

Research Trends in Natural Hazards, Disasters, Risk Reduction and Climate Change in Indonesia: A Systematic Literature Review

Riyanti Djalante^{1,2}

¹United Nations University – Institute of Environment and human Security, Bonn, 53117, Germany

5 ²University of Halu Oleo, Kendari, 93111, Sulawesi Tenggara, Indonesia

Correspondence to: Djalante@ehs.unu.edu

Abstract. Indonesia is one of the most vulnerable countries from disasters and climate change. While there has been a proliferation of academic publications written on issues related to natural hazards, risks, and disasters on Indonesia, there has not yet a systematic literature review (SLR) to determine the progress, key topics and directions for further research. SLR is important so researchers can build upon existing works, avoid bias, determine major research and need for further research. It is also important to determine who, how, in which way the research has been conducted in order to strengthen research capacity in the future. The author conducted a SLR of publications indexed within the Scopus database from 1900 to 2016 on topics related to natural hazards, risks, risk reduction and climate change impacts on Indonesia. The findings are outlined in two parts. The first part focuses on the research topics and the finding are be categorized into three major topics: (1) natural hazard, risk and disaster assessments (HRD), (2) disaster risk reduction (DRR), and (3) climate change risks, vulnerability, impacts and adaptation (CC). More than half the publications fall into HRD and focus on volcanic eruptions, tsunami and earthquakes. Publications on DRR focus on governance, early warning systems, and recovery and reconstruction. Those on CC are mostly on carbon emission, forestry, governance, and CC impacts. The second part focuses on roles of Indonesian researchers and organizations in these publications. Findings show limited progress in research, publication and collaboration. International/ non-Indonesian authors dominate the literature and only half of the publications are co-authored by Indonesians. Moreover, international collaborations took place by and through very few Indonesian organizations. Reasons for this could be due to limited experience in academic collaboration, power play amongst researchers, lack of research capacity, weak English academic writings skills as well as a lack of incentives for international collaboration and publication within the Indonesian higher education system. The author recommends more funding and incentives for collaborations, inclusion of Indonesian authors in academic articles on Indonesia, training on English academic writing and journal article publications, more early career researchers and female researchers, increased roles of social scientists, collaborations between private actors and policy makers, and practitioners, and lastly on science communication beyond academic publications to social media outlets and science-policy advocacy..

30 **Keyword:** Systematic literature review; natural hazard; disaster; climate change; authorships, Indonesia

1 Introduction

Disaster events and their associated social and economical impacts are on the rise (EMDAT, 2016). The last decade has witnessed the highest number and impacts from disasters and 2015 has been declared as the hottest year ever (WMO, 2016).

35 The Asia Pacific region has experienced the highest number of disasters on record (EMDAT, 2016), within which Indonesia is one of the most at risk countries to disasters and climate change impacts (EMDAT, 2016). Between the period of 1900 to 2016, there have been a total of 434 disasters in Indonesia caused by natural hazards, with 237,728 deaths, 29.1 million people affected and total damage almost 30 Billion USD (EMDAT, 2016). Geophysical disasters caused more than 90% deaths while the hydrological, meteorological and climatological disasters occur more frequently, affected more people, and
40 caused three times damages (EMDAT, 2016).

This paper aims to systematically review literature related to natural hazards, risk and disaster risk reduction, as well as climate change vulnerability, impact, and assessments in Indonesia. Even though there is vast material on these topics on Indonesia, there has not yet been a literature review that examines them in a comprehensive and systematic way. A systematic literature review (SLR) is defined as a method for systematically reviewing evidence or literature with explicit
45 and transparent methods (Gill and Malamud, 2014). By reviewing published works through SLR, topics that have been heavily researched can be determined, researchers can build upon others' existing works, avoid bias and repeat heavily researched topics (Khan et al., 1996), and topics that need further research can be outlined (Moher et al., 2009b).

There are two research objectives adopted. The **first** is to determine progress of research in natural hazards, risks, disasters and climate change in Indonesia within the timeframe from 1900 to 2016. The Sendai Framework for DRR
50 (SFDRR) has just been adopted and with it an extension of the scope of hazards and risk reduction strategies (UN/ISDR, 2015). There is a move toward an integrated approach to DRR which calls for strategies and actions to reduce risks and associated impacts, as well as an inclusive role of multiple actors in DRR. This review will enable the identification of strategies that have been undertaken for DRR and hence suggest strategies for future DRR and implementing the SFDRR. Also, there is an increasing focus on the impacts of climate change in the changing profile of hazards and disasters, and
55 hence this calls for integrated DRR and climate change adaptation (CCA) to manage climate risks (EMDAT, 2016). This review will try to capture whether consideration of climate change risks have been considered as part of research progress in Indonesia.

The **second** is to examine roles and progress of Indonesian authors in contributing to research, international publications and collaborations. This is important and relevant for several reasons. It is important to gauge who, how and in which way
60 the research has been conducted so that future strategies and consideration for strengthening research capacity can be recommended in the future (Mallett et al., 2012). Indonesian scholars have most likely lived in Indonesia for a considerable amount of time. They have experienced, assessed and examined those social and environmental changes that have shaped natural hazards and disasters in the first place, which will help them to be more focused and sharp in terms of documenting. Also, in Indonesia, there is an increasing pressure for scholars to write for international journal publications and collaborate.

