doi:10.1111/disa.12477

Attracting altruists: explaining volunteer turnout during natural hazard events in Japan

Akiko Iizuka Assistant Professor, Center for International Exchange, Utsunomiya University, Japan, and **Daniel P. Aldrich** Professor of Political Science, Public Policy and Urban Affairs, and Director, Security and Resilience Studies Program, Northeastern University, United States

Volunteers play a crucial role in post-disaster situations, providing resources, emotional support, and labour when local and national government capacity may be diminished. The number of volunteers who assist can range from dozens to more than one million. Yet, little is known about the broader conditions that result in more (or fewer) of them heading to disaster sites. Using a new dataset of 57 disasters in Japan between 1995 and 2019, this study analyses the factors influencing volunteer turnout. Controlling for a number of aspects, three are found to correlate most strongly: the number of dead and missing; the size of the population affected by the shock; and the time period of the year. Moving beyond tables of regression coefficients, simulations and graphics are used to illustrate the relationship between key variables of interest as well as uncertainty about the predictions. The study's findings—robust across multiple model types—have important policy and practical implications.

Keywords: disasters, Japan, natural hazards, quantitative analysis, volunteers

Introduction

Volunteers have long been a part of the disaster landscape in North America: records show that thousands of people rushed to help after the Halifax Explosion in Nova Scotia, Canada, on 6 December 1917. In Japan, by contrast, the concept of voluntarism has evolved rapidly in recent decades (Suzuki, Suga, and Atsumi, 2003). The recorded number of volunteers doubled between 1987 and 2016 in that country (SBJ, 2017). While Japanese volunteers responded to the Kanto earthquake in 1923 (Aldrich, 2012), academic research on volunteerism in Japan has expanded fastest since the 1990s. The founding of the Japan NPO Research Association (JANPORA) in 1999, the first academic society for the study of volunteerism, marked a new era in the field (Okada et al., 2017).

One of the important catalysts was the Kobe earthquake of 1995, which ushered in what observers called the 'first year of volunteering'. After that major disaster, which killed more than 6,000 people in a principal metropolitan centre, approximately one million people came to the disaster site within two months from across Japan to assist. Numerous residents saw these disaster relief activities on national media broadcasts and changed how they envisioned volunteerism. Many Japanese citizens

had assumed that the government and local communities would be able to handle natural hazards and their accompanying challenges, but the scope of the Kobe earthquake revealed the importance of outsiders' labour, financial support, and other inputs. Following the disaster, public recognition of the contributions of volunteers as new and alternative ways of problem- solving increased. In fact, the Government of Japan amended the Disaster Countermeasures Basic Act, first in 1995 and again in 2013, to emphasise the important role of volunteers and collaboration between the public sector and civil society.

Volunteers around the world continue to play a crucial part in significant post-disaster situations, providing resources, emotional support, and labour at a time when local responders are often overwhelmed. The American Red Cross mobilised more than one million volunteers for response and recovery in the wake of Hurricanes Katrina, Rita, and Wilma in 2005 (American Red Cross, 2007). After the Tohoku earthquake and tsunami in Japan on 11 March 2011, more than 1.5 million volunteers came to the affected region via disaster volunteer centres set up in affected municipalities (JNCSW, 2018; Aldrich, 2019).

Our data on Japan show that some four million volunteers in total responded to 57 disasters (see Table A1 in the Appendix) over the course of 25 years (1995–2019). Some large-scale shocks, such as the Kobe earthquake in 1995 and the 'triple disasters' (earthquake, tsunami, and nuclear accident) in March 2011, attracted more than one million volunteers each within a year of the incidents. Interestingly, more than 10,000 volunteers still showed up for smaller-scale disasters in spite of fewer casualties and less media coverage, such as the torrential flooding caused by rain in Kochi in 2001 and in Niigata and Fukushima in 2011. In this paper, we seek to understand the factors that influence volunteer turnout, which has varied tremendously from dozens after some disasters to more than one million. Controlling for a number of factors, including damage, media coverage, regional variation, and population size, we identified three variables that correlate most strongly with turnout: the number of dead and missing; the size of the affected population; and the time when the disaster occurs.

This paper adds to the literature in several ways. First, it is among the first English-language publications to study spontaneous disaster volunteer turnout in Japan using quantitative data and multivariate analysis—see Alexander (2010) for an overview of the types of volunteers. Many books on disaster volunteers serve as how-to manuals for would-be Japanese volunteers and communities because many have not had experience in the field (Suga, Yamashita, and Atsumi, 2008; Murai, 2011; PBVC, 2017; Yamamoto, 2018). Nakahara (2011), for example, introduces the 'Ishinomaki Model' as a good platform for gathering and managing disaster volunteers. When other academic projects have looked at volunteers, they have typically used ethnographic and qualitative methods (Nakano, 2000; McMorran, 2017), often focusing on the relationship between the state and volunteerism (Rausch, 2009; Ogawa, 2012). Much of the English literature examines the dynamism of Japan's civil society and its non-governmental organisations (NGOs), which utilise broader concepts of voluntarism than disaster relief activities (Hirata, 2002; Schwartz and Pharr, 2003;

Shaw and Goda, 2004; Pekkanen, 2006; Ogawa, 2009; Kim, 2010; Atsumi and Goltz, 2014; Okada et al., 2017; Iizuka, 2018). These scholars emphasise the structure of civil society rather than the spontaneous goodwill shown by ordinary citizens or groups (Pekkanen, 2003, 2006; Kim, 2010).

Second, those scholars using quantitative data on volunteerism in Japan have done so descriptively, mapping trends over time (Yamashita and Suga, 2002; Suzuki, Suga, and Atsumi, 2003; Nishiyama, 2005; Yanagida et al., 2006; Hasegawa, Shinohara, and Broadbent, 2007; Nakahara, 2011; Suga, 2011; Honma, 2014). Atsumi (2007) summarised current trends in disaster volunteering from the Kobe earthquake of 1995 to the Chūetsu earthquakes of 2004. Sakurai (2013b) examined volunteers and non-profit organisations (NPOs) in the 'triple disasters' in Japan in March 2011 and compared that situation with the Kobe earthquake. We build on their work to analyse factors that explain some of the variation in the number of volunteers following shocks and crises.

