the context of mapping, we can distinguish the open-source materials or data (i.e. the information input) that are in the public domain but also then the actual form mapping takes (i.e. the research output), which could also be open-source.

Digital open-source information is used here to mean ‘open-source information on the internet, which can be accessed, for example, on public websites, internet databases, or social media platforms’ (Human Rights Center UC Berkeley School of Law and UNOHCHR 2022, 6).

Mapping is routinely geomatics driven but is used here to mean the diagrammatic recording of geographic features together with any associated and proxy variables (Congram *et al.* 2017).

The following section offers an analysis of the goals and benefits of mapping exercises in a human rights context.

3 Why mass grave mapping? An appraisal of goals associated with mapping projects

Mapping can have many different purposes and objectives; therefore an explicit statement of goals helps in understanding and clarifying the boundaries of the mapping exercise itself. In fact, the mapping of mass graves has been undertaken, sometimes as a bespoke mapping endeavour (BIRN and DC-Cam are prime examples); in other initiatives it is rather a by-product of past or ongoing investigations of mass graves (FAFG 2013); yet other examples list mass graves as part of sites where human rights violations were performed (such as Syria Justice and Accountability Centre 2024) and as part of memorialisation efforts (as in Rwanda). When reviewing literature as well as relevant mass grave mapping and human rights-related documentation project goals, a number of identifiable and evidence-based benefits can be discerned.

Generally, by making violations visible, including the scale and patterns of the human rights violation in question, a key driver is awareness raising. The following analysis is grouped around three sets of benefits (espoused, if not always strictly evidenced): the advancement of justice goals; the capturing of testimony and offering commemorative opportunities; and the pursuit of protection and monitoring.

3.1 Mapping for justice goals

Arguing for greater responsibility and accountability is at the fore of the Transitional Justice Working Group based in Seoul, Korea, documenting and mapping violations, killing sites and sites of body dumping in order ‘to support a stronger push for accountability as part of conceptualizing transitional justice’ (Transitional Justice Working Group 2021, 8). Its aim is supported by literature. A starting point for effective justice efforts is documentation of the alleged crime scenes: ‘[o]pen source information, particularly digital open-source information that is publicly available on the internet, plays an increasingly central role in the landscape of human

rights investigations' (Murray *et al.* 2022, 554). Such information when well collated, documented and mapped can inform an investigation. The utility of open-source evidence of this nature is demonstrated in the arrest warrant issued against militia leader Mr Al-Werfalli on 15 August 2017 by the International Criminal Court (ICC): it was the first ICC arrest warrant to be based largely on evidence collected from social media (Prosecutor v. Al-Werfalli 2017; see also Costello 2018). Indeed Murray *et al.* (2022, 554) believe that 'open source research can offer tremendous benefits in planning investigations, supplying lead evidence, and providing direct evidence of violations, thereby overcoming some of the access barriers that investigators face, and potentially giving voice to a wider range of perspectives'. Its benefits are accrued to independent fact-finding missions and human rights inquiries not just as corroboration of accounts but also as generating new leads which can then be explored in more depth, and to indicate areas where an investigation should focus (*ibid.*; see also Abrahams and Murray 2020). Ukraine now serves perhaps as the best example, where (mostly NGO-instigated) activities of open-source documentation, including so-called Open-Source Intelligence (OSINT) (Karalis 2022) are prolific and inform significant knowledge and understanding of human rights documentation, including on humanitarian needs (ReliefWeb 2023).

Specific justice and accountability efforts relating to mass graves can be seen in BIRN's Bitter Land project which links court cases, and with it convicted offenders, to specific sites. One such mass grave is the Tomašica site (BIRN 2020a). The record suggests that a 'total of 37 Bosnian Serbs have been found guilty of committing crimes in the area and have been sentenced to a total of 617 years in prison' (*ibid.*). Among the listed court cases is that of Ratko Mladić whose case was re-opened following new evidence from that particular mass grave site (ICTY 2014; see also Fournet 2020).

The outcomes of investigations and mass grave excavations, even if not used in legal disputes, have also been mapped. The FAFG has assembled a set of data to outline the numbers of reported victims vis-à-vis the numbers recovered from mass graves and those that have led to identifications (FAFG 2013). Such data collation and mapping lend themselves to disaggregation outlining distribution of mass grave investigations over time and geographic areas. Efforts such as those pursued by Yazda, a Yazidi organisation actively engaged in documenting mass graves (Yazda 2018), are laying the foundation for more elaborate mapping as well as presenting a collection of evidence for (future) accountability mechanisms. Efforts undertaken by the Cambodian Documentation Centre (DC-Cam) in relation to documenting mass graves to capture their sheer magnitude, scale and spread are also worthy of note here: the 2014 judgment of the ECCC in the case of Nuon Chea and Khieu Samphan (ECCC 2014) refers to 390 sites as researched and documented by DC-Cam.

3.2 Mapping as testimony and memorialisation

Amplifying the voices of survivors is a strong impetus for interactive mapping, to generate acknowledgement if not corroboration. More generally the technologies and open-source avenues available 'enable collective mobilisation and empower ordinary people to get involved' (Sarkin 2021, 349). Through methodological rigour, verification is sought to be achieved. But it also makes victims participants in the actual data collation. For example, survivors can become service providers by contributing to a global dataset. Web-based virtual globes, like Google Earth, used by Doctors Without Borders, allow for inclusion of photos and texts about conflict and violence in Uganda, with hyperlinks out 'to increase global awareness about human rights issues' (Madden and Ross, 9). The Salvadorian initiative 'Surviving Memory Sites' (*n.d.*) has a similar function as it documents community-identified mass graves where survivors are actively integrated into the methodological approach. BIRN's 'Bitter Lands' web presence also captures testimony by linking

mass grave sites to witnesses and survivor accounts as given in court, thus adding further corroboration to their testimony. Yazda (2018, 11) as part of its efforts to document mass grave and killing sites, collects witness and/or survivor testimonies; indeed, this forms a crucial part of the methodology.

When done well, such persistent and continued information collation will form the basis for, and sometimes be in and of itself, a systematic evidence-based inquiry. As an archive, these mapping exercises enable the conduct of wider systematised research, including comparative and thematic inquiries, academic teaching and scientific investigation to support knowledge production (Martinez-Alier 2021; Temper *et al.* 2015, 270–71).

Other mapping efforts foreground memorialisation and commemoration. Through the capturing of mass grave information, efforts in Sierra Leone emphasise the ability to tell the story of what happened through mass graves. The project acts as a ‘painful reminder’ (iGIS Team 2021), encouraging the exploration of what happened in the hope that this will play a role in commemoration and dialogue.

