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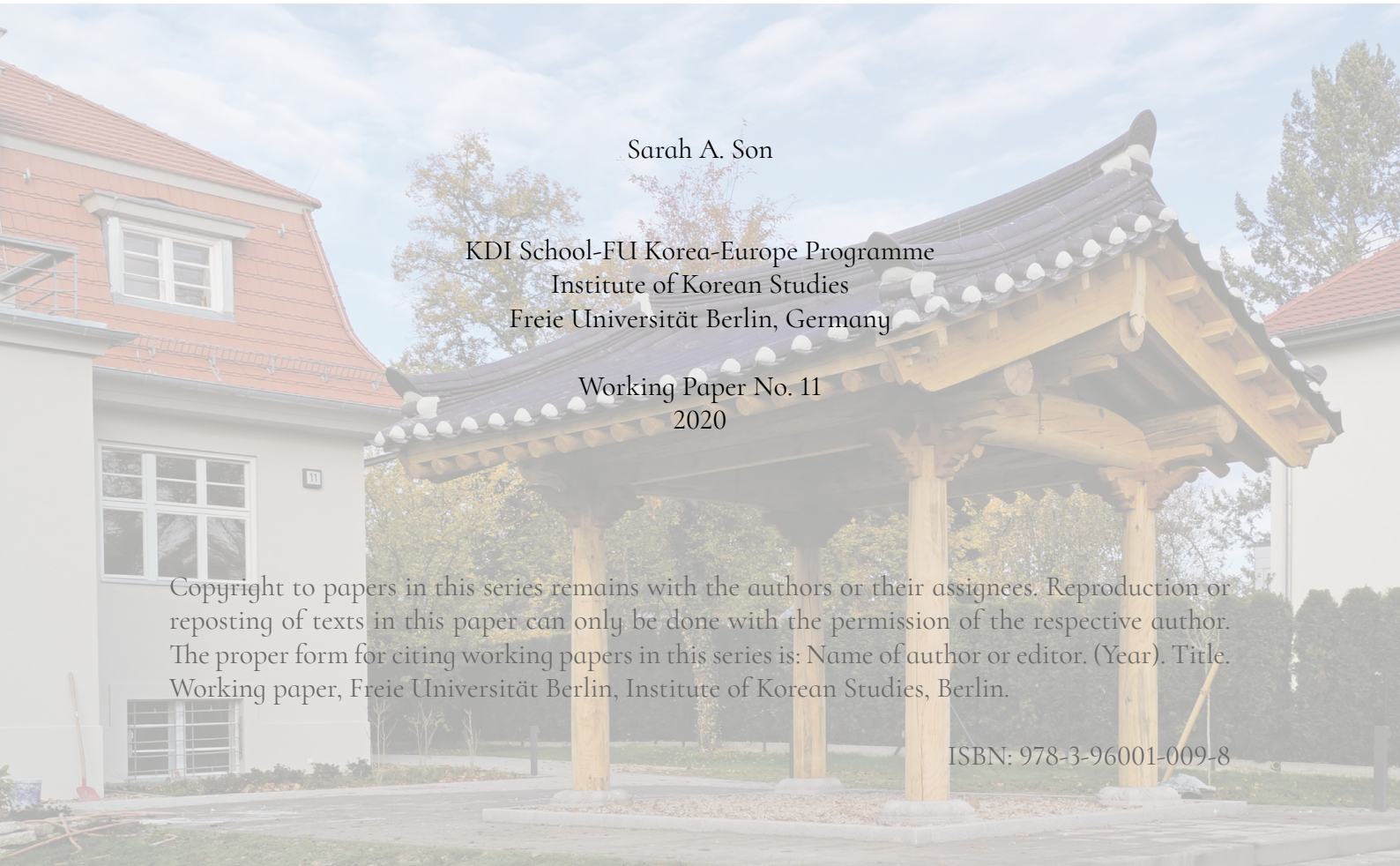
Geospatial Mapping in North Korean Human Rights Monitoring



Sarah A. Son

KDI School-FU Korea-Europe Programme
Institute of Korean Studies
Freie Universität Berlin, Germany

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Geospatial Mapping in North Korean Human Rights Monitoring

Sarah A. Son*

KDI School-FU Korea-Europe Programme
Institute of Korean Studies
Freie Univesität Berlin

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Abstract:

For organisations committed to documenting human rights abuses in North Korea, gathering data is an ongoing challenge. As a result, some organisations have turned to remote sensing methodologies, including pairing Geospatial Information Systems (GIS) technology with testimonial data. The use of satellite imagery has become popular in work on North Korea, particularly in the area of monitoring nuclear and conventional weapons infrastructure development. Such work has at times sparked controversy, given the scope for analytical error and the high stakes associated with flawed analysis. It has also been the subject of critical attention highlighting the contribution of satellite image-based activism to reinforcing state-led ways of seeing and knowing. With these concerns in mind, this paper discusses the potential of GIS to support human rights research on North Korea through the discussion of one current project using a GIS to document human rights violations. While considering the drawbacks and risks involved in using GIS technology for such work, the paper will cite advantages to be had from piloting new methods of this nature and will describe some of the practical considerations involved in applying this method to the North Korean context.

* Dr. Sarah A. Son, Lecturer in Korean Studies, School of East Asian Studies, University of Sheffield
Contact: s.a.son@sheffield.ac.uk

Introduction

Human rights abuses in the Democratic People's Republic of Korea (North Korea) have been the subject of increasing international attention since the 1990s, when the growing presence of North Korean escapees, primarily in the Republic of Korea (South Korea), began to swell the volume of testimonies about conditions in what is arguably the world's most repressive regime. These testimonies have captured attention through their publication in research reports by human rights organisations, in the memoirs of North Korean escapees and, more recently, in TV programmes and TED Talks featuring North Korean escapees and watched by millions, due to the power of social media. However, the narratives presented in such testimonies, while useful and important in a context where direct access to the country is all but impossible, have come under increasing scrutiny in recent years. Accusations of exaggeration and even direct falsification of accounts have affected several high-profile escapees. Questions have also been raised about the accuracy and currency of information about human rights abuses in North Korea, particularly in instances where the news media has generated and reproduced stories that are either sensationalised or manifestly untrue (Dalton et al., 2016; Smith, 2014).