Third, our *sui generis* dataset will be shared publicly so that other scholars can replicate and broaden the information. Based on the philosophy of transparency and the need for replication across all social science disciplines, we hope that our dataset will allow other scholars to validate, disconfirm, and extend our findings to other disasters in Japan and abroad (King, 1995). By putting our data in the public domain, we are seeking to help expand the knowledge base and provide a starting point for other researchers.

Theory and literature

Volunteering involves individuals or groups providing services—time, effort, and technical services included—for no financial purpose, only to 'benefit another person, group, or organizations' (Wilson, 2000, p. 215). These services may be offered only a single time or over an extended period. According to the *Survey of Time Use and Leisure Activities*, 26 per cent of the Japanese population engaged in some type of volunteer activity at least once during 2016 (SBJ, 2017).

A large body of literature deals with volunteerism in general and its drivers at the individual level, concentrating on education attainment, employment status, household size, social capital, and religiosity (Jackson et al., 1995; Wilson and Musick, 1997; Wilson, 2000; Rossi, 2001). Taniguchi (2010), for instance, found that social capital factors were stronger predictors of the number of volunteered hours in Japan than demographic and socioeconomic factors. We focus specifically on volunteering in disasters, and Table 1 presents some of the cases in point.

Other scholars have looked beyond individual-level factors when analysing volunteerism during crises. Tierney and Goltz (1997, p. 3) state that participation is determined by several variables, including 'the severity of the disaster; the tremendous evidence of need among the victim population; intense media reporting; and the fact that the earthquake occurred during a break between academic terms, so that students were freer to travel to the impact area'. Twigg and Mosel (2017, p. 445)

Table 1. Types of volunteer activities during Japanese disasters

At individual houses	At locations such as emergency shelters and temporary housing
• Clearing debris and dust from affected built structures such as houses, yards, garages, farms, drains, and roads. • Cleaning the interior of the house.	• Collecting and sorting relief supplies. • Assisting in the management of emergency shelters and temporary housing. • Running a small cafe where people can chat and organise a footbath, for instance.
• Listening to and ascertaining the needs of affected people and looking for solutions. • Delivering foods and necessities. • Shopping, babysitting, playing with children, and helping the elderly. • Taking care of pets. • Providing information. • Organising events and seminars related to disaster recovery. • Coordinating with other actors and introducing officers or experts.	

Source: authors.

point to 'individual case studies predominant in the literature' and underscore that more generalisable literature is needed to understand the broader context for volunteers. Recognising the diversified types of volunteering and the possibility that disaster volunteering may be driven by characteristics of the event along with the environment in which it occurs, we spotlight the factors related to the shock and to the pool of available volunteers.

This study is motivated by the scarcity of empirical and generalisable literature on disaster volunteers in Japan. Little is known about the broader conditions, geographical, environmental, and social, inter alia, that result in more or fewer volunteers heading to disaster sites. This study goes beyond focusing on just one case study, covering 57 recent disasters in Japan and the factors influencing volunteer turnout. Below we detail some of those that may have a bearing on the number of volunteers and which are captured in our dataset.

Damage due to disasters

If a disaster causes more damage, more volunteers might come to assist victims because more people are in need. Much literature deals with the concept of altruism as a motivation of volunteers to work for people to whom they are weakly connected (Wilson and Musick, 1997; Wilson, 2000; Bekkers and Wiepking, 2011; Einolf, 2017; Phillips, 2020). Disaster volunteers 'face the destruction and discern places, tasks, and people in need' (Phillips, 2020, p. 1) and 'feel a compelling need to do something' (Lowe and Fothergill, 2003, p. 300). One study found that many who assist during crises are first-time volunteers and the reason for volunteering is a desire to help the community (Barraket et al., 2013). This study uses damage caused by the relevant crisis as a way of encapsulating the severity of a disaster and the 'evidence of need among the victim population' in affected areas (Tierney and Goltz, 1997).

Time period of disasters

If a disaster happens during a national holiday or right before a period of time off, more volunteers might come because potential participants can do so without halting their everyday activities, such as study or work. This factor is probably closely related to the demographic characteristics of the volunteers. After the Kobe earthquake in 1995, for example, between 40 and 60 per cent of volunteers were students, as the disaster occurred right before a university break (Suzuki, Suga, and Atsumi, 2003). Compared to general volunteers, disaster volunteers in the United States are typically younger (Rotolo and Berg, 2011); many who responded after Hurricane Katrina in 2005 were social work students who earned academic credit (Plummer et al., 2008). In the year after the March 2011 triple disasters in Japan, the number of volunteers entering the local community of Minamisanriku-cho was highest in September, followed by August and October (Honma, 2014), months when students are usually on leave. Another key demographic of disaster volunteers is retirees who may have free time throughout the year (Phillips, 2020).

Media coverage

The media may play a critical role in influencing volunteers because their 'coverage provides images of compelling needs people feel they can meet' (Phillips, 2020, p. 71). Volunteers may take action when viewing the intense reporting right after a disaster (Tierney and Goltz, 1997; Suzuki, Suga, and Atsumi, 2003; Coppola, 2015). It may be that when media coverage is greater, volunteers turn out in larger numbers.

Region of disasters

Volunteers may come from neighbouring areas or from further away. If a disaster occurs in the Tokyo metropolitan area, more volunteers may arrive because the capital is home to nearly 30 per cent of Japan's population. After the Kobe earthquake, more than 60 per cent of volunteers came from nearby Hyogo Prefecture (Suzuki, Suga, and Atsumi, 2003), which includes Osaka, the second largest city in the country. However, following the triple disasters in the relatively remote area of Tohoku, far fewer volunteers went to the affected areas (Sakurai, 2013b). While the paucity of volunteers may be partially explained by the radiological contamination owing to the meltdowns at the Fukushima Daiichi Nuclear Power Plant, another major reason could be the distance to Osaka and Tokyo (Watanabe, 2011).

Types of disasters

We theorise that certain disaster types may influence the turnout of volunteers for several reasons. To investigate the matter, we begin by categorising each disaster according to the following types: strong wind and/or heavy rain (typically from hurricanes and typhoons); earthquake and/or tsunami; volcanic eruption; fire; and others (including oil spills and tornadoes). It may be that certain kinds of disasters

(such as earthquakes, tsunamis, typhoons, and volcanoes) dampen the number of volunteers because they damage the transportation and logistical infrastructure necessary to bring people to the area. Alternatively, some types of disasters (such as earthquakes and typhoons) may create broader levels of sympathy and a feeling of altruism because of their ubiquity. Next, we code all of our disasters and remain openminded about their impact on disaster volunteer outcomes.