The fear of denial and revisionism is alive in many contexts. This has found expression by the US Holocaust Memorial Museum in relation to Darfur:

Typically, perpetrators of genocide operate under a cloud of denial and deception. The Sudanese government maintains that fewer than 9,000 civilians have been killed in the “civil war” in Darfur. Claims like these are easily refuted when any citizen worldwide can view high-resolution satellite imagery and other critical evidence which was previously accessible only to a limited few. (Hollinger *n.d.*)

Bosnia and Herzegovina face similar challenges. Here the initiative emphasised by Balkan Transitional Justice (2021) to launch the database of mass graves from the Yugoslav Wars is to ‘counter the continuing selective denial of crimes and historical revisionism about the 1990s wars’. The Spanish ‘Mapa de fosas’ also has a commemorative function (Junta de Andalucía *n.d.*) in capturing sites that date back to the period between 1936 and 1951. Additionally, activities concerning human rights abuses committed in Iran (PainScapes *n.d.*) seek to preserve some information on alleged crimes and mass graves amidst state denial.

3.3 Mapping for protection and monitoring

By remembering and educating about past atrocities many projects suggest preventative value for future generations. But the MENA-focused Sites of Conscience project (2024) also wishes to protect sites in the here and now.

Across the Middle East and North Africa, prisons, checkpoints and former clandestine sites of torture are at risk of destruction or deterioration. Erasing this past will prevent new generations from learning critical lessons and destroy opportunities to build a peaceful future in the region – and the world. (International Coalition of Sites of Conscience 2024)

The fears are not unfounded, because sites are at risk of being forgotten, destroyed or built upon (El Murr 2024). Through documenting, protection is sought.

Other projects are intended to prevent future atrocities from occurring through the monitoring propensities of documenting and mapping. Mapping, according to Madden and Ross (2009), will enable a degree of monitoring, as for example conducted in Ukraine in relation to war crimes trials (Justiceinfo.net 2022). While not taking the explicit form of mapping, much open-source information feeds into monitoring initiatives, such as those conducted by the OSCE (2023).

The Early Warning Project by the US Holocaust Memorial Museum is a strong example of highlighting threats in an attempt to foster prevention. They ‘use quantitative and qualitative

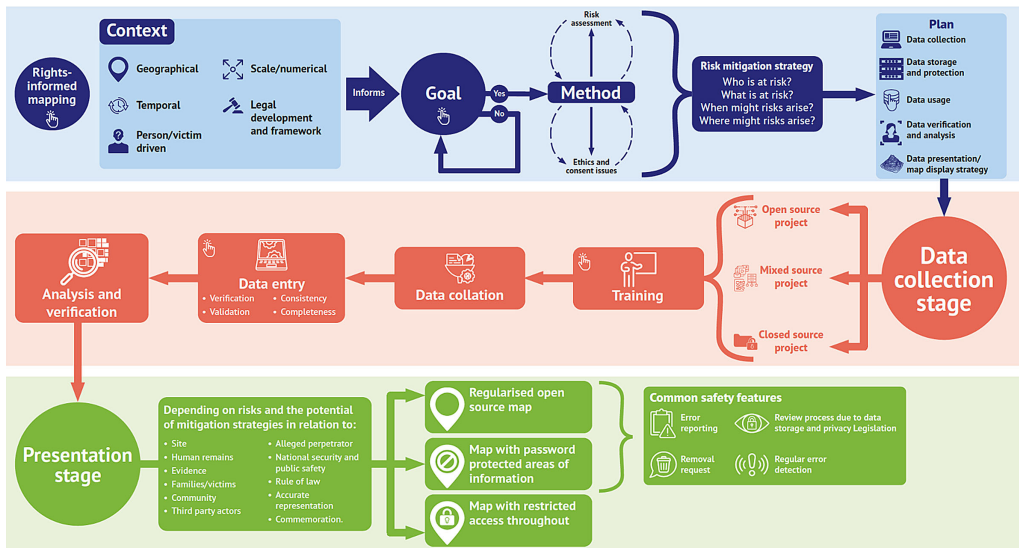


Figure 1. MaGMap mapping process flowchart.

methods to spotlight countries where mass atrocities have not begun, but where the risk for such violence is high'. They do this by 'using a variety of publicly available data and forecasting methods' (Early Warning Project 2023).

The Armed Conflict Location & Event Data Project (ACLED) is predicated on a similar approach (ACLED 2023): as a disaggregated data collection, analysis and crisis mapping project, it 'collects information on the dates, actors, locations, fatalities, and types of all reported political violence and protest events around the world'. It 'conducts analysis to describe, explore, and test conflict scenarios, and makes both data and analysis open for free use by the public', thus functioning as an information-sharing and distributing tool.

4 An overview of applicable mapping steps

Goals dictate the direction and mandate of a mapping endeavour. But what does mapping entail? Based on our research and analysis, the following section offers an overarching understanding of the processes involved in mapping. Broadly, three phases can be distinguished: (1) planning; (2) data collection; and (3) presentation. These three phases are depicted in different colour blocks in the flowchart (Figure 1).

The flowchart, in its full design, is interactive and wherever a 'hand icon' can be seen, users can click to access a pop-up window (Klinkner and Smith 2024). In the planning phase of a prospective mapping project, the starting point is to clarify rights (and corresponding duties) that arise in the context of mass graves (discussed under Section 5) to ensure a rights-informed approach to all other mapping activities. The contextual elements, including the ways in which the law in a country or region protects or engages with mass graves and its victims, are important. Similarly, the scope of the mapping exercise numerically, geographically and temporally will have to be clarified, including the actors involved in shaping the actual mapping project.

In many regards, the context and goals will be in dialogue and will shape what the project is seeking to achieve. From the scope of the project and its aim, the choice of methods employed, and risks follow accordingly, and with them a considered plan for data collation, storage and protection, usage, analysis and verification as well as a final presentation strategy have to be devised.

Only then can the actual data collation commence, depicted in red in the flowchart. For this stage, it is helpful to distinguish what type of information is collated. We distinguish between

open-source, closed-source and mixed-source (i.e. a combination of open- and closed-source). Naturally, depending on what information is sourced, different training needs arise from which data collation, data entry and analysis follow.

In green then, is the presentation stage. Here we interject a ‘risk-check stage’ whereby risks to people, sites, evidence and society are considered before proceeding to the presentation as an open-source map, a map with restricted access area or a completely non-public-facing map that is behind protection with password access or through multi-factor authorisation. Common safety features should be put in place for the public, or part public-facing, maps to ensure errors can be rectified and edits made. Significantly, the process flowchart highlights the difference between consulting open-source material in the data collation phase and making the outcome of mapping available open-source. Indeed, the safety features available to mappers enable control over what is made publicly available, including in how much detail.