These concerns aside, individual testimonies continue to be gathered by human rights monitoring organisations as often and in as much depth as typically limited resources allow, usually via 1:1 interviews held in the offices of these organisations before being stored in secure databases. Generally, this work is done according to a theme that is the topic of a limited-term project, such as the investigation of the North Korean political prison camp system, child rights or women's health (An & Sim, 2018; Hawk, 2003; Lee, 2009). In subsequent project reporting, narrative testimonies are usually used descriptively and direct quotes and anecdotes are used to illustrate specific issues and to provide the media with quotes for re-publication in what tend to be text-heavy documents, given the dearth of images or video from North Korea related to the conditions or events described. In other words, consistent with documentation practices in many situations globally, the content of individual testimonies is not often analysed systematically in ways that may reveal patterns of abuse that could prove more powerful in addressing rights violations both now and in any potential future mechanisms to hold those responsible for violations to account (Edwards & Koettl, 2011, p. 66). While individual accounts are an impactful aspect of human rights advocacy, a reliance on individual testimony can lack the necessary impact in pursuing accountability for violations because:

> ...when faced with accusations of human rights violations, governments and other actors rely on a sequential and nearly standardised series of responses... designed to avoid accountability, allow space for human rights violations to persist, and undermine the credibility of those who would attempt to document abuses (Edwards & Koettl, 2011, p. 67).

The North Korean state has certainly fulfilled this critique by denying and/or minimising claims of abuses, blaming any rights violations it does acknowledge on external forces or causes, or by criticising the available evidence as false, unreliable or politically motivated (Chow, 2017; Fahy, 2019; Hawk, 2014).

Despite the continued denials, the publication of findings by a United Nations Commission for Human Rights in North Korea (UN COI) in 2014 went a long way towards providing evidence of widespread and systematic human rights abuses having taken place in North Korea, sufficient to argue that crimes against humanity have been committed, "pursuant to policies established at

the highest level of the state" (United Nations, 2014). The volume of evidence gathered and the recommendations presented prompted an unusually robust response from North Korea, along with an unprecedented level of sudden, if largely token, engagement with the United Nations' human rights review mechanism, the Universal Periodic Review (UPR) (Chow, 2017; Fahy, 2019; Son, 2018). However, aside from sparse evidence of minor progress in the area of the rights of persons with disabilities, (Human Rights Watch, 2017) it does not appear that the state institutions and policies associated with many forms of continuing human rights violations have changed in any significant way as a result of the findings and recommendations UN COI. Meanwhile, NGOs (based mostly in South Korea) documenting North Korean human rights abuses have continued to focus on individual, narrative testimonial-gathering as their primary mode of monitoring.

Edwards and Koettl have argued that the tendency among human rights NGOs globally to rely on "emotive and illustrative testimony, individual cases and on the concept of 'sameness' in order to illicit public interest and action on a particular matter of concern", limits the ability of such organisations to develop and improve their information-gathering methods and modes of analysis (Edwards & Koettl, 2011, p. 68). Specifically, reliance on tried methods steers organisations away from developing competence in collecting and/or collating "statistics, survey data and macro-level measures of abuses" (Edwards & Koettl, 2011, p. 68) of the kind that are more likely to serve as evidence of widespread and systematic abuse – two key criteria outlined in the Rome Statute of the International Criminal Court as pertaining to crimes against humanity (Rome Statute of the International Criminal Court, 1998). However, over the last two decades, a number of scientific organisations have sought to lend their assistance to human rights monitoring to push the boundaries of traditional methods, particularly through the application of remote sensing such as Geographic Information Systems (GIS) technologies to find new ways to discover and document information, particularly where direct access to the ground has been difficult. While claiming much promise, these technologies have only been able to be tested in a limited number of settings, and as a result, there is currently little research in the area of remote sensing using a human rights framework. This is "likely due to low visibility of human rights studies in academic departments providing remote sensing education" (Wolfinbarger, 2016, p. 474). However, organisations such as the American Association for the Advancement of Science (AAAS) and the United Nations Operational Satellite Applications Program (UNOSAT) have been making progress in this area, including by applying their expertise to selected human rights documentation projects. Such advances have not escaped the interest of those seeking to monitor the situation in North Korea, where conventional means of access for the purpose of investigating and recording information about anything the state wishes to keep away from critical eyes, is virtually impossible. While foreign governments and private organisations have already sought to apply remote sensing technologies such as satellite imagery analysis to gather insights about North Korea's nuclear weapons programme, uptake of such technologies in human rights monitoring has been slower to develop, for a number of reasons discussed in this paper.

In order to understand the current scope and potential of remote sensing as a method of documenting human rights violations in North Korea, this paper discusses one project in South Korea that has drawn on this method through the application of a GIS to record and map locations of certain types of abuses. I first examine the state of the field in terms of applying remote sensing technologies to human rights documentation work and address some of the problems that have arisen in the use of such technologies when attempting to engage in new ways of observing and recording information, both generally and in regard to

North Korea specifically. I then discuss the progress of one of the first projects focused on the North Korean context to gather and document human rights abuse locations in a systematic fashion via the use of digital mapping. The paper discusses some of key the methodological considerations integral to the project's design, as well as lessons learned in the project's development thus far. The paper concludes with some reflections on the project's progress in light of the available technological and analytical support, as well as avenues for further research and reflection.