Data

This study, using a new dataset of 57 Japanese disasters between 1995 and 2019, analyses the factors that drove volunteer turnout. Data collection starts with the Kobe earthquake because many observers consider 1995 to be the 'first year' of volunteering in Japan and because data on disaster volunteers before then were limited.

The number of volunteers

Our dependent variable of interest is the total number of volunteers per disaster. After a crisis, entities such as civil society organisations (CSOs), NPOs, private companies, and universities collect volunteers and dispatch them to affected places. Owing to inconsistency in data gathering by various news and volunteer organisations, we recognise that it is impossible to identify exact numbers through newspaper articles or local media coverage over the period. We rely instead on the number of volunteers captured by the Japan National Council of Social Welfare (JNCSW), Disaster Volunteer Centres set up by the Councils of Social Welfare (CSW) in the affected municipalities, and the affected municipalities themselves.

The CSWs provide welfare services to the local population in ordinary times and their activities are defined by the Social Welfare Act. In the event of a major disaster, the CSWs set up Disaster Volunteer Centres in affected municipalities to ascertain the needs of the people and to receive volunteers. The coordinating capacity of the CSW in the affected area is crucial, therefore, because the Councils make decisions about accepting volunteers (from where and for how long). During the triple disasters in March 2011, for instance, the CSWs set up 168 Disaster Volunteer Centres in the affected municipalities of Fukushima, Iwate, and Miyagi Prefectures. Eighty-four of them, accounting for 50 per cent, were established within six days of the disaster and more than half of them continued to operate for more than six months (JNCSW, 2013).

This paper considers four main types of independent variables: damage (human casualties, damage to housing, the affected population, and the impacted areas); time period; media coverage; and region.

Damage due to disasters

The number of volunteers may be influenced by direct damage, which is measured using human casualties and housing damage. Human casualties include the number

of dead and missing along with those with major and minor injuries, whereas housing damage includes the number of fully and partially destroyed houses and houses facing flooding at the ground level. The data on damage in each disaster come from the Fire and Disaster Management Agency (FDMA) of the Ministry of Internal Affairs and Communications in Japan.

In addition to direct damage caused by the disaster, the affected population and the areas should be taken into account. If a disaster causes more of the population to be affected, more volunteers might come because more people and/or larger areas are in need. This information is derived from the National Census at the municipality level. Japan's National Census (E-Stat) details the area of municipalities every year on 10 October and the population every five years, so this study uses the population and area data in the existing year or in the year prior to each event. The application of the Disaster Relief Act is based on the criteria set by the legislation. The affected population and the areas depend significantly on each disaster; for example, more than 300 municipalities were covered under the Act during typhoon No. 19 in 2019, and one municipality was covered during the tornado in Saromacho in 2006, the high tide in Toyama-wan in 2008, and the torrential rain in Kagoshima in 2011.

A corollary to the size of the affected population is the impact that it has on networks of potential volunteers through citizen recruitment (*cf.* Schlozman, Verba, and Brady, 1998). Research on social networks and on voluntarism has argued that social networks serve as a pathway to voluntarism through the size of the network (the number of contacts engaged) and geographic proximity (the spatial closeness of the network members, which would make interactions more probable and frequent) (Ajrouch, Antonucci, and Webster, 2016). The more people who are touched by a shock the larger the network of individuals who know about it and thus the larger the pool of potential volunteers. Furthermore, it need not be close friends and family that drive the activity: even 'weak' or 'thin' ties have the ability to motivate and activate volunteers (Granovetter, 1973).

Time period of disasters

The timing of a disaster is divided into four periods based on the date of occurrence: January, February, and March; April, May, and June; July, August, and September; and October, November, and December. Dummy variables are used here to capture these four periods.

Media coverage

Data are obtained from the *Asahi Shimbun* newspaper database, which is one of the most popular newspapers in Japan and has the largest database of any newspaper in the country. The study assesses nationwide and local coverage at two points: six months and one year after the disaster. As we evaluate disasters between 1995 and 2019, newspapers serve as a consistent media source for much of the Japanese public over the past 25 years. It is recognised, though, that non-print media, such as the internet and television-based news, have become popular more recently,

Region of disasters

Regions are categorised here in seven groupings:

- Hokkaido;
- Tohoku (Aomori, Akita, Yamagata, Iwate, Miyagi, and Fukushima Prefectures);
- Kanto (Ibaraki, Tochigi, Gunma, Chiba, Saitama, Tokyo, and Kanagawa Prefectures);
- Chubu/Hokuriku (Niigata, Toyama, Ishikawa, Fukui, Yamanashi, Nagano, Gifu, Shizuoka, and Aichi Prefectures);
- Kinki (Mie, Shiga, Kyoto, Osaka, Hyogo, Nara, and Wakayama Prefectures);
- Chugoku/Shikoku (Tottori, Shimane, Okayama, Hiroshima, Yamaguchi, Tokushima, Kagawa, Ehime, and Kochi Prefectures); and
- Kyushu (Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, and Kagoshima Prefectures)/Okinawa.

Dummy variables are used in the full regressions (not shown here due to space). Table 2 presents descriptive statistics on the full dataset of disaster volunteers.

Table 2. Descriptive statistics

Variable	N	Mean	Standard deviation	Minimum	Maximum
Number of volunteers	57	66,492	225,747.5	170	1,377,300
Number of dead and missing	57	529	3,049.6	0	22,252
Number of injured	57	1,161	5,853.9	0	43,792
Number of houses destroyed	57	4,504	21,077.6	0	121,995
Number of partially destroyed houses	57	11,277	42,697.6	0	282,939
Number of inundated houses	57	1,990	3,867.8	0	22,894
Number of houses in flooded areas	57	5,840	9,517.3	0	46,943
Affected population	53	1,937,586	5,165,809	6,078	2.98E+07
Affected areas (hectares)	53	639,082.4	1,534,179	7,129	7,842,077
Number of affected municipalities	46	24.84783	62.29	1	348
Newspaper hits over six months	57	1,249.632	3,972.9	3	27,894
Newspaper hits over one year	57	1,676.737	5,683.4	3	40,534
Time period during the year	57	2.877193	0.88	1	5
Region of Japan	57	5.912281	2.17	1	8
Type of disaster	57	1.561404	1.11	1	5

Source: authors.