From the outset, for any mass grave mapping, it is worth highlighting operating principles that will govern any engagement with mass graves. While it is beyond the scope of this paper to elaborate fully on each of the principles (for this, see Klinkner and Smith 2020, 6–7), the following operating principles will apply:

- (1) The ‘do no harm’ principle, which for mapping has the potential to be far-reaching as it may include individuals, communities and even large populations. Any mapping attempt should thus actively seek to avoid undermining existing community cohesion, creating inequalities, instilling perceptions of bias or entrenching existing inequalities. It will be most likely rooted in, and adhere to, the cultural sensitivities, beliefs and norms of victims and/or their families.
- (2) Physical and emotional safety of all those involved in the processes of mapping, from reporting to presentation of findings, are paramount and include considerations (without distinction) of dignity, privacy and well-being of the victims and their families.
- (3) Independence and impartiality: without a non-discriminatory and impartial approach to the mapping process in its entirety, the legitimacy of the work may be questioned by the affected community. This is put to the test by the Balkan Investigative Reporting Network team based in Bosnia whose approach to mapping extends beyond Bosnia to include grave sites in Croatia, Kosovo and Serbia (BIRN/BalkanInsight 2020).
- (4) Confidentiality: any data and information processing must be consistent with national legislation and data protection regulations. Organisations such as the International Commission on Missing Persons and the BIRN project mentioned above, as well as the Srebrenica Memorial Center, offer such reporting structures, but the perception of anonymity and confidentiality may depend on the mandate of an organisation as well as trust (which may differ from individual to individual).
- (5) Transparency of process will help instil confidence in the rationale, methodology and methods employed in the entire mapping process.
- (6) Accuracy and reliability of the data sources, analysed and presented as part of a mapping project are key. Pointing to the BIRN initiative again, it is worth noting that only fully investigated mass graves beyond a threshold of victim numbers are displayed on the map.

At a fundamental level these operating principles are linked to rights. They are based on the rights of all those potentially impacted by the indication of a mass grave on a map, and are instrumental to the protection of those rights, as well as to the safe production of the map. Respect for these principles will also support mappers as they seek to build relationships of trust with affected communities, and better ensure the validity of the map with the communities most directly affected.

5 Untangling the web of rights

Regardless of who undertakes mass grave mapping, whether at grass-roots level or as part of a top-down investigative process, a number of rights and rightsholders (not least the mappers themselves) will have to be considered. This is reflected in ‘Documenting international crimes and human rights violations for accountability purposes: Guidelines for civil society organisations’ (ICC/Eurojust 2022) which inter alia contains a section on burial sites and mass graves (ICC/Eurojust 2022, 36) as well as a section on documents and digital materials (ICC/Eurojust 2022, 30). Our research demonstrates that the rights potentially engaged by the mapping of mass graves are manifold and varied between the stakeholder groups.

5.1 The dead

Fundamentally the rights of the dead and thus the direct victims are at issue. The dignity of the dead is imperative. Under international humanitarian law, ‘[e]ach party to the conflict must take all possible measures to prevent the dead from being despoiled. Mutilation of dead bodies is prohibited’ (Henckaerts and Doswald-Beck 2006, Rule 113; for an outline of ethical considerations see Squires *et al.* 2019). Indeed, there is also the expectation that human remains are returned to the party or next of kin (*ibid.*, Rule 114), that the remains are disposed of respectfully with graves being maintained and respected (Rule 115) and the location of the graves are marked (Rule 116). Mass grave mapping, in recording information relating to the dead, ought to be cognisant of these provisions so as to strengthen and preserve the dignity of the dead.

5.2 Secondary victims and survivors

Survivors or secondary victims have a number of rights, some of which can be advanced through mass grave mapping:

The **right to know the truth** about what happened to a missing person. This right is enshrined in the International Convention for the Protection of All Persons from Enforced Disappearance (ICPPED, Art. 24). Withholding information about persons that are missing would amount to cruel and inhumane treatment and be in contravention of the International Covenant on Civil and Political Rights (ICCPR, Art. 7). Other international codifications in the Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment or the Convention on the Rights of the Child, with its provision on the right to receive essential information concerning the whereabouts of an absent member of the family (Art. 9(4)), can be cited in support.

The **right to an effective investigation** into the fate of missing loved ones arises from Articles 6 and 9 of the International Covenant on Civil and Political Rights (1966). When the rights to life, liberty or security are breached, the independent investigative procedures must follow and are obligations placed on the state. Mapping can record sites as a first step towards investigation.

Allied to both these rights is the **right to seek and share information**, as contained in Article 19 of the ICCPR. This entitles family members to see, receive and impart information. Such activity and ‘participation’ are increasingly recognised as part of the investigative duty placed on states but also to facilitate family members and individual victims to participate in legal processes; this also offers some public scrutiny, not just the receipt or provision of relevant information (see Smith and Klinkner 2023). Maps can be a digital repository of such information and facilitate engagement therewith.

The **right to an effective remedy and reparations** is a complex one (Klinkner and Smith 2022). The first element, the right to an effective remedy, is a procedural one to safeguard equal access to justice mechanisms and processes. The right to reparation aspect can be considered as more substantive, whereby states need to offer redress for harm suffered. The *Basic Principles and Guidelines on the Right to a Remedy and Reparation for Victims of Gross Violations of*

International Human Rights Law and Serious Violations of International Humanitarian Law (UNGA 2006) distinguishes five reparative measures: restitution, compensation, rehabilitation, satisfaction and guarantees of non-repetition. Since in the context of mass graves the primary victim is dead, restitution, that is, returning the victim to the original situation prior to the rights infringement, is not possible (UNGA 2006, para. 19). Compensation, in the form of financial contribution for the damages and costs suffered, may be possible (*ibid.*, para. 20), as may be rehabilitation (*ibid.*, para. 21) whereby general well-being support (medical, social, psychological and also legal) is on offer. Satisfaction may include a number of measures from truth seeking to the recovery and return of human remains, but it can also be in the form of a public apology, sanctions to the 'shortfalling institutions', commemoration activities and training (*ibid.*, para. 22). Finally, a state may issue guarantees of non-repetition through structural and institutional reforms, for example, but also through actively improving the protection of human rights defenders, standards, enforcement and awareness (see *ibid.*, para. 23). All, or part of, these remedies can be captured through mapping, especially where it is publicly accessible and available.

To find mass graves and to determine who may be in the graves (especially where this may require identification of human remains) raises **privacy rights** concerns, particularly for the surviving families. The right to privacy is a fundamental human right as enshrined by Article 12 of the Universal Declaration of Human Rights (UNGA 1948). In the context of missing persons, the International Commission on Missing Persons stresses that this consists of an individual's right to 'determine freely [...] what personal information is communicated to others' (ICMP 2023, 6), and where information is provided this should be used only when prior, free and informed consent is given (*ibid.*).

Depending on where mass graves are situated, **land rights** may be at issue: who has the right to use the land; who has access rights to the land? These rights will have to be taken into account when deciding how to collate relevant mass grave information and whether to publicise the exact location of a mass grave.