Applying remote sensing technologies in human rights monitoring

The application of Information Technology to human rights monitoring work has grown in the last two decades, due to its promise in offering information on events in real-time, from remote places, and in connecting this information with other sources of information in ways that provide us with new perspectives on events. GIS technologies are "a subset of information technologies and are concerned with data that have an explicit geographic context" (Wolfinbarger, 2016, p. 463). When applied to human rights work, geographical mapping via a Geographic Information System supports and adds to data from narrative testimonies about human rights violations in a number of ways. First, geographical coordinates related to people, places and events provide a visible starting point for targeted investigations into human rights abuse incidents. Second, a GIS makes it possible to view and analyse those coordinates and their relationships to spatial and other variables with relative ease. For instance, a GIS allows adding and removing layers of data by date, associated criminal charges or information about the credibility of the source of the report, in conjunction with spatial aspects like proximity to certain government facilities or types of communities that are the target of state violence. With properly coded data the possibilities for analysis are vast. Third, geographical mapping of sites connected to human rights abuses provides critical information related to patterns that are often not visible in interviewee testimonies, such as patterns around locations of killings and secret burials. Data such as site elevation, relationships to neighbouring sites, proximity to roads and other infrastructure, and natural features in the landscape are all elements of the "spatial thinking" that can help investigators understand behaviours around state-sponsored violence (Congram et al., 2017; Weizman, 2019). Fourth, work to investigate incidents of state violence can involve preservation of certain sites as crimes scenes. Knowing the location of such sites on a map, along with an understanding of the surrounding environment, can increase the likelihood of securing protection for such sites at an early stage before tampering can take place, while also providing information about on-the-ground limitations to investigations ahead of time, such as access and cost (Wolfinbarger, 2016, p. 466).

Major international human rights projects that have sought to employ GIS mapping and that have attracted global attention include the "Crisis in Darfur" project formed in 2006 through a partnership between Google Earth and the United States Holocaust Memorial Museum. These organisations worked together with UN Agencies, the US Department of State and NGOs to combine data from a range of locations and in various formats with high resolution satellite imagery of the ground in the Darfur region of Sudan to locate and capture imagery of the charred remains of villages that had fallen victim to state violence (*United States Holocaust Memorial Museum: Crisis in Darfur*, n.d.). In mid-2007, Amnesty International launched the "Eyes on Darfur" project, which aimed to put the Sudanese Government "on notice" that vulnerable villages under threat of attack and burning in

Darfur were "being watched around the clock" via satellite imagery capable of showing destroyed huts, massing soldiers or fleeing refugees (*Sudan (Darfur)*, 2007). GIS technology has since been used in other places, such as in work to investigate "crimes of international concern" in Northern Uganda by taking qualitative interview data from displaced persons, georeferencing it and transferring it to a geographic database for data storage, organisation and spatial query, display, visualisation and analysis (Madden & Ross, 2009, p. 510) More recently, Amnesty International has sought to map attacks and destruction of Rohingya villages in Myanmar (*Mapping Myanmar's Atrocities Against Rohingya, n.d.*).

The use of GIS technology in this way, or "critical cartography" as some have dubbed it (Madden & Ross, 2009, p. 508), has three primary areas of application potential in the human rights field. The first is in monitoring, which is the primary focus of the work I will discuss in this paper focussed on North Korea. In simple terms, this consists of all that goes into detecting, gathering, recording, storing and analysing data on human rights abuses. This process leads into the second application, which is intervention. Intervention can take different forms, from publishing a report, to launching an advocacy campaign, or at the more action-oriented end of the spectrum, a military or humanitarian intervention that attempts to stop a violation in progress. It must of course be stated that this latter form of intervention can have serious, if not disastrous consequences if the data-gathering and analysis that precedes it is insufficient in one respect or another, and that even the most well-intentioned interventions can have long-term, unforeseen and harmful consequences on the context. The final application of GIS technology – and this is an emerging field with much unknown about its potential as yet – is in prosecutions of those deemed to have perpetrated human rights abuses, given that data gathered with such technologies "often underscore[s] the impunity with which governments and militias can oppress" (Bromley, 2009, p. 161).

There are a number of challenges to applying remote sensing in human rights work. First, a satellite image "cannot document torture; it cannot document widespread and systematic rape… genocidal intent or conspiracy; it cannot distinguish between legal and illegal housing demolitions" (Edwards & Koettl, 2011, p. 70). The use of satellite imagery must therefore be "an adjunct to traditional field work" (Edwards & Koettl, 2011, p. 71). A second challenge is resources: the necessary financial investment in computer infrastructure and high-resolution satellite imagery (which can cost from US$350 to over $2,000 for a single image), and the need for qualified, expert analysts to conduct the research is prohibitive for almost all but the largest human rights organisations. Even large organisations have tended only to adopt such technologies as a result of significant support from an interested tech company willing to supply images or other data and capacity in exchange for corporate social responsibility PR gains (Rothe & Shim, 2018). Although recent years have brought a plethora of high quality, free and open-source tools with which to gather and analyse data, finding in-house or even external competencies to adapt and apply those tools makes it difficult for human rights groups to adopt in-house technologies to improve their effectiveness (Wolfinbarger, 2016, p. 464). The local context also imposes limits on gathering additional data that might be complementary to satellite imagery analysis and this is particularly relevant to North Korea. While crowd-sourcing information in real-time using mobile phones, or capturing high resolution images of burning villages from satellites has drawn worldwide attention to, and allowed intervention in ongoing situations of violence in Africa and the Middle East, the lack of access to the ground in North Korea and the limited ability of outsiders to receive information from people on the inside (not to mention the surveillance efforts of the state) (Jun et al., 2015) make such applications of

remote sensing technologies particularly difficult.