65 Any outputs from these publications and collaborations are used toward counting their ranks as academics in universities and research institutions (GoI, 2014). Hence identification of this progress through SLR will enable to determine recent progress undertaken by Indonesian researchers, and can help outline recommendations for further actions in the future to increase the quality of publications and roles in collaborations in international spheres.

70 The structure of this paper is as follows. The first section of this paper has presented the rationale, aim and research questions. The second section outlines the research method related to data sources and document selection. The third section gives the analysis and presentation of results and is divided into two sub sections, the first on key research topics and timelines, and the second on the progress of Indonesian researchers and organizations. The last section presents the conclusion and recommendations for further research and strategies to improve the quality of collaborations and scientific publications for Indonesian authors and organizations.

75 **2 Research method**

2.1 Data Collection and Multi-stage Processes

The SLR method has been used in the fields of health (e.g. Moher et al., 2009a), software engineering (e.g. Kitchenham et al., 2009), and engineering (e.g. Gosling and Naim, 2009). There have also been studies that use this form of review in topics related to natural hazards, disasters, and climate change. They are however have been done individually. This papers
80 examines those research progress as an integrated analysis. Examples include reviews of different natural hazards such as droughts (Woodhouse and Overpeck, 1998), landslides (Aleotti and Chowdhury, 1999), wildfires (Neale and Weir, 2015), tsunami (Chiu and Ho, 2007), and the interactions of those natural hazards (Gill and Malamud, 2014). Others focuses on the impacts (Hunt and Watkiss, 2011) and DRR strategies from social science perspectives such as ecosystem-based adaptation (Brink et al., 2016; Kabisch et al., 2015), education (Johnson et al., 2014), health and psychology after disasters (Kôlves et al.; Harada et al., 2015), volunteerism (Whittaker et al., 2015), disaster management (Beerens and Tehler, 2016; Lettieri et al., 2009; Gall et al., 2015). A significant works on the systematic review of climate change studies has been done by Berrang-Ford et al (2015; 2015; 2012).

Berrang-Ford et al (2011; 2015) suggested an analytical approach for an SLR need to outline the research questions and aims, data sources and document selection, and analysis and presentation of results. They stated that the questions and aims
90 needed to be clearly described and explicit; the data sources needed to be justified and described, including the articulation of the articulation of search term and description of inclusion and exclusion, along with the documentation of literature included and excluded. They added that the methods for analysis needed to be described and the quality of information needed to be critically appraised (Berrang-Ford et al., 2015). These approaches are adopted in this paper.

In regards to the data sources and document selection, the author conducted a multi-layered literature review to study
95 publications using the Scopus research engine, with a timeframe from 1900 to 2016. There have been several studies comparing the strengths and weakness of Scopus, PubMed, Web of Science and Google Scholar (e.g., Bakkalbasi et al.,

2006; Bar-Ilan, 2008). The Scopus research engine was selected because it has the largest database of peer-reviewed literature (Leydesdorff et al., 2010). Scopus has within its features the capability for search, discovery and analysis (SCOPUS, 2016b). Additional information is gathered from Google Scholar (Google, 2016c), Research Gate (Gate, 2016) or researchers' profiles (if available) to give the full extent of particular scholars' works. The author checked the organizations, nationalities and genders of the researchers using Google search.

Multi stage processes are taken to determine inclusion and exclusion for more relevant findings. The key research terms adopted are natural hazard, disaster, disaster management, disaster risk reduction, climate change, climate change adaptation, resilience, vulnerability, geology, and Indonesia. With these search terms inputted, the first stage gave a total hit of 8077 publications. The author applied the second stage to further refine the results. The exclusion included refinement in subject areas, document types, and source title which did not directly related to the topics. This gave a total hit of 3447 publications. The third stage involved downloaded the results into xml format, saved and imported them into Microsoft Excel. When importing into Excel format the author chose all delimiters to ensure particular information went into the right column. However, the results were not always consistent and hence a manual check on each entry row was needed. The author found that the number counts on the authors' publications and citations presented in the Scopus search were sometimes different to the actual check of the Excel sheet. It was also different when examining the profile of one particular author. Hence, to ensure consistency, higher number of publications and citations are selected. The results in the Excel format were examined line by line to further determine exclusion from the lists. Materials that were excluded in this final stage were related to research in the mining industry in Indonesia, those discussed the science of climate change in very general scope and those that touched on the issue of disasters but not specifically in Indonesia. Further exclusions were warranted when the author judged the scope was too broad to be included in the review. In the end 921 materials selected. The three stages along with the inclusion and exclusion terms are Table 1.