Equality and non-discrimination are principles that apply to all rights and freedoms. The overarching principles listed in Section 4 speak to this. Equality and non-discrimination should apply without adverse distinction to political orientation, birth, age, sex, sexual orientation, gender identity, marital status, religious belief, race, colour, language, ethnicity, caste, nationality, social status, disability or health status. Indeed, duties arising for states are far-reaching as explained by the UN Human Rights Committee in its General Comment 31 on the nature and general legal obligations of state parties to the Covenant:

States Parties are required [...] to respect and to ensure the Covenant rights to all persons who may be within their territory and to all persons subject to their jurisdiction. This means that a State party must respect and ensure the rights laid down in the Covenant to anyone within the power or effective control of that State Party, even if not situated within the territory of the State Party. (UNHRC 2004, para. 10)

Mapping can reveal whether a state has engaged with mass graves indiscriminately. Moreover, mappers themselves may need to be reminded of such framing for their own rights-informed mapping.

Research on mass graves further highlights that mass grave sites may become sites of commemoration and memorialisation (Klinkner and Smith 2020). The manner of burying the dead can form an essential aspect of religious practice as protected under freedom of thought, conscience and religion provisions. **Freedom of religion or belief** is safeguarded in Article 18 of the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights as well as through the Declaration on the Elimination of All Forms of Intolerance and of Discrimination Based on Religion or Belief (UNGA Res. 36/55 of 1981). Mass grave mapping can offer a platform for (digital) commemoration and memory preservation.

5.3 The public, community or society

Following atrocities that result in mass graves, there is likely to be a public and political justification, and indeed expectation, for investigation and disclosure of atrocity. In that sense, some of the rights listed above as rights vested in the individual also have a public or collective dimension. The **right to the truth, an effective investigation and guarantees of non-recurrence** are such examples.

Specifically, there is a public requirement of the right to the truth which entails that the evidence is made public to assist a society in coming to terms with its past and in moving forwards (see *El-Masri v. the former Yugoslav Republic of Macedonia* 2012). Investigation and disclosure of events relating to mass graves may thus form part of what is reasonably expected by a ‘democratic’ society or a society keen to reorientate itself towards a (more) just future.

Soft law instruments require the state to work towards non-repetition also by preserving the **collective memory** and commemoration of events, thereby contributing to societal learning and knowledge (UNCommissionHR 2005, reiterated in UNHRC 2023) and implicitly speaking towards the right to freedom of conscience and religion while upholding the fundamental tenets of **non-discrimination**.

In recent years cultural and Indigenous rights, also in relation to the land, have attracted more attention, including ties with the land and how material artefacts in graves may be significant in relation to ancestors. Furthermore, the way information is stored or displayed may require additional consideration in these contexts. In addition, First Nation, Indigenous or Aboriginal community borders will not always align with country borders, therefore potentially attracting differing laws and regulations, including social and religious norms. Interestingly, climate-change litigation before the Human Rights Committee (HR Committee) sheds light on the importance of being able to honour the dead as an activity of culture and linked to the land (though recognised and deliberated on by the Committee under Article 17 (right to privacy)). The Committee notes that:

[U]pkeeping ancestral graveyards and visiting and feeling communion with deceased relatives is at the heart of their cultures, and the most important ceremonies (such as coming-of-age and initiation ceremonies) are only culturally meaningful if performed on the native lands of the community whose ceremony it is. (UNHR Committee 2023 at para. 5.3)

This quote underscores the interwoven nature of rights (both individual and collective) when it comes to culture and commemorative activities linked with the land and the deceased. Moreover, it raises awareness for a mapping project to be respectful of public and community rights as well as furthering their realisation.

5.4 Safety of third-party personnel

While conceptually less complex, though perhaps not in its practical implementation, any mapping project has to be mindful of the safety and security, both physically and mentally, of its own staff, but also those who may be presently working on a mass grave. Here it is important to flag that rights-informed action must extend to mapping project personnel as well as third-party actors engaged in mass grave protection, investigation, identification, liaison or any such related activities.

5.5 Rights of the alleged perpetrator

While these are rights attached to an individual (and possible family), it is imperative to also highlight the rights of an alleged perpetrator. As a citizen, an alleged perpetrator enjoys the rights to privacy, equality and non-discrimination and the right to family life as amply highlighted above.

Specifically, the right to a presumption of innocence and generally the right to a fair trial must be respected. The Universal Declaration (UNGA 1948) guarantees such rights across the globe and in every country through its provisions in Articles 6, 7, 8 and 11. They are designed to safeguard and strengthen the rule of law and, with it, justice mechanisms. For mapping projects, the disclosure of information relating to a perpetrator will need to be carefully scrutinised so as to not jeopardise their rights, nor cause prejudice for court proceedings.

Part of a defendant's right to a fair trial includes the ability to test the evidence brought against them. An example includes the defence submission in Mladić that victims may have died 'during combat, internal [...] clashes, or committed suicide' (at 1392, para. 2677; for an assessment around mass grave findings in the Karadžić judgment, including the defence contesting numbers and cause of death, see Klinkner 2016). Before the ICC in the case of Abd-Al-Rahman, the prosecutor has sought to introduce pre-recorded testimonies by protected witnesses that allege a connection between the defendant and mass graves (Prosecutor v. Abd-Al-Rahman 2022). This has the potential to present an obstacle to defence scrutiny in proceedings. That said, while the defence may not have a presence during excavations under the auspices of the prosecutor, the Office of the Prosecutor has an obligation to investigate incriminating and exonerating circumstances equally (UNGA 1998 'Rome Statute', Art. 54(1)(a)).

5.6 Corresponding obligations

Where there are rights, there are also corresponding **obligations on the state**. They include the legal duty to search for the missing and to investigate their disappearance, including the circumstances of the disappearance, the violation of rights and to hold perpetrators to account. At a broader level, states are required to protect national security and public safety and to safeguard the rights of those within its territory.

Rights-informed mapping, we argue, has to be cognisant of the rights arena it operates in, hence this exposition. Grounded in law, careful consideration of these rights provides the foundational underpinning of our project. It is recognised that not all of the users for the purpose of the project are duty bearers, and to that extent the rights that are identified above may not be 'engaged' in the true sense of the term in all mapping contexts. As legal principles that operate to ensure safety, truth and justice delivery, however, adherence in all contexts represents good practice.

6 Towards a data-gathering strategy: Ukraine pilot

Cognisant of what rights-informed mapping would require and mindful of the many goals that may be attached to mapping exercises, our next project step was to examine the methods that mass grave mapping might employ in relation to the data points, that is, the specific pieces of information and their corresponding value, gathered as part of the dataset. This is where the project conducted its pilot mapping exercise based on real-time emerging open-source information: when in February 2022 the full-scale invasion of Ukraine began, and open-source documenting and mapping casualties became a core activity, through the conduct of a pilot, close attention was paid to what surfaced in open-source media on the subject of mass graves. This was to get a better understanding of what setting up a mapping project during a time of war would entail and what issues this would raise for data-gathering strategies, specifically data points.