An additional challenge to gathering human rights violation data via remote sensing has to do with methodology, particularly the replicability of results and the ability to corroborate information gathered remotely. Champions of the use of GIS technology have pointed to the power of "irrefutable data and evidence" (Edwards & Koettl, 2011, p. 71) gathered through remote sensing and used in legal settings such as the US federal courts as evidence of the veracity of such methods. Due to the ability to subject such data to peer review and its "acceptance within a relevant scientific community" (AAAS quoted in (Wolfinbarger, 2016, p. 472), "remote sensing can aid in overcoming objections to human rights-related evidence" (Wolfinbarger, 2016, p. 472). However, where human rights organisations are gathering and analysing information, mistakes can be made when non-experts are involved. In addition, connecting analysis with an often urgent advocacy agenda "can lead an analyst to discount countervailing possibilities for interpretation or, for example, to over or undercount a phenomenon" (Wolfinbarger, 2016, p. 474). Analytical errors can have serious consequences, as evidenced by the 2003 speech made by then US Secretary of State, Colin Powell, to the United Nations, where he referenced a satellite image that had been misinterpreted to indicate the presence of weapons of mass destruction (WMDs) in Iraq. This lead to the "pre-emptive" strikes and war that followed, and as the world now knows, no WMDs (Wolfinbarger, 2016, p. 474). Specialists thus note the primacy of ensuring that analysis of remote sensing data be documented thoroughly and in such a way as to allow replication and verification of results. In the case of using GIS technology, this means ensuring location coordinates, identification numbers for photographs and records of interviews, alongside the practice of employing expert peer review in the reporting process undertaken by human rights organisations (Wolfinbarger, 2016, p. 474). Research on new technologies in global human rights monitoring also cites benefits to be had from engaging in cooperative information-gathering between organisations, to reduce duplication of findings while at the same time increasing the capacity to collect more, better-quality data overall (Alston & Gilespie, 2012). The abovementioned challenges are pertinent to the ability of North Korean human rights monitoring organisations to make use of remote sensing; however, as will be discussed in the section that follows, there is precedent in remote sensing work on North Korea that has laid some important groundwork useful for informing research and practice.

Looking at North Korea from the sky

Given the rising interest in North Korea as a country of both interest and concern over the last two decades, satellite imagery has become a tool for a number of individuals and organisations to watch North Korea. Applications have included monitoring of nuclear sites (Centre for Strategic and International Studies, Middlebury Institute of International Studies at Monterey), monitoring of national infrastructure development more generally (NK News), mapping detention centers and prisons and recording locations of human rights abuses (The Committee for Human Rights in North Korea (HRNK), the Database Center for North Korean Human Rights (NKDB) Digital Atlas, the Transitional Justice Working Group), and academic research using, for example, evidence of light to measure economic activity in North Korea (Ernst & Jurowetzki, 2016). Daily NK, an arm of the Unification Media Group (UMG), often attaches satellite imagery to its news coverage of events inside North Korea as a means of illustrating stories that would otherwise go without visual elements. Between these groups there are differences in the level of analysis of the imagery in use. In the case of presenting the locations of

human rights abuses or other events, the imagery may have been exposed to no expert analysis at all, rather, in the absence of other illustrative imagery, satellite photographs are used in order to show the geographical coordinates connected to a witness testimony or news report. In other instances, some imagery analysis is conducted, such as via HRNK's partnership with expertise from AllSource Analysis, Inc. to examine imagery of detention centres or military training areas (Scarlatoiu and Bermudez Jr., 2015).

While this "democratisation of imagery intelligence" should be considered a positive thing, to the extent that it weakens the monopoly of large, well-resourced intelligence agencies over certain forms of knowledge (Pollack, 2018), the smaller organisations now attempting to compete with intelligence agencies cannot, as one WMD specialist has argued, "remotely approach them in breadth or depth, and the think tanks still have only a handful of appropriately skilled personnel with the right forms of specialised knowledge" (Pollack, 2018). In addition to the difficulty of securing the appropriate expertise for analysis is the question of how to communicate information gleaned from this form of analysis to the public, as this is where observations can facilitate political action and, therefore, where errors in analysis and reporting can have the most serious consequences. This is particularly true in relation to North Korea – a country that is routinely painted as an unpredictable, dangerous pariah in the international system (Smith, 2000). As Pollack rightly notes,

> Where should a new discovery, an update on something older, appear? What context should it be placed in? What uncertainties should be highlighted? What overall significance should be ascribed to the findings? (Pollack, 2018).

Pollack raised such questions in the aftermath of an article published by the New York Times, based on a report by well-regarded North Korea specialists at the Centre for Strategic and International Studies (CSIS) in Washington DC. The headline stated, "In North Korea, Missile Bases Suggest a Great Deception" (Sanger & Broad, 2018), implying the activities at these sites were previously unknown. However, the scud missile bases that were the focus of the article were not newly discovered but had been known about for some time. Both South Korea's Presidential Blue House and the US White House issued public rebukes over the article. The potential of misleading reports such as these to lead to a serious escalation in tensions between states goes without saying; however, Pollack argues that the work of independent analysts and think tanks, as long as it goes correctly reported, provides an important "independent check on official claims" about, for example, a foreign WMD programme (Pollack, 2018).

Yet there is an additional layer of critique around the use of satellite imagery in looking at North Korea (and other places too), which sees the work as far from impartial. Research by Shim and others in the field of international relations seeks to challenge the use of satellite imagery by pointing to the fact that such data always comes from somewhere, and in the case of North Korea, this is most often from US-government or US-based, privately-owned satellites (Rothe & Shim, 2018; Shim, 2014; Shim & Nabers, 2011). The potential problems with this reality arose in regard to North Korea in the early 1990s, when the International Agency for Atomic Energy (IAEA) used US intelligence imaging to demand an investigation into North Korea's suspected non-compliance with the Nuclear Non-Proliferation Treaty (NPT). At that time, the then Director of the IAEA, Hans Blix, defended the use of the imagery by saying, "I think it is more important for the DPRK to explain what is shown on those pictures than it is to discuss whether they should be shown or not" (quoted in Shim, 2014, p. 92). However, as Shim argues, the political actions that flow from such applications of imagery are "not only dependent on what they (see),

but, more precisely, on what they (are) *allowed* to see", reliant as they are on the visual perspectives of an external actor – the United States government, in this case (Shim, 2014, p. 92).