Methods

We began with a standard ordinary least squares (OLS) regression, utilising all of our observations and variables, including disasters with very high levels of volunteer turnout, such as the Kobe earthquake of 1995 and the triple disasters of 2011. Those initial results, not shown here, were influenced significantly by the handful of outliers and had an extremely high level of the variable inflation factor (VIF), well above acceptable levels. Consequently, we decided to move on to models that excluded the extreme outliers and pruned variables that had high multicollinearity and had not demonstrated significance in the full regression model. The remaining three models (see Table 3) involve an OLS regression, a generalised linear model, and a left censored tobit model.

Results

Table 3 shows that three variables were consistently statistically significant across the models and had the same signs regardless of model type: the number of dead and

Table 3. Estimated regression coefficients

	OLS regression, truncated dataset	GLM, truncated dataset	Left censored tobit, truncated dataset
Number of dead and missing	393.20** (219.3)	393.21** (219.31)	393.2** (199.02)
Number of houses destroyed	1.51 (7.38)	1.51 (7.38)	1.51 (6.70)
Number of inundated houses	0.02 (1.22)	0.02 (1.22)	0.02 (1.11)
Affected population	0.0051*** (0.00)	0.0051*** (0.00)	0.0051*** (0.00)
Affected area	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Time period (April, May, June)	-28,956.9** (12,624.59)	-28,956** (12,624.59)	-28,956** (11,456.63)
Region of Japan	-115.39 (2,135.55)	-115.39 (2,135.55)	-115.39 (1,937.98)
Type of disaster	-1,096.39 (4,244.72)	-1,096.39 (4,244.72)	-1,096.39 (3,852.02)
Constant	10,868.38 (15,949.46)	10,868.38 (15,949.46)	10,868.38 (14,473.90)
N	51	51	51

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses located underestimated coefficients.

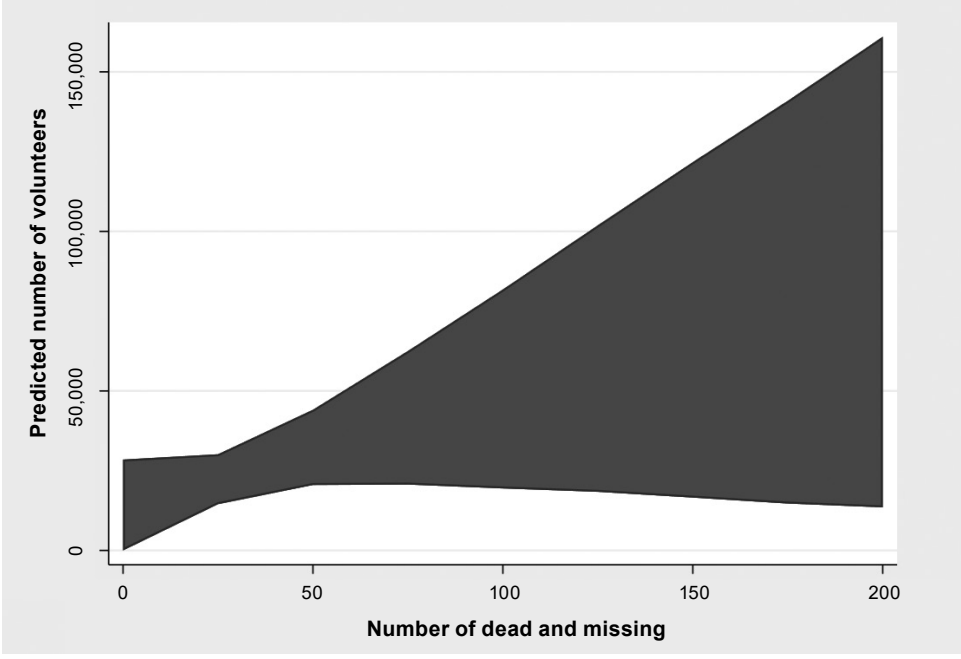
Source: authors.

missing in each disaster; the affected population; and (the dummy variable for) the time period. Where estimated regression coefficients have negative signs, the model recognises them as associated with lower turnout; where the signs are positive, they are correlated with an increase in the number of volunteers. As the number of dead and missing and affected people in the region went up, volunteer numbers rose. In contrast, during certain periods of time, especially between April and June when schools and universities start, volunteer turnout declined. A number of variables did not demonstrate statistical significance in any of the models, including the number of homes destroyed and inundated by flooding, the size of the affected area, the region of Japan, and the type of disaster.

Rather than relying solely on tables of estimated regression coefficients to understand these factors, we explore the relationships between them and our outcome of interest by engaging in simulations and visualisations of the connections using Monte Carlo experiments. Below we produce two figures with marginal effect plots with 95 per cent confidence intervals based on our OLS models (King, Tomz, and Wittenberg, 2000).

Figure 1 shows that, controlling for the other variables in our model, there is a positive correlation between the number of dead and missing and the number of

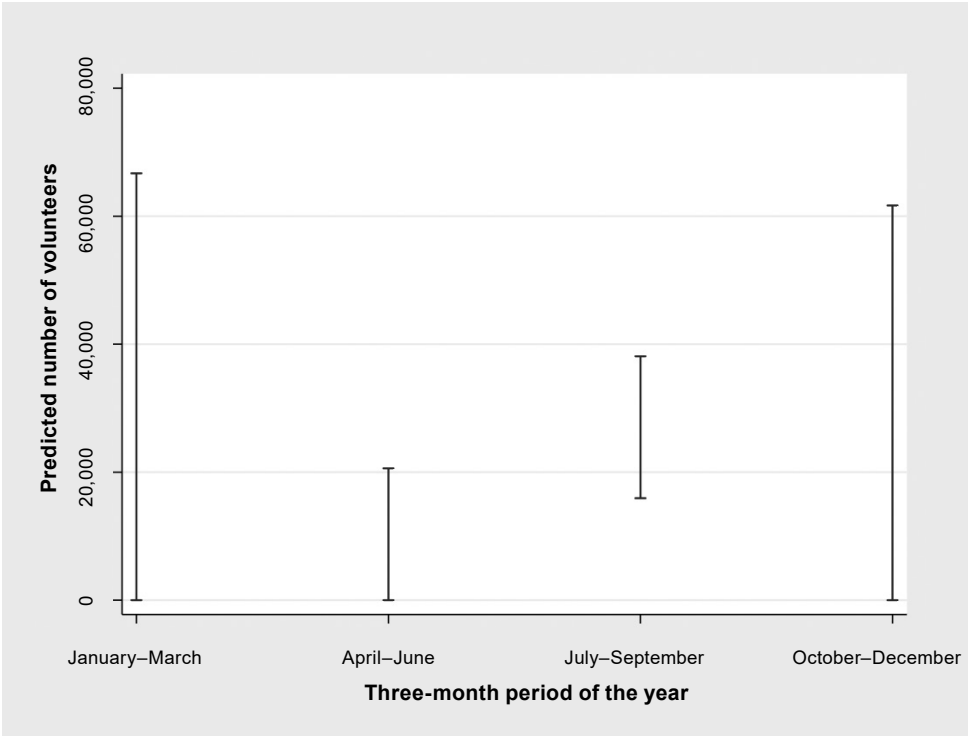
Figure 1. Number of dead and missing impacts on the predicted number of volunteers