In the context of the ongoing armed conflict between Russia and Ukraine, mass graves in and around Mariupol made news headlines early in the conflict, with those found in Bucha perhaps the most prominent to date (Cotovio *et al.* 2022). They have become widely associated with the possible commission of war crimes as investigators and forensic experts have started probing alleged crime scenes (Aljazeera 2022), including excavations of mass graves (France24 2022), and amidst many open-source investigations.

The aim of the pilot was to observe, collate and categorise information as reported on media outlets (including social media) on the subject of mass graves, to confirm and refine the data-entry points and identify associated challenges with data collation. Notably, there was no aspiration to deliver on any of the goals found in the literature or human rights projects as such, though, of course, the pilot was a systematic enquiry – but crucially, to inform the project itself. As a pilot, it was framed as an exercise of information collation. In addition, in line with the rights-informed approach designed to ensure the safety of stakeholders, it was clear that our pilot would not result in an open-source output (though relying on open-source input). The tapestry of rights engaged, as outlined above, is complicated, but particularly so during an ongoing armed conflict, hence this clear practical measure to not take any such risks and conduct open-source research remotely. That said, the well-being of the researchers who may be exposed to distressing images, narratives and information was carefully considered (and indeed was a concern that we had to mitigate against for ethical reasons at the outset of the entire MaGMap project). We therefore had a designated resource page with training materials on how to avoid any form of psychological harm.

Due to extensive engagement with the Bournemouth Protocol (Klinkner and Smith 2020),¹ the importance of the full life-cycle of a mass grave to collate information was clear: from the reporting, to the protection stage, to more detailed information as to who may be in the grave and how they died, to very important matters such as positive identification efforts but also justice – be that reparative, commemorative or indeed retributive.

This life-cycle must be understood, for it dictates what data categorisation might be utilised. With that in mind, our data-entry points were to capture:

- the emergence of mass graves;
- the recording of mass graves;
- the reporting on mass graves;
- information on victim numbers in mass graves;
- the protection of mass graves;
- the investigation of mass graves;
- post-investigative activities (including return of human remains; commemoration and justice efforts).

These data-entry points were captured in the pilot protocol to ensure uniformity in the approach to data collation and entry. In addition to this, there was a free-text data-entry point where the researchers could add any additional notes. In terms of keyword searches, we used: ‘mass grave’/‘massgrave’, ‘mass burial’, but also ‘missing persons’ and ‘enforced disappearance’ as proxies and for verification purposes.² Core sources were Twitter/X (with #massgrave(s)) and Google News. We then identified several international organisations and official channels that might report on mass graves potentially confirming (or discrediting or omitting) prior reports.³ Many of these entities’ updates and reports, as well as those from grassroots NGOs and organisations active in Ukraine in conducting OSINT investigations, were first captured on Twitter/X. The logic here was to provide cross-references with international bodies (UN entities

¹Recourse to the Bournemouth Protocol is also recommended by the ICC/Eurojust guidelines for civil society organisations (2022) and mapping projects such as BIRN (2024) publicise information pertaining to these categories.

²Search terms were also translated into Ukrainian, Russian, Chinese and Spanish for sense-checking and run through media outlets in the respective languages.

³The list of additional sources consulted consisted of entities such as the UN Office of the High Commissioner (which on 4 March 2022 created the Independent International Commission of Inquiry on Ukraine); the World Health Organization; the Institute for Protection of Women’s Rights; the International Committee of the Red Cross; the International Commission on Missing Persons; the Organization for Security and Co-operation in Europe; the Organization for Defending Victims of Violence; Ukraine Ministries; Amnesty International; Human Rights Watch; Bellingcat; and research entities such as the Institute for the Study of War.

and international organisations), followed by official domestic channels, international non-governmental organisations with relevant mandates and research bodies, including those operating in situ.

The amount of data in the main mass grave log (collated from English language sources) between April and June 2022 revealed thirty-seven alleged mass grave reports amounting to a total of 1406 data entries. This provided us with a useful substrate to triangulate with literature and rights-based considerations before drawing the following inferences:

- (1) Due to the nature of the conflict, including loss, gain and/or control over territory, the speed of mass grave reporting and investigation was astonishing, especially in the early days when Russian forces were pushed back in and around Bucha. It is particularly noteworthy how quickly information was moving from the ‘discovered a mass grave’ stage to reportedly being investigated. And further, to a reburial (albeit without identification), resulting in graves marked with numbers as opposed to names, as no identification of the human remains had taken place (e.g. Arhirova 2022). This has a significant impact on what data could be captured to ensure nuanced, accurate record keeping in relation to investigation, excavation and affiliated dates.
- (2) The paucity of information from East Ukraine and Russia-controlled regions that was readily available was in stark contrast to information flows in territories controlled by the Ukrainian government. Indeed, it was when Russian troops left the territories that information emerged (Reuters 2022). Accessibility of information *and* accessibility to sites must thus be considered, which will be particularly pronounced during an armed conflict (and occupied territories). Naturally, this limitation also arises due to, and is exasperated by, the choice of media outlets and organisations that are scrutinised. The point here is to stress generally the issue of accessibility whether built into the method of data collation or due to physical constraints.
- (3) A consequence of a lack of accessibility (both informative and physical) is an increased verification challenge, especially where information and evidence have potential utility as propaganda.
- (4) Conversely, where there is an abundance of media reporting and a high information flow, this presents difficulties in making sense of a multitude of reporting of sites to ensure that they relate to one and the same site.
- (5) Indeed, the accuracy of (and in) open-source reporting renders verification extremely difficult; it introduces elements of uncertainty into analysing, categorising and recording information.
- (6) Allied to the issue of accuracy in reporting is the use of a clear definition: what is a mass grave? What is a mass burial site? This may not be a concern for a reporting journalist, but it will cause issues for a lawyer or mapper keen to detect the illegal activity connected to the burial structure which gives rise to the recording of a possible human rights violation. Of course, this will also have societal relevance (including political, social, community and cultural).
- (7) This leads to a related issue: that of applying the definition to reports (i.e. is it a mass grave, a mass burial, a crime site, a killing site or a historic site?). Here we also noted a cautious approach by organisations such as the OSCE (Benedek *et al.* 2022; Human Rights Watch 2022) and the UN, following the UN Secretary General’s visit, in using the term ‘mass grave’ (UN News 2022). This is in part due to the fact that there is no unified definition, but also because it indicates a gravity and severity of events that, in addition to attracting protection and the need to investigate, draws condemnation on behalf of survivors, families, affected societies and the international community.

- (8) From the outset as signposted above and through our rights-informed approach, we conducted mapping in the safe data-protected space of our own organisation. However, the well-being of the researcher remained a concern and priority. This was mitigated through training materials, regular debriefings, and an approach where images were only viewed when necessary to avoid unnecessary distress.