While advocates of the uses of such technologies to do good highlight the success of certain interventions resulting from the use of remote sensing technologies, most often these successes have only been possible because expert organisations or companies took an interest in the issue and decided to supply high resolution photographs or expert analysis. For smaller organisations working on issues that are less politically expedient, the task is much more challenging. The work that is done by smaller groups on North Korea, however, cannot claim to be free from potential criticism for its reliance on even grainy imagery that comes from Google or Digital Globe. A fuller engagement with this debate on the utlisation of data provided by political actors in the present geopolitical environment will be the subject of a future paper. For the purpose of this preliminary discussion of remote sensing and human rights documentation focused on North Korea, I seek to acknowledge the above concerns to the extent that they should be held in the minds of anyone seeking to access and apply remote sensing data to a context such as North Korea, where it is often impossible to verify suspicions, and there are certainly powerful political interests involved in supporting efforts resulting in information that can be used to vilify the North Korean regime and justify policies aimed at containment and reducing the perceived threat posed by the regime to international security. Yet I also argue that there is merit in exploring remote sensing tools that may contribute new forms of data alongside the witness testimonies most commonly gathered and deployed in documentation work on North Korean human rights issues. I suggest that more ways of gathering and analysing data should be encouraged, and that this is the case regardless of whether new information corroborates *or undermines* existing assumptions about the scale and nature of human rights abuses based on existing data. In addition to this, there are important, yet often overlooked, grassroots-level reasons to conduct such research. Using new tools provides the ability to create a more comprehensive historical record that, however and whenever a political transition unfolds in North Korea, could be a valuable tool to helping resolve some of the many personal losses experienced by the North Korean people through, for example, the enhanced possibility of locating and identifying those disappeared and/or killed by the state and finding out what happened to them.

Mapping human rights abuses in North Korea

The project (the "Mapping Project") discussed in the remainder of this paper arose out of a desire to harness the above technologies being applied to the documentation of human rights abuses in a number of contexts globally, but which were relatively novel in the context of human rights work on North Korea. It acknowledges the continuing importance of the individual testimony, but seeks to position that testimony as part of a larger body of testimonies and other data that is analysed in aggregate, looking for patterns that may emerge not just in terms of the types and forms of events and incidents, but also in terms of relevant spatial, temporal and geographical features – both natural and human-made. The focus of the research is on three types of sites related to human rights violations in North Korea: 1. state-organised killing sites; 2. sites where the dead are disposed of by the regime; and 3. locations which may house documents or other forms of evidence related to these events. The project combines interviews with GIS technology to map these locations in the landscape, and to link those locations with a range of spatial and other information gathered in the interviews. In year three of the project, the researchers also

began recording sites of deaths that were not explicitly sanctioned killings or executions, but which resulted from torture, starvation or illness in state-run facilities, or as a direct result of state mandates.

The project intends to generate data that may be used to serve a variety of institutions and objectives in the future, while supporting current advocacy efforts on the problem of North Korean human rights violations. Its future-oriented objectives include locating sites where victims of the regime have been killed or died and been buried by the state to help piece together past events, to identify perpetrators and victims, and to provide families and communities with knowledge about those who have been killed or disappeared by the state. Future examinations of state-led killing and body disposal sites will likely be an important part of North Korea's transition from authoritarianism, if or when a new government may seek to launch investigations into violations of international criminal law, international human rights law and international humanitarian law. Finding and often exhuming the remains of victims of state violence are core aspects of the "right to know" (Petrig, 2009). It is also the legal responsibility of states to resolve cases of missing persons.[1]

Yet the significance of locating the dead and missing is not limited to criminal procedures and formal record-creation. As post-conflict/post-authoritarian exhumation work done in many settings globally has found, exhumations are powerful interventions (Pereira, 2019). The experiences of people in contexts as diverse as Afghanistan, the former Yugoslavia, Spain and Guatemala suggest that such work is a central part of the recovery of communities from the trauma and suffering caused by killings and disappearances (Marx & Goward, 2013, pp. 104–105; Rothenberg, 2012). The scholarship on remembered landscapes, geographies of violence and the socio-psychological impact of the physical presence of killing and mass grave sites is particularly relevant here, as it attempts to theorise the "spatial manifestations of trauma and memory" (Colombo & Schindel, 2014, p. 2). For example, the way spaces such as school grounds, stadiums and marketplaces in North Korea may have been reconfigured by the violence of public executions may demand attention at a time when the threat of such violence no longer hangs over local communities. Exhumations of sites where victims of state violence have been buried may also be prioritised if such sites become the location of future economic and infrastructural development in North Korea – lessons from Lebanon's struggle to locate mass graves in the midst of postwar urban development are poignant here (Waddell, 2018). Finally, and as has already been in evidence, for advocacy and awareness-raising, geospatial mapping provides a visual element to testimonies which are usually unaccompanied by images due to the closed nature of North Korea. In today's visually-oriented media environment, this can increase the exposure of the accompanying narratives. These are all aspects and consequences of geospatial mapping focused on sites of killings and burials that deserve deeper discussion; and will be the subject of future papers on this topic.

There were and continue to be a number of limitations to this project. The most obvious is the fact that researchers do not have direct access to the country and cannot visit sites they have been told about or easily find other potential witnesses from a given area to assist with corroboration. In addition, the focus of the project on location-based documentation (mapping) is designed to complement – not replace – existing human rights documentation initiatives,[2]

1 International humanitarian law outlines the obligations to search for the dead victims of conflict or other violent situations, to maintain their dignity, identify and return remains to families, note the location of gravesites, and facilitate access to victims and gravesites (Guyomarc'h & Congram, 2017, pp. 335–345).
2 These include the South Korean government's Center for North Korean Human Rights Records, the Database Center for North Korean Human Rights (NKDB), the UN Human Rights Office (Seoul) and the Korea Institute for National Unification (KINU).

while providing credible methods of mapping the locations of infrastructure, events and evidentiary leads mentioned in interviewee testimonies. The research does not evaluate the criminal, civil, administrative or legislative remedies which might apply to specific sites and the events which are believed to have occurred there. Nor does it attempt to predict when or how a political transition may occur in North Korea, of the kind that would allow on-the-ground investigations. However, in the interests of preparedness, the data is intended to create a repository of information to support future, post-transition activities focused on the many potential forms of redress for what has gone on in North Korea for many decades.