Notes: N=51, number of simulations=1,000, OLS model. All variables (number of houses destroyed, number of houses inundated, affected population, affected area, time period, region, and disaster type) held at their means except for the number of dead and missing, which varied between 0 and 200. The shaded area indicates the 95 per cent confidence interval around the predicted value.

Source: authors.

Figure 2. Time period impacts on the predicted number of volunteers



Notes: N=51, number of simulations=1,000, OLS model. All variables (dead and missing, number of houses destroyed, number of houses inundated, affected population, affected area, region, and disaster type) held at their means except for the time period. The vertical bars indicate the 95 per cent confidence interval around the predicted value.

Source: authors.

predicted volunteers. The size of the confidence interval is narrower when we have more data (in this research, we have more disasters with smaller numbers of volunteers) and wider when we have less data for our predictions (in this case, as the number of dead and missing approaches 200). It is also important to remember that our current model excludes the largest and deadliest of Japan's disasters over the past three decades, namely the Kobe earthquake of 1995 and the Tohoku earthquake and tsunami of 2011.

Figure 2 holds constant the other variables in our model to visualise how time periods interact with the number of predicted volunteers. Based on our regression model, the three-month period between April and June saw the fewest number of predicted volunteers, holding constant the other variables tested. This is the start of the school and university year, so we believe that many would-be volunteers are too busy with their education. Other periods, especially January–March and October–December, had far more variation in the predicted number of volunteers. July–September had a more constrained but higher number of volunteers: between 20,000 and 40,000.

Discussion

As Figure 1 reveals, the number of dead/missing variable positively and significantly correlates with volunteer turnout. This reinforces the findings of past studies, suggesting that the concept of altruism—giving to others selflessly—serves as a primary motivation among volunteers (Wilson and Musick, 1997; Wilson, 2000; Bekkers and Wiepking, 2011; Einolf, 2017; Phillips, 2020). When Japanese residents hear about the human impacts caused by a natural hazard, they are more likely to put aside their own work and needs and focus on those of others when they are greater. A higher death toll or number of survivors in hospital underlines the destructiveness of the event and may signal that local, regional, and national government frameworks are insufficient to provide the full amount of support necessary. In a different way, well reported disasters with a high death toll motivate people to engage in volunteer activities, owing to social pressure, and may lead to the social sanctioning of those who do not participate. University students felt a sense of guilt about their survival of the tsunami of 2011 and simultaneously a sense of duty to work on behalf of people more severely affected by the earthquake (Kino, 2014).

In addition to the direct ramifications of the number of dead and missing, the size of the affected population correlates positively and significantly with volunteer turnout. As expected, more volunteers emerge when more people are in need. The more people affected by a large-scale event such as a typhoon or coastal flooding, the more likely would-be volunteers are to have relatives and friends who have been touched by it. For instance, when nearly three million people were impacted by torrential rain in the Kanto and Tohoku regions in 2015, many people knew someone who suffered flooding and were motivated to travel from outside the disaster zones to volunteer. In contrast, fewer volunteers responded to torrential rain in Chugoku and northern Kyushu in 2009, torrential rain in Niigata and Fukushima in July in 2011, and typhoon No. 10 in Tohoku region in 2016, due to the smaller size of the affected population.

The scale of damage differs among members of the affected population: some people are severely affected whereas others are not affected much at all; people who were not severely affected were willing to help others. In fact, 32.6 per cent of students at Miyagi University joined volunteer activities in Tohoku within six months of earthquake in 2011 (Kino, 2014). Daimon and Atsumi (2018) found that people supported by others in a time of disasters have a high level of motivation to support others, describing the phenomenon as 'pay it forward'. In this sense, the more people affected directly or indirectly, the greater the turnout of volunteers.

Lastly, the time period, especially the three months of April, May, and June, was negatively correlated with volunteer turnout (see Figure 2). The month of April marks the start of a number of events and the opening up of institutions in Japan, including new academic years, changes in personnel in government and private companies, and a new fiscal year. If a disaster occurred in April, for instance, many

people would probably be busy with changes in their lives, including moving to a new location and taking on a new set of administrative and financial responsibilities. Other periods, January to March and October to December, experience far more variation in the predicted number of volunteers.

These broader confidence intervals can be explained by the limited number of shocks in the sample: of the 51 disasters in our dataset, three happened in January–March and 10 in October–December. The annual typhoon season in Japan spans July to September, causing serious damage every year. In our dataset, 31 disasters occurred during this time, accounting for 60 per cent of the sample, limiting the variation in the predicted number of volunteers. What is interesting here is that the April–June period is negatively correlated with slight variation, in spite of only seven disasters occurring during this time. However, we could not pinpoint positive correlation (as some case studies have done) between the July–September period and volunteer turnout, even though schools and universities are on holiday.

As with any study that applies quantitative methods, this one has limitations. For example, our nearly quarter century of disasters does not capture all of the natural hazard types that Japan has faced over time. Furthermore, our research centres on one advanced, industrial democracy, and patterns in Japan may be quite different to those in other less advanced or less developed nations. Finally, our study may have omitted factors, legal, political, perceptual, or regional. Nevertheless, we see our approach as advancing the broader literature on spontaneous volunteer activities and hope that it opens the way for future studies.