7 Conclusion and agenda

Any human rights documenting effort, including mass grave mapping, arises out of a specific context, and indeed the context may dictate the extent to which rights-informed mapping is conducted. In summary, this paper contributes to existing literature and knowledge regarding the benefits attributed to mass grave mapping while also explicating the principles, steps, considerations and rights that frame mass grave mapping for practical, safe consideration. Moreover, through the conduct of a pilot on data gathering, insights and findings for conceptualisation and replication of future mapping efforts are offered.

The following foundational insights stand out, from which other findings logically follow:

1. **Know your subject.** It was imperative to understand the subject of mass graves, while being cognisant of the fact that no mass grave is the same as any other. What we mean by this is that the full life-cycle of a mass grave really matters: from the reporting, to the protection stage, to more detailed information as to who may be in the grave and how they died, to very important matters such as positive identification efforts and the achievement of justice. This life-cycle must be understood. It unlocked overarching principles associated with mass grave engagement generally, highlighted the applicable rights, and led to the identification of key data-entry points.
2. **Know the applicable rights.** With an understanding of the full life-cycle, the rights of those associated with a mass grave come to the fore: who may have rights, and why and when might those rights be at issue? This then leads to a careful appraisal of applicable rights that will inform all stages of a mapping project and – depending on assessments – result in an adjusted but always rights-informed strategy.
3. **Know the data-entry points associated with your goal.** Similarly, as evidenced in the pilot study, it (combined with the specific context) dictates what data is worthy of capturing and what categorisation and analysis challenges this will bring. If allied to a specific goal, for example ‘amplifying the voices of survivors’, the content and emphasis of this goal will be prominent in the data-gathering strategy. Knowing what the data-entry points will be also serves to foresee where issues of accuracy may lie. Furthermore, it will guide the strategy for communication, possible publication format, storage, archiving, and ultimately, deletion of data.
4. **Beware of changing context.** This can include shifts in the political situation or the stability of peace. Within the context of mass grave mapping, particularly in situations of ongoing crisis, accessibility of data will be crucial. While accessibility has been noted in relation to controlled territory, choice of sources and who has access to the information, accessibility is also a concern when seeking to ascertain who will be able to make use of the data in the way envisaged by the goals. Such biases have to be uncovered and mitigated.

Indeed, our findings here all have in common that they will unlock and serve to highlight the risks associated with mass grave mapping that require mitigation. This, in turn, will help mappers make choices as to what information to display publicly open-source and what to keep behind protection measures.

Knowing your subject, rights, data-entry points and context will highlight who (and what) may be at risk during what stage. For example, when reporting a grave, who may be at risk? The

informant, perhaps a coincidental witness, perhaps a survivor, perhaps a perpetrator, perhaps a third-party engaged in technical surveillance or information gathering. During the protection of a mass grave, the authorities tasked with the protection might be at risk. Whereas during an investigation itself, a whole raft of scientific and law enforcement actors may be exposed as well as a community keen to understand what happened and, more importantly, survivors, anxious to learn the fate of their loved ones. But the site itself can also be at risk from destruction, contamination, robbing or tampering, and with it the quality of evidence retrievable may be compromised, risking investigation, identification and retrieval of associated evidence.

Through an understanding of the subject life-cycle, and as indicated in the flowchart, mappers will become aware that an assessment of risks should not be considered a one-time event but should be kept under review as situations and corresponding risks fluctuate and change. The pilot, coupled with the entire flowchart exercise of putting on paper the steps involved and the alleged benefits accruing to mapping, have set the scene for our next set of findings: an analysis of the risks associated with all mapping aspects not discussed in this paper (including analysis of the data, involvement of the local community, degree of disclosure or location specificity) and an exposition of appropriate mitigation strategy. This is our agenda for risk-informed mass grave mapping. On its basis, the UN Special Rapporteur's (UNGA 2020) suggestion to produce a regularised mass grave map for the world to see can be rights- and risk-informed.

Acknowledgements. We are grateful to the Leverhulme Trust for funding this project and to the many generous people we spoke to on our fieldwork. Our thanks also go to the Design Unit at Bournemouth University for creating imagery of our research outputs, and to Dr David Biggins, Natalia Garcia-Ocampo and Chiedoie Nwagu for their assistance with our Ukraine pilot.

References

- AAAS – Association for the Advancement of Science** (2019) Location-based data in crisis situations – Principles and guidelines. Available at https://www.aaas.org/sites/default/files/2019-04/VGI%20Principles%20and%20Guidelines_FINAL%20%28002%29.pdf
- Abrahams F and Murray D** (2020) Open-source Information: Part of the Puzzle. In Dubberley S, Koenig A and Murray D (eds), *Digital Witness*. Oxford: Oxford University Press, pp. 85–105.
- ACLED** (2023) Bringing Clarity to Crisis. Available at <https://acleddata.com>
- Against Torture Convention and Cruel Other, Inhuman or Degrading Treatment or Punishment** (adopted 10 December 1984, entered into force 26 June 1987) 1465 UNTS 85.
- Aljazeera** (2022) ICC sends 42-member team probe alleged war crimes in Ukraine. *Aljazeera News* (17 May 2022). Available at <https://www.aljazeera.com/news/2022/5/17/icc-sends-largest-ever-investigative-team-to-war-torn-ukraine>
- ARCIKS** (n.d.) Genocide Archive Rwanda Mapping. Available at <https://www.arcgis.com/apps/Viewer/index.html?appid=50043b4af9d64b26aea4ac405fc7e925>
- Arhirova H** (2022) Buried as numbers, more of Bucha's victims are laid to rest. *Associated Press* (11 August 2022). Available at <https://apnews.com/article/russia-ukraine-kyiv0aced874ccf203a5219ad37c2ed3f636>
- Balkan Transitional Justice** (2021) BIRN launches database of mass graves from Yugoslav Wars (3 June 2021). Available at <https://balkaninsight.com/2021/06/03/birn-launches-database-of-mass-graves-from-yugoslav-wars/>
- Benedek W, Bilková V and Sassóli M** (2022) Report on violations of international humanitarian and human rights law, war crimes and crimes against humanity committed in Ukraine since 24 February 2023. OSCE (13 April 2022) ODIHR.GAL/26/22/Rev.1
- BIRN/BalkanInsight** (2020) Bitter lands. Available at <https://massgravesmap.balkaninsight.com>
- BIRN/BalkanInsight** (2020a) Bitter lands – Tomasica. Available at <https://massgravesmap.balkaninsight.com/tomasica-2/>
- Congram D, Kenyhercz M and Green G** (2017) Grave mapping in support of the search for missing in conflict and contexts. *Forensic Science International* 278, 260–68.
- Convention on the Rights of the Child** (adopted 20 November 1989, entered into force 2 September 1990) 1577 UNTS 3.
- Costello R** (2018) International criminal law and the role of non-state actors in preserving open-source evidence. *Cambridge International Law Journal* 7(2), 268–83.
- Cotovio V, Pleitgen F, Blunt B and Markina D** (2022) The horrors of Putin's invasion of Ukraine are increasingly coming to light. *CNN* (4 April). Available at <https://edition.cnn.com/2022/04/03/europe/ukraine-bucha-horrors/index.html>
- DC-Cam – Cambodian Documentation Centre** (n.d.) Mapping project. Available at <https://d.dccam.org/Projects/Maps/Mapping.htm>