Methodological considerations

Organisations collecting data through interviews with North Korean escapees face a number of challenges in sampling the escapee population, in addition to limits on resources and the institutional environment (*Broadly Accepted Practices Regarding the Use of Geospatial Technologies for Human Rights, 2016; Promoting Accountability in the Democratic People's Republic of Korea, 2019*). The research process for the mapping project involves sourcing interviewees by referral from the North Korean escapee community in South Korea (a snowball, or convenience sample). Methodologically, working with a community of escapees, as opposed to being able to access the resident population in North Korea directly, raises important issues of representation and this is very evident in the findings. Over 75 percent of North Koreans settled in South Korea are from two northern provinces, Ryanggang and North Hamgyeong, which account for only 12 percent of the North Korean population (Song & Denney, 2019, p. 453). Additionally, the proportion of female escapees in the South is 72 percent at present, creating some limitations to the scope and types of data that can be gathered (*Policy on North Korean Defectors, 2019*).[3] There are also challenges to getting access to North Korean escapees by means other than referral from existing contacts, as the government restricts access to newly arrived escapees to only a few organisations until they are released from the secure settlement center (*Hanawon*).[4] While any research conducted within the escapee community must come with the important caveat that findings cannot be considered representative of the experiences and opinions North Korean population as a whole (Kretchun & Kim, 2012, p. 7), the long-running and varied work done by many organisations with this community has established both survey and interview work as valid tools of inquiry into the experiences and views of the North Korean escapee population (Han, 2018; Kim, 2017). Moreover, Song and Denney note that "empowering the voices of those who, because of their former positions in the DPRK, can speak with some authority is just and warranted" (Song & Denney, 2019, 453).

Data collection for the Mapping Project to date has not been targeted at investigation of any specific event, location or time period. Information is recorded on the three site types regardless of the time, date or place in the DPRK, in order to see where patterns may begin to emerge through the clustering of geographical points, providing direction for targeted, investigative interviews later in the research process. Participants are shown satellite images from Google Earth with only basic information to help orient them, such as town and city names and railway stations.[5]

3 The Mapping Project's interviewees consist of around 8 percent more women than the North Korean escapee population in South Korea.

4 In order to secure research participation, organisations very often pay a financial reward of between US$30 and $300 to interviewees, designed to compensate for the cost of travel and the inconvenience of perhaps having to miss work shifts (Song & Denney, 2019, p. 453). For this research, interviewees were paid around US$45 for their time.

5 This information comes from pre-existing, publicly available base maps created by Curtis Melvin: North Korea Uncovered, Version 18, June 25, 2009, http://www.nkeconwatch.com/north-korea-uncovered-google-earth/; OpenStreetMap, https://www.openstreetmap.org/#map=14/41.4089/128.1953; The 38 North DPRK Digital Atlas, http://38northdigitalatlas.org/; and an online map produced by South Korea's National Geographic Information Institute, http://map.ngii.go.kr/ms/map/NlipMap.do.

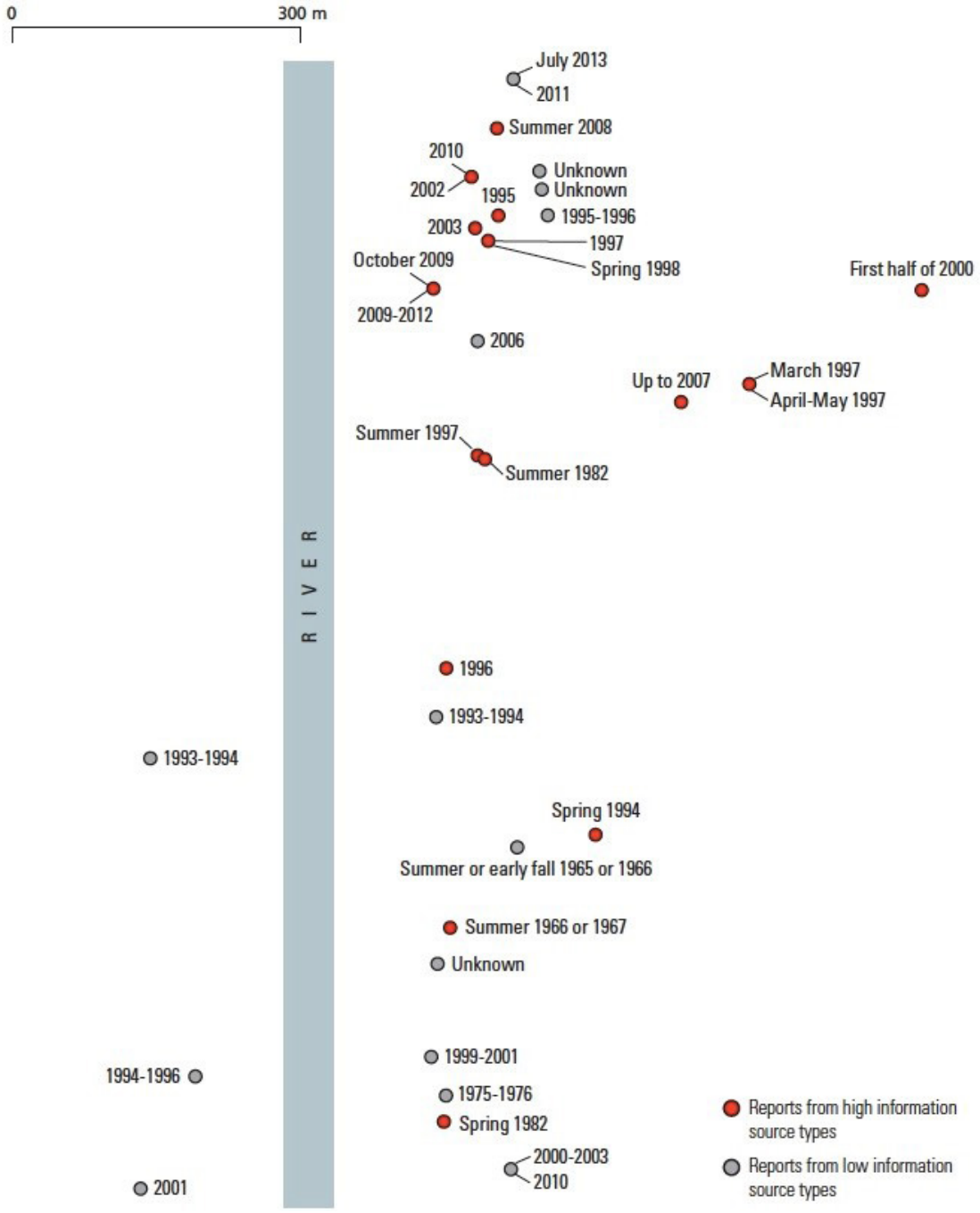
Beginning with an area where they have either resided or with which they are very familiar, the researcher asks a range of questions about the specific types of sites and events the project seeks to identify. Interviewees are asked to point out the locations of the events they describe on the satellite imagery, without being led by the researcher. If they cannot pinpoint a location, no geographical coordinates are recorded, although descriptive details of the location will be kept for future analysis and further interviews. Details of the location and the incidents or events believed to have occurred there are recorded systematically in a database with a large number of fields to separate key searchable pieces of data out, along with narrative comments and an indication of the reliability of the information, as far as can be estimated at the time of interview.