Conclusion

Some have argued that it is difficult to predict volunteerism, and that the motivation and profile of volunteers depend on each particular event and the context (Twigg and Mosel, 2017), but we identified regular patterns across a subsection of recent disasters in Japan. Looking at 57 disasters between 1995 and 2019, we pinpointed three factors that consistently correlate with volunteer turnout: the number of dead and missing; the size of the population affected by the shock; and the time period of the year. After the Kobe earthquake in 1995, as disaster volunteering became popular, still only 26 per cent of the population engaged in volunteer activities in general at least once a year (SBJ, 2017). Clearly, there is potential for growth.

Given the importance of volunteers in complementing existing social and logistical support frameworks during and after disasters, local, regional, and national governments should consider several changes to current practice. First, based on the finding of negative correlation between the period of April–June and volunteer turnout, we recommend more flexibility in school and university opening times to allow for more volunteers year-round. After the triple disasters in March 2011, all universities in the three affected prefectures of Fukushima, Iwate, and Miyagi postponed

their start date from the standard April; in fact, more than 80 per cent of universities commenced after May of 2011 (MEXT, 2011). More recently, public schools postponed opening until the end of May 2020 due to the spread of COVID-19. Such an approach can be applied after smaller-scale disasters by permitting municipalities or schools and universities to make their own decisions depending on their context, without a top-down approach. Almost all Japanese universities start in April and end in March, and courses take four years to complete. Rigid schedules decrease the opportunities for students to undertake volunteering, internships, overseas study, and other activities.

In addition, Japan's Ministry of Education, Culture, Sports, Science, and Technology (MEXT) has, in the past, asked universities to accord special consideration, such as a leave of absence, to students who wish to volunteer. Such a move is effective to some extent, but government notification is not always enough for students to take action. Some students cannot travel to affected locations on their own and/or cannot afford the transportation and a place to stay without the support of university-based Volunteer Centres. Institutional support would encourage students to join disaster recovery volunteers, absent any costs (Kino, 2014). Indeed, 30 per cent of students volunteered through their universities to go to affected areas of Tohoku in 2011 (Sakurai, 2013a). Yet, many universities lack well-equipped, -funded, and -staffed Disaster Volunteer Centres. The central government should support Disaster Volunteer Centres in universities to ensure volunteer opportunities for students.

This study has also illuminated the positive correlation between the size of the affected population and volunteer turnout. The more populated municipalities need to expect a large number of volunteers and prepare to coordinate in the event of a disaster. The capacity of Councils of Social Welfare, which coordinate volunteers, should be enhanced. For instance, they should practise setting up a Disaster Volunteer Centre in collaboration with other coordination entities, such as NPOs, private companies, and universities, and the central government and the municipalities should offer support. In contrast, less populated municipalities might not be able to receive many volunteers for recovery and may need to collaborate with volunteers in ordinary times and issue effective appeals to potential volunteers after a disaster strikes.

The COVID-19 pandemic of 2020–21 has posed a challenge to volunteering in Japan. In fact, the Council of Social Welfare in flood-affected municipalities of Kumamoto Prefecture did not accept volunteers from outside to avoid infections. Given that Japan will face extreme weather events, ranging from climate change to large-scale earthquakes (such as the one predicted for Nankai Trough) in the near future, ensuring that the maximum possible number of volunteers attend crises should be a top priority of residents, governments, and NGOs. Attracting altruists, setting up frameworks to smooth their transition from school and work to volunteering, and helping ordinary people go forward need to be at the top of the agenda of civil society and the state.

Appendix

Table A1. Dataset of 57 disasters in Japan between 1995 and 2019

Date	Event
17 January 1995	Kobe earthquake
2 January 1997	Nakhodoka heavy oil spill
11 September 2000	Torrential rain in Tokai
6 September 2001	Torrential rain in Kochi
13 July 2004	Torrential rain in Niigata and Fukushima
18 July 2004	Torrential rain in Fukui
9–10 October 2004	Typhoon Nos. 21 and 22
18 October 2004	Typhoon No. 23
23 October 2004	Niigata ken Chuetsu earthquake
4–8 September 2005	Typhoon No. 14
15 July 2006	Torrential rain in July
7 November 2006	Tornado in Saromacho
25 March 2007	Noto Island earthquake
16 July 2007	Niigata ken Chuetsuoki earthquake
17 September 2007	Torrential rain in Tohoku
24 February 2008	High tide in Toyama-wan
28 July 2008	Torrential rain
28 August 2008	Torrential rain at the end of August
21 July 2009	Torrential rain in Chugoku and northern Kyushu
8 August 2009	Typhoon No. 9
11 June 2010	Torrential rain in June and July
8 September 2010	Typhoon No. 9
18 October 2010	Torrential rain in Amami
26 January 2011	Mount Kirishima Shinmoedake eruption
11 March 2011	Great East Japan earthquake and tsunami
28 July 2011	Torrential rain in Niigata and Fukushima
2 September 2011	Typhoon No. 12
2 November 2011	Torrential rain in Kagoshima
23 August 2013	Torrential rain in Shimane and elsewhere
13 September 2013	Typhoon No. 18
10 October 2013	Typhoon No. 26
6 July 2014	Typhoon No. 8
1 August 2014	Typhoon Nos. 11 and 12

Date	Event
15 August 2014	Torrential rain in August
19 August 2014	Landslides in Hiroshima
9 September 2015	Torrential rain in Kanto and Tohoku
14 April 2016	Kumamoto earthquake
30 August 2016	Typhoon No. 10
17 September 2016	Typhoon No. 16
21 October 2016	Earthquake in central Tottori
30 June 2017	Torrential rain in northern Kyushu Island
22 July 2017	Torrential rain in Akita
13 September 2017	Typhoon No. 18
23 October 2017	Typhoon No. 21
9 April 2018	Earthquake in eastern Shimane
18 May 2018	Torrential rain in Akita
18 June 2018	Earthquake in northern Osaka
5 July 2018	Torrential rain in July
5 August 2018	Torrential rain in Yamagata
4 September 2018	Typhoon No. 21
6 September 2018	Hokkaido earthquake
12 May 2019	Fire in Yoshikachou, Shimane
18 June 2019	Earthquake in Yamagatakenoki
27 August 2019	Torrential rain in Saga and Fukuoka
3 September 2019	Torrential rain in Niimi, Okayama
8 September 2019	Typhoon No. 15
6 October 2019	Typhoon No. 19

Source: authors.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Correspondence

Akiko Iizuka, Assistant Professor, Center for International Exchange, Utsunomiya University, 350 Mine Utsunomiya-city, Tochigi 321-8505, Japan.
E-mail: iizuka@cc.utsunomiya-u.ac.jp

References

Ajrouch, K.J., T.C. Antonucci, and N.J. Webster (2016) 'Volunteerism: social network dynamics and education'. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 71(2). pp. 309–319.