- Dubberley S and Ivens G** (2022) *Outlining a Human-Rights Based Approach to Digital Open-source Investigations: A guide for human rights organisations and open-source researchers' Human Rights, Big Data and Technology Project*. University of Essex: Project Report.
- Dubberley S, Koenig A and Murray D** (2020) Introduction. In Dubberley S, Koenig A and Murray D (eds), *Digital Witness*. Oxford: Oxford University Press, pp. 3–11.
- Early Warning Project** (2023) The Early Warning Project assesses the risk of mass atrocities in countries around the world. Available at <https://earlywarningproject.ushmm.org>
- EJAtlas** (2023) Our mission. Available at <https://ejatlas.org/backoffice/cms/en/our-mission/>
- El Murr S** (2024) The desperate last-ditch search for Lebanon's missing war victims', *The Guardian* (27 February 2024). Available at <https://www.theguardian.com/global-development/2024/feb/27/the-desperate-last-ditch-search-for-lebanons-missing-war-victims>
- El-Masri v. the former Yugoslav Republic of Macedonia**, Application No 39630/09, Judgment, Grand Chamber, 13 December 2012.
- ECCC, Nuon Chea and Khieu Samphan**, (Judgment) Case 002/01, (7 August 2014).
- FAFG – Fundación de Antropología Forense de Guatemala** (2013) Mapa. Available at <https://fafg.grupovesica.com/mapa.php>
- Fournet C** (2020) Face to face with horror: The Tomašica mass grave and the trial of Ratko Mladić. *Human Remains and Violence* 6(2), 23–41.
- France24** (2022) Ukraine begins excavation of Bucha mass grave. *France24* (8 April 2022). Available at <https://www.france24.com/en/live-news/20220408-ukraine-begins-excavation-of-bucha-mass-grave>
- Freeman L** (2018) Digital evidence and war crimes prosecutions: The impact of digital technologies on international investigations and trials. *Fordham International Law Journal* 41(2), 283–335.
- Gillett M and Fan W** (2023) Expert evidence and digital open-source information: Bringing online evidence to the courtroom. *Journal of International Criminal Justice*, online 27 December 2023, 1–33. <https://doi.org/10.1093/jicj/mqa-d050>.
- Harding L** (2022) Ukraine says victims from Izium mass grave show signs of torture. *The Guardian* (16 September 2022). Available at <https://www.theguardian.com/world/2022/sep/16/ukraine-mass-grave-with-440-bodies-discovered-in-recaptured-izium-says-police-chief>.
- Henckaerts J-M and Doswalk-Beck L** (2006) *Customary International Humanitarian Law, Vol. 1: Rules*. Geneva: ICRC.
- Hollinger A** (n.d.) United States Holocaust Memorial Museum: Crisis in Darfur. *Google Earth Outreach*. Available at <https://www.google.com/earth/outreach/success-stories/united-states-holocaust-memorial-museum/>
- Human Rights Center UC Berkeley School of Law and UNHRCOHC** (2022) *Berkeley Protocol on Digital Open-source Investigations*. New York – Geneva, United Nations. Available at https://www.ohchr.org/sites/default/files/2024-01/OHCHR_BerkeleyProtocol.pdf.
- Human Rights Watch** (2022) Ukraine: Russian Forces' Trail of Death in Bucha (21 April 2022). Available at <https://www.hrw.org/news/2022/04/21/ukraine-russian-forces-trail-death-bucha>
- iGIS Team, Directorate of Science, Technology and Innovation** (2021) Mass Graves and Other Sites of Conscience Left by the War. Available at <https://storymaps.arcgis.com/stories/c6f67a87ead44133b5d614c5d6bea6f68>
- ICC/Eurojust** (2022) Documenting international crimes and human rights violations for accountability purposes: Guidelines for civil society organisations. Available at <https://www.eurojust.europa.eu/sites/default/files/assets/eurojust-icc-csos-guide-lines.pdf>
- ICMP** (2023) Family Rights. Short Guide for Families of the Missing. Available at https://www.icmp.int/wp-content/uploads/2023/03/230302_ICMP_FAMILY-GUIDE_EN.pdf
- International Coalition of Sites of Conscience** (2024) MENA Mapping. Available at <https://mappingmena.org/>
- International Covenant for the Protection of All Persons from Enforced Disappearance** (adopted 12 January 2007, entered into force 23 December 2010) UN Doc A/RES/61/177 (20 December 2006).
- International Covenant on Civil and Political Rights** (adopted 19 December 1966, entered into force 23 March 1976) 999 UNTS 171.
- ICTY** (2014) Mladić Prosecution allowed to reopen its case-in-chief to present evidence from Tomašica mass grave, Press Release of 23 October 2014. The Hague: ICTY. Available at <https://www.icty.org/en/press/mladić-prosecution-allowed-reopen-its-case-chief-present-evidence-tomašica-mass-grave>
- Journalists for Democracy in Sri Lanka (JDS)**, the International Truth and Justice Project (ITJP), Centre for Human Rights and Development (CHRD) and the Families of the Disappeared (FoD) (2023) Mass Graves and failed Exhumations in Sri Lanka. Available at https://www.slcat.org/wp-content/uploads/2023/06/ITJP_MassGraves_report_v5.1.pdf
- Junta de Andalucía** (n.d.) Mapa de Fosas. Available at <https://www.juntadeandalucia.es/organismos/turismoculturaydeporte/areas/cultura/memoria-democratica/fosas.html>
- Justiceinfo.net** (2022) Map of War Crimes Trials in Ukraine (6 December 2022). Available at <https://www.justiceinfo.net/en/109654-map-of-war-crimes-trials-in-ukraine.html>