What has been found?

Thus far, the research has gathered a relatively large number of reports on locations of state-sponsored killings, and a smaller number of reports of burial sites of victims of such killings. This is unsurprising, given that state-sponsored killings (primarily public executions) are often conducted in front of an audience, while burials take place in secret in order to prevent relatives or friends of those killed from accessing the dead in order to, for example, practice customary burial traditions (Transitional Justice Working Group, 2019). All site figures published in project reports thus far reflect the number of reports recorded from research participants and are not de-duplicated or consolidated at this time. De-duplicating reports of events requires site-by-site analysis of both the location data and the recorded narratives. For example, many of the sites recorded have been used for a large number of public executions spanning decades, making it possible that more than one interviewee local to the area has reported the same event to the researchers. In addition, memories of executions can be old or confused with other events, resulting in insufficient specificity in the testimony to match them with other testimonies to determine whether multiple informants are referring to the same event and location. However, while de-duplication is not possible at this stage (and can never be definitive without direct access to North Korea), sometimes certain stories overlap in ways which suggest a high likelihood that multiple participants are referring to the same event. Looking at the specific locations on the maps provides another dimension which can help clarify suspicions or suggest where further research is needed. This provides helpful leads for targeted investigations, either within the organisation's own research, between organisations sharing data, or in the case of future fact-finding efforts.

The data can be visualised in various ways to attempt to define patterns in events over time. Map 1 shows a recorded public execution site beside a river in a regional city where the researchers recorded 35 reports of public executions that were claimed to have taken place in every decade since the 1960s. These reported executions included six hangings, all before the mid-2000s, and the remainder were executions by firing squad. The location is open and easy for members of the public to access on foot from a nearby market, while also being an short drive from a local prison. These are all useful pieces of information that can be compared to future witness testimonies to assess accuracy and assist with de-duplication of reports as the body of data grows. The image shows how it is possible to map the source types (marked "high" or "low" according to the perceived reliability of the information at the time of interview), dates and proximity of reports to each other. Although not shown here, layers showing the method of killing and proximity to buildings can also be added or removed.

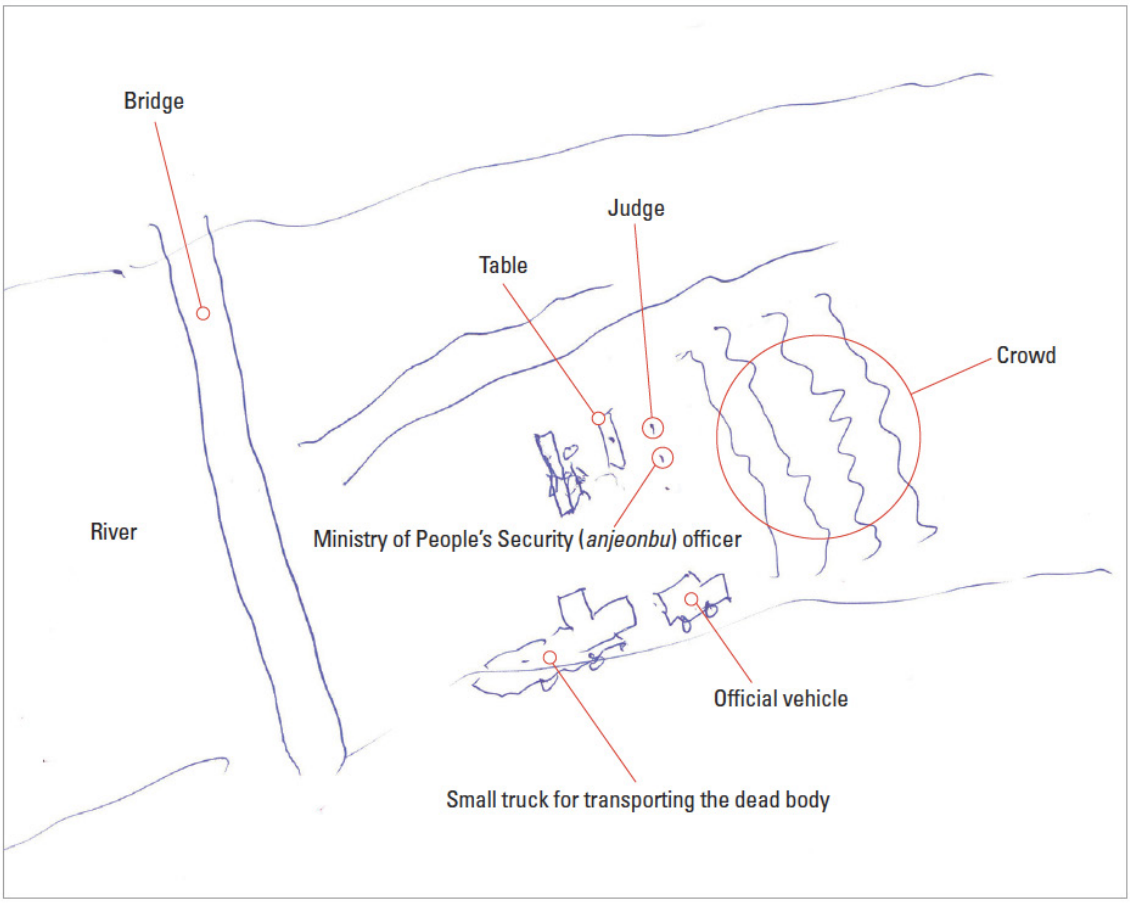
Map 1
Riverbank public execution site reports (Transitional Justice Working Group, 2019)