Atsumi, T. (2007) *Saigai borantia no doko: Hanshinawaji Daishinsai kara Chuetsu Jishin wo hete*. Osaka Daigaku Daigakuin Ningen kagaku kenkyuuka kiyo. Osaka University, Osaka. 3. pp. 97–112.

Atsumi, T. and J. Goltz (2014) 'Fifteen years of disaster volunteers in Japan: a longitudinal assessment of a disaster non-profit organization'. *International Journal of Mass Emergencies and Disasters*. 32(1). pp. 220–240.

Aldrich, D.P. (2012) *Building Resilience: Social Capital in Post-disaster Recovery*. University of Chicago Press, Chicago, IL.

Aldrich, D.P. (2019) *Black Wave: How Networks and Governance Shaped Japan's 3/11 Disasters*. University of Chicago Press, Chicago, IL.

Alexander, D. (2010) 'The voluntary sector in emergency response and civil protection: review and recommendations'. *International Journal of Emergency Management*. 7(2). pp. 151–166.

American Red Cross (2007) *The Face of Recovery: The American Red Cross Response to Hurricanes Katrina, Rita and Wilma*. https://www.redcross.org/content/dam/redcross/atg/PDF_s/Publications/Annual_Reports/face_of_recovery.pdf (last accessed on 1 October 2021).

Barraket, J., R. Keast, C. Newton, K. Walters, and E. James (2013) *Spontaneous Volunteering during Natural Disasters*. Working Paper No. ACPNS 61. Australian Centre for Philanthropy and Nonprofit Studies, Queensland University of Technology, Brisbane, QLD.

Bekkers, R. and P. Wiepking (2011) 'A literature review of empirical studies of philanthropy: eight mechanisms that drive charitable giving'. *Nonprofit and Voluntary Sector Quarterly*. 40(5). pp. 924 –973.

Coppola, D.P. (2015) *Introduction to International Disaster Management*. Elsevier Science, Oxford.

Daimon, H. and T. Atsumi (2018) '"Pay it forward" and altruistic responses to disasters in Japan: latent class analysis of support following the 2011 Tohoku earthquake'. *Voluntas*. 29. pp. 119–132.

Einolf, C.J. (2017) 'Parents' charitable giving and volunteering: are they influenced by their children's ages and life transitions? Evidence from a longitudinal study in the United States'. *Nonprofit and Voluntary Sector Quarterly*. 47(2). https://doi.org/10.1177/0899764017737870.

Granovetter, M. (1973) '*Strength of weak ties'. American Journal of Sociology*. 78(6). pp. 1360–1380.

Hasegawa, K., C. Shinohara, and J. Broadbent (2007) 'Volunteerism and the state in Japan'. *Asia-Pacific Journal*. 5(12). Article number: 2616. https://apjjf.org/-Koichi-HASEGAWA/2616/article.html (last accessed on 1 October 2021).

Hirata, K. (2002) *Civil Society in Japan: The Growing Role of NGOs in Tokyo's Aid and Development Policy*. Palgrave Macmillan, New York, NY.

Honma, T. (2014) 'Saigai borantia katsudo no tenkai to aratana kadai: shienryoku to juenryoku no huchouwa ga umidasu tomadoi'. *Shakaigaku nenpo*. 43. pp. 49–64.

Iizuka, A. (2018) 'The nature and characteristics of Japanese NGOs in international disaster response'. *Disaster Prevention and Management*. 27(3). pp. 306–320.

Jackson, E., M. Bachmeier, J. Wood, and E. Craft (1995) 'Volunteering and charitable giving: do religious and associational ties promote helping behavior?'. *Nonprofit and Voluntary Sector Quarterly*. 24(1). pp. 59–78.

JNCSW (Japan National Council of Social Welfare) (2013) *Hisashi Nihon daishinsai e no shakaihukushi bunya no torikumi to kadai*. https://www.shakyo.or.jp/bunya/saigai/archive/2011higashinihon/201303kiroku.pdf (last accessed on 14 October 2021).

JNCSW (2018) *Higashi Nihon daishinsai Iwate ken Miyagi ken Fukushima ken no borantia katsudōsyasū*. https://www.saigaivc.com/ (last accessed on 14 October 2021).

Kim, D.R. (2010) *The Rise of Japanese NGOs: Activism from Above*. Routledge, New York, NY.

King, G. (1995) 'Replication, replication'. *PS: Political Science and Politics*. 28(3). pp. 444–452.

King, G., M. Tomz, and J. Wittenberg (2000) 'Making the most of statistical analyses: improving interpretation and presentation'. *American Journal of Political Science*. 44(2). pp. 347–361.

Kino, K. (2014) 'Higashi Nihon daishinsai ni kansuru borantia katsudō e no sanka wo sayū suru youin no kentō: Miyagi kennai no daigaku ni zaiseki suru daigakusei wo taishō ni'. *Miyagi gakuin joshi daigaku kenkyū ronbunshū*. 118. pp. 23–42.

Lowe, S. and A. Fothergill (2003) 'A need to help: emergent volunteer behavior after September 11th'. In Natural Hazards Research and Applications Information Center, Public Entity Risk Institute, and Institute for Civil Infrastructure Systems (eds.) *Beyond September 11th: An Account of Post-disaster Response*. Special Publication No. 39. Natural Hazards Research and Applications Information Center, University of Colorado, Boulder, CO. pp. 293–314.

McMorran, C. (2017) 'From volunteers to voluntours: shifting priorities in post-disaster Japan'. *Japan Forum*. 29(4). pp. 558–582.