- Karalis M** (2022) Open-source intelligence in Ukraine: Asset of liability? Chatham House Expert Commentary of 14 December 2022. Available at <https://www.chathamhouse.org/2022/12/open-source-intelligence-ukraine-asset-or-liability>
- Klinkner M** (2016) Karadžić's guilty verdict and forensic evidence from Bosnia's mass graves. *Science and Justice*, **56** (6), 498–504.
- Klinkner M and Smith E** (2020) Bournemouth protocol on mass grave protection and investigation. Available at https://issuu.com/bournemouthuniversity/docs/the_bournemouth_protocol_on_mass_grave_protection_?fr=sMjc3OTI0MjAyNzM
- Klinkner M and Smith E** (2022) Victims' rights. In Binder C, Nowak M, Hofbauer J and Philipp J (eds), *Elgar Encyclopedia of Human Rights*. Edward Elgar Online, pp. 529–35.
- Klinkner M and Smith E** (2024) MaGMap a guide to the use of mapping tools. Available at https://issuu.com/bournemouthuniversity/docs/12106_fmc_magmap_output_tools_a4_booklet_issu_v3.0
- Madden M and Ross A** (2009) Genocide and GIScience: Integrating personal narratives and geographic information science to study human rights. *The Professional Geographer* **61**(4), 508–26. <https://doi.org/10.1080/00330120903163480>
- Martinez-Alier J** (2021) Mapping ecological distribution conflicts: The EJAtlas. *The Extractive Industries and Society* **8**(2), 1–16. <https://doi.org/10.1016/j.exis.2021.02.003>
- Massud Y and Victor D** (2023) More than 100 bodies are delivered to a mass grave in Southern Gaza. *The New York Times*, 23 November 2023. Available at <https://www.nytimes.com/2023/11/23/world/middleeast/gaza-mass-grave.html>
- Murray D, McDermott Y and Koenig A** (2022) Mapping the use of open-source research in human rights investigations. *Journal of Human Rights Practice* **14**(2), 554–81.
- OSCE** (2023) Interim reports on reported violations of international humanitarian law and international human rights law in Ukraine. Available at <https://www.osce.org/odihr/537287>
- PainScapes** (n.d.) Mass Graves. Available at <https://painscapes.com/en/cities>
- Prosecutor v. Abd-Al-Rahman**, Public Redacted Version of “Prosecution’s fourth application under rule 68(3) to introduce into evidence prior recorded testimony of witnesses P-0001, P-0581, P- 0884, P-0917, P-0922 and P-0991” 26 January 2022 ICC-02/05-01/20 (31 January 2022).
- Prosecutor v. Al-Werfalli**, Warrant of Arrest, ICC-01/11-01/17 (15 August 2017).
- Prosecutor v. Mladić**, Judgment, IT-09-02-T-117281 (22 November 2017).
- Prosecutor v. Karadžić**, Public redacted version of Judgment issued on 25 March 2016, IT-95-5/18-T (25 March 2016).
- ReliefWeb** (2023) Ukraine: Humanitarian Situation Snapshot, October 2023. Available at <https://reliefweb.int/report/ukraine/ukraine-humanitarian-situation-snapshot-october-2023-enuk>
- Reuters** (2022) Ukraine completes exhumation of soldiers at Lyman mass grave. *Reuters News Agency*, 14 October 2022. Available at <https://www.reuters.com/world/ukraine-completes-exhumation-soldiers-lyman-mass-grave-2022-10-14/>
- Sarkin J** (2021) Promoting the rights of victims in under-resourced places by using science and technology that can be used by ordinary people, to deal with human rights violations: Bolstering the right to the truth. *Liverpool Law Review* **42**, 339–60.
- Smith E and Klinkner M** (2023) Victims' rights to participation and their legitimate information interests In Borghi M and Brownsword R (eds), *Law, Regulation and Governance in the Information Society Informational Rights and Informational Wrongs*. Abingdon: Routledge.
- Squires K, Erickson D and Márquez-Grant N** (eds) (2019) *Ethical Approaches to Human Remains*. Springer.
- Stover E, Peress G and Goldstone R** (1998) *The Graves: Srebrenica and Vukovar*. Zurich: Salto.
- Surviving Memory in Post War El Salvador** (n.d.). Surviving Memory Sites. Available at <https://westernu.maps.arcgis.com/apps/dashboards/30478d69e46a45118445cb721b3146e7>
- Syria Justice and Accountability Centre** (2024) Interactive map. Available at <https://experience.arcgis.com/experience/83876e6bc33244eda89194c923177d1f>
- Temper L, del Bene D and Martinez-Alier J** (2015) Mapping the frontiers and front lines of global environmental justice: The EJAtlas. *Journal of Political Ecology* **22**(1), 255–78. <https://doi.org/10.2458/v22i1.21108>
- Transitional Justice Working Group** (2021) Mapping Killings under Kim Jong-Un: North Korea's response to international pressure, December 2021. Progress Report. Seoul: Transitional Justice Working Group. Available at https://en.tjwg.org/wp-content/uploads/2021/12/Report2021_MappingKillingsUnderKimJong-un.pdf
- UNCommissionHR** (2005) Report of the independent expert to update the Set of Principles to combat impunity, 18 February 2005. UN Doc E/CN.4/2005/102.
- UNHR Committee** (2004) General Comment No. 31, The nature of the general legal obligation imposed on States Parties to the Covenant, 26 May 2004. UN Doc CCPR/C/21/Rev.1/Add.13.
- UNHR Committee** (2023) Views adopted by the Committee under article 5 (4) of the Optional Protocol, concerning communication No. 3624/2019, 18 September 2023. UN Doc CCPR/C/135/D/3624/2019.
- UNHRC** (2022) Report of the Independent Fact-Finding Mission on Libya, 23 March 2022. UN Doc A/HRC/49/4.
- UNHRC** (2023) International legal standards underpinning the pillars of transitional justice, 10 July 2023, UN Doc A/HRC/54/24.
- UNGA** (1948) Universal declaration of human rights, 10 December 1948, UN Doc 217 A (III).

- UNGA** (1981) Declaration on the elimination of all forms of intolerance and of discrimination based on religion or belief, 25 November 1981, UN Doc A/RES/36/55.
- UNGA** (1998, last amended 2010) Rome Statute of the International Criminal Court.
- UNGA** (2006) Basic principles and guidelines on the right to a remedy and reparation for victims of gross violations of international human rights law and serious violations of international humanitarian law, adopted on 21 March 2006, UN Doc A/RES/60/147.
- UNGA** (2020) Human rights standards and possible steps towards the respectful and lawful handling of mass graves, 12 October 2020, UN Doc A/75/384.
- UN News** (2022) Ukraine: UN's Guterres joins call for Bucha war crimes probe, 5 April 2022. Available at <https://news.un.org/en/story/2022/04/1115522>
- UNOHCHR** (2023) Sudan: At least 87 buried in mass grave in Darfur as Rapid Support Forces deny victims decent burials, 13 July 2023. Available at <https://www.ohchr.org/en/press-releases/2023/07/sudan-least-87-buried-mass-grave-darfur-rapid-support-forces-deny-victims>.
- Van Schaack B** (2020) Innovations in ICL documentation methodologies and institutions. In Van Schaack B, *et al.* (eds), *Imagining Justice for Syria*, New York: Oxford Scholarship online. <https://doi.org/10.1093/oso/9780190055967.003.0009>.
- Wright R and Hanson I** (2016) Forensic archaeology under the auspices of large organizations. In Blau S and Ubelaker D (eds), *Handbook of Forensic Anthropology and Archaeology*, New York - London: Routledge, pp. 607–21.
- Yazda** (2018) Working against the Clock: Documenting Mass Graves of Yazidis killed by Islamic State, Report. Available at https://irp.cdn-website.com/16670504/files/uploaded/Yazda_Publication_2018_DocumentingMassGravesYazidisKilledISIS_28062021_Download_EN_vf.pdf