Another way matching satellite imagery with witness testimonies can prove useful is by asking interviewees to hand sketch the locations of public executions they have witnessed, *before* asking them to view and locate the site on the imagery. The sketch in Image 1 shows a riverbank where an interviewee reported seeing six public executions over a period of five years in the late 1970s and early 1980s. The sketch shows the layout of the scene as it typically occurred in each of these instances. According to the interviewee, all those executed were miners charged with murder. There is a table shown in the centre, which was typically where one Ministry of People's Security officer and one judge sat during a short trial. A crowd of 100-400 people typically stood behind. The interviewee recalled two vehicles usually being present: one regular official vehicle and a small truck for transporting the dead. The sketch was drawn before the interviewee was shown the satellite imagery; however, when compared with the photographs, the sketch matches the layout of the area with a high degree of accuracy, including the position and angles of the railway bridge and river. Nearby a mine can be clearly seen on the satellite photo, which supported the interviewee's claim about the executed individuals being workers from the mine.[6]

Image 1

Sketch of a public execution site on a riverbank (Transitional Justice Working Group, 2019)



6 It is not possible to include the actual satellite imagery here due to a need to avoid the possibility of it being tampered with by the North Korean state if it is concerned about outsiders knowing the location.

Regarding burial sites of victims of state-sponsored killings, finding overlaps in testimonies that might point to individuals referring to the same event is much more difficult. Cases where the researchers have elicited multiple accounts about a single site are few, and those that do exist in the data have come with discrepancies at times. However, certain patterns have emerged in accounts of burial sites located, for example, within the grounds of political prison camps, which describe common methods of burial or cremation at a single location, sometimes over many years. Other testimonies provide helpful information about burial sites within a short drive of a commonly-used public execution ground, barely off a main road, concurrent with the hypothesis that both fuel shortages and North Korea's mountainous terrain may mean that body disposal sites are rarely far from the location of killings. There is much more work to be done in gathering data on the different site types, and in the coming years the project hopes to introduce new lines of inquiry to build on the existing data.

Conclusion: Future Directions

Despite being five years in, this project is currently only in its infancy in terms of exploring its full potential for the data to be subject to more sophisticated analysis. The team has a range of avenues they hope to explore with the support of the requisite expertise in the fields of information technology, data science, international law and geography. It is hoped that in the future, following a transition in North Korea of the kind that would make it possible to investigate these sites, GIS work done now holds strong potential to complement work investigating violations of international human rights and humanitarian law, as well as to locate the missing who are known or believed to have been victims of state-sponsored killings.

Of course, witness testimonies remain vital in the process of investigating burial sites. In addition to actual witnesses of "last seen" locations of the missing and dead, local knowledge about language, culture and institutional practices that might be related to these sites and events is crucial to painting a comprehensive picture of what happened, where, why and how (Congram et al., 2017, p. 262). Yet experts working with GIS in human rights, and particularly those mapping locations of killings and burials, do encourage human rights documentation groups to "think spatially… and consider how people understand and use space with respect to the treatment of bodies" (Congram et al., 2017, p. 262). This demands making adjustments to traditional interview questionnaires to consider spatial factors such as distance, elevation, relevant natural and man-made landmarks, as well as sounds or smells which may provide clues as to the environment surrounding a site of concern. Instead of relying exclusively on witness testimony, more advanced methods can then examine common patterns or characteristics of the known locations of events and incidents (Congram et al., 2017, p. 262). As the project progresses, it is the intention to advance the application of GIS methods such as by digitising related site information to enable the researchers to conduct new forms of analysis of spatial relationships and to compare site information between open source digital maps created by different researchers globally. There is also merit in considering pooling information between organisations – no small task in an organisational environment which can be fairly territorial – as research has found that doing so offers considerable potential to remove unnecessary duplication of research, to provide confirmation of findings and strengthen the robustness of results (Alston & Gilespie, 2012).

It goes without question that any party using satellite imagery or interview testimony to report on events and developments in North Korea should exercise extreme caution for the reasons discussed in this paper. However, it is argued that this should not preclude efforts today to document and record information on human rights abuses, to the extent that it might move us closer to an accurate picture of events for use as and when the opportunity may come to develop modes of redress.

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