MEXT (Ministry of Education, Culture, Sports, Science, and Technology) (2011) *Higashi Nihon Daishinsai ni okeru daigaku nado no higai jōkyō to kore made no torikumi*. Chūō kyōiku shingikai daigaku bunkakai Heisei 23 nen 5 gatsu 23 nichi. https://www.mext.go.jp/b_menu/shingi/chukyo/chukyo4/siryo/__icsFiles/afieldfile/2011/06/01/1306377_1_1.pdf (last accessed on 1 October 2021).

Murai, M. (2011) *Saigai borantia no kokorogamae*. SB Creative Coop., Tokyo.

Nakahara, I. (2011) *Kiseki no saigai borantia Ishinomaki moderu*. Asahi Shimbun Publications, Tokyo.

Nakano, L. (2000) 'Volunteering as a lifestyle choice: negotiating self-identities in Japan'. *Ethnology*. 39(2). pp. 93–107.

Nishiyama, S. (2005) *Borantia katsudo no ronri: Hanshinawaji Daishinsai kara sabusisutensu shakai e*. Toshindo Publishing, Tokyo.

Ogawa, A. (2009) *The Failure of Civil Society?: The Third Sector and the State in Contemporary Japan*. State University of New York Press, Albany, NY.

Ogawa, A. (2012) 'Invited by the state: institutionalizing volunteer subjectivity in contemporary Japan'. *Asian Anthropology*. 3(1). pp. 71–96.

Okada, A., Y. Ishida, T. Nakajima, and Y. Kotagiri (2017) *The State of Nonprofit Sector Research in Japan: A Literature Review*. Brill Academic Publisher, Leiden.

PBVC (Peace Boat Disaster Volunteer Centre) (2017) *Saigai borantia nyuumon*. Godo shuppan, Tokyo.

Pekkanen, R. (2003) 'Molding Japanese civil society: state-structured incentives and patterning of civil society'. In F. Schwartz and S.J. Pharr (eds.) *The State of Civil Society in Japan*. Cambridge University Press, Cambridge. pp. 116–134.

Pekkanen, R. (2006) *Japan's Dual Civil Society: Members Without Advocates*. Stanford University Press, Palo Alto, CA.

Phillips, B.D. (2020) *Disaster Volunteers: Recruiting and Managing People Who Want to Help*. Elsevier Science and Technology, Oxford.

Plummer, C.A. et al. (2008) 'Volunteerism among social work students during Hurricanes Katrina and Rita'. *Journal of Social Service Research*. 34(3). pp. 55–71.

Rausch, A. (2009) 'The emerging consciousness of Japanese voluntarism'. *International Journal of Japanese Sociology*. 7(1). pp. 1–21.

Rossi, A.S. (2001) 'Domains and dimensions of social responsibility: a sociodemographic profile'. In A.S. Rossi (ed.) *Caring and Doing for Others: Social Responsibility in the Domains of Family, Work, and Community*. University of Chicago Press, Chicago, IL. pp. 97–134.

Rotolo, T. and J.A. Berg (2011) 'In times of need: an examination of emergency preparedness and disaster relief service volunteers'. *Nonprofit and Voluntary Sector Quarterly*. 40(4). pp. 740–750.

Sakurai, M. (2013a) 'Higashi Nihon Daishinsai ni okeru daigakusei no hisaichi hisaisha shienkodo'. *Ritsumeikan ningen kagaku kenkyuu*. 28. pp. 55–65.

Sakurai, M. (2013b) *Higashinihon Daishinsasi to NPO borantia: Shimin no chikara wa ikanishite tachiarawaretaka*. Minerva shobo, Kyoto.

SBJ (Statistics Bureau of Japan) (2017) *Heisei 28 nen shakai seikatsu kihon chōsa*. SBJ, Tokyo.
Schlozman, K., S. Verba, and H. Brady (1998) 'Civic participation and the equality problem'. In T. Skocpol and M.P. Fiorina (eds.) *Civic Engagement in American Democracy*. Brookings Institution Press, Washington, DC. pp. 427-458
Schwartz, F. and S.J. Pharr (eds.) (2003) *The State of Civil Society in Japan*. Cambridge University Press, Cambridge.
Shaw, R. and K. Goda (2004) 'From disaster to sustainable civil society: the Kobe experience'. *Disasters*. 28(1). pp. 16–40.
Suga, M. (2011) 'Nihon ni okeru saigai borantia katsudo no ronri to katsudo tenkai: borantia gannen kara jūgo nengo no genjō to kadai'. *Journal of Society Safety Sciences*. 1. pp. 55–66.
Suga, M., Y. Yamashita, and T. Atsumi (2008) *Saigai to syakai: Saigai borantiaron nyuumon*. Koubundou Publishers, Tokyo.
Suzuki, I., M. Suga, and T. Atsumi (2003) 'Nihon ni okeru saigai borantia no doko: Hanshinawaji daishinsai wo keiki toshite'. *Japanese Journal of Experimental Social Psychology*. 42(2). pp. 166–186.
Taniguchi, H. (2010) 'Who are volunteers in Japan?'. *Nonprofit and Voluntary Sector Quarterly*. 39(1). pp. 161–179.
Tierney, K.J. and J. Goltz (1997) *Emergency Response: Lessons Learned from the Kobe Earthquake*. Preliminary Paper #260. Disaster Research Center, University of Delaware, Newark, DE.
Twigg, J. and I. Mosel (2017) 'Emergent groups and spontaneous volunteers in urban disaster response'. *Environment and Urbanization*. 29(2). pp. 443–458.
Watanabe, Y. (2011) 'Higashi Nihon Daishinsai ni okeru borantia kōdō'. *Surugadai daigaku Keizai kenkyuusho shohou*. 15. pp. 99–118.
Wilson, J. (2000) 'Volunteering'. *Annual Review of Sociology*. 26 (August). pp. 215–240.
Wilson, J. and M. Musick (1997) 'Who cares? Toward an integrated theory of volunteer work'. *American Sociological Review*. 62(5). pp. 694–713.
Yamamoto, K. (ed.) (2018) *Saigai borantia nyuumon*. Minerva Shobo, Kyoto.
Yamashita, Y. and M. Suga (2002) *Shinsai borantia no shakaigaku*. Minerva Shobo, Kyoto.
Yanagida, K., H. Kuroda, J. Oga, and M. Murai (2006) *Borantia ga shakai wo kaeru*. Kansai Kango shuppan, Otsu.