Table 1 Multi-Stage Processes for Inclusion and Exclusions for Search Terms

| Stage | Inclusion / Exclusion | Description | Results |
|--------|---------------------------------|---|---------|
| First | Inclusion based on Search Terms | (TITLE-ABS-KEY(hazard*) OR TITLE-ABS-KEY(risk*) OR TITLE-ABS-KEY(disaster*) OR TITLE-ABS-KEY(disaster management*) OR TITLE-ABS-KEY(disaster risk reduction*) OR TITLE-ABS-KEY(climate change*) OR TITLE-ABS-KEY(climate change adaptation*) OR TITLE-ABS-KEY(resilien*) OR TITLE-ABS-KEY(vulnerabili*) OR TITLE-ABS-KEY(volcan*) OR TITLE-ABS-KEY(geolog*) AND TITLE-ABS-KEY(Indonesia)). | 8077 |
| Second | Exclusion on keywords | AND (EXCLUDE (EXACTKEYWORD , "Human") OR EXCLUDE (EXACTKEYWORD , "Humans") OR EXCLUDE (EXACTKEYWORD , "Female") OR EXCLUDE (EXACTKEYWORD , "Male") OR EXCLUDE (EXACTKEYWORD , "Adult") OR EXCLUDE (EXACTKEYWORD , "MajorClinicalStudy") OR EXCLUDE (EXACTKEYWORD , "ControlledStudy") OR EXCLUDE (EXACTKEYWORD , "Adolescent") OR EXCLUDE (EXACTKEYWORD , "Prevalence") OR EXCLUDE (EXACTKEYWORD , "Child") OR EXCLUDE (EXACTKEYWORD , "Thailand") OR EXCLUDE (EXACTKEYWORD , "Aged") OR EXCLUDE (EXACTKEYWORD , "China") OR EXCLUDE (EXACTKEYWORD , "India") OR EXCLUDE (EXACTKEYWORD , "Infant") OR EXCLUDE (EXACTKEYWORD , "Developing Country")) OR (EXCLUDE (EXACTKEYWORD , "Gold")) | 3447 |
| | Exclusion on subject area | AND (EXCLUDE (SUBJAREA , "ENER") OR EXCLUDE (SUBJAREA , "MEDI") OR EXCLUDE (SUBJAREA , "BIOC") OR EXCLUDE (SUBJAREA , "CENG") OR EXCLUDE (SUBJAREA , "MATE") OR EXCLUDE (SUBJAREA , "CHEM") OR EXCLUDE (SUBJAREA , "NURS") OR EXCLUDE (SUBJAREA , "DECT") OR EXCLUDE (SUBJAREA , "PHAR") OR EXCLUDE (SUBJAREA , "I | |

| Stage | Inclusion / Exclusion | Description | Results |
|-------|----------------------------|--|---------|
| | | MMU") OR EXCLUDE (SUBJAREA , "NEUR") OR EXCLUDE (SUBJAREA , "DENT") OR EXCLUDE (SUBJAREA , "Undefined")) | |
| | Exclusion on title | AND (EXCLUDE (EXACTSRCTITLE , "ChemicalGeology") OR EXCLUDE (EXACTSRCTITLE , "Journal Of Petrology") OR EXCLUDE (EXACTSRCTITLE , "Contributions To Mineralogy And Petrology") OR EXCLUDE (EXACTSRCTITLE , "SPE Asia Pacific Oil And Gas Conference") OR EXCLUDE (EXACTSRCTITLE , "International Conference On Health Safety And Environment In Oil And Gas Exploration And Production") OR EXCLUDE (EXACTSRCTITLE , "Society Of Petroleum Engineers International Petroleum Technology Conference 2012 Iptc 2012") OR EXCLUDE (EXACTSRCTITLE , "Acta Horticulturae") OR EXCLUDE (EXACTSRCTITLE , "Preventive Veterinary Medicine") OR EXCLUDE (EXACTSRCTITLE , "SPE Asia Pacific Oil Gas Conference") OR EXCLUDE (EXACTSRCTITLE , "Society Of Petroleum Engineers SPE Asia Pacific Oil And Gas Conference And Exhibition 2011") OR EXCLUDE (EXACTSRCTITLE , "Australasian Institute Of Mining And Metallurgy Publication Series") OR EXCLUDE (EXACTSRCTITLE , "Australian Systematic Botany") OR EXCLUDE (EXACTSRCTITLE , "Society Of Petroleum Engineers SPE Asia Pacific Oil And Gas Conference And Exhibition Apogee 2013 Maximising The Mature Elevating The Young") OR EXCLUDE (EXACTSRCTITLE , "AAPG Bulletin American Association Of Petroleum Geologists") OR EXCLUDE (EXACTSRCTITLE , "Bird Conservation International") OR EXCLUDE (EXACTSRCTITLE , "Construction And Professional Practices Proceedings Of The 10th East Asia Pacific Conference On Structural Engineering And Construction Easec 2010") OR EXCLUDE (EXACTSRCTITLE , "Corporate Ownership And Control") OR EXCLUDE (EXACTSRCTITLE , "Undefined")) | |
| | Exclusion on language | AND (EXCLUDE (LANGUAGE , "Italian") OR EXCLUDE (LANGUAGE , "Polish") OR EXCLUDE (LANGUAGE , "Spanish") OR EXCLUDE (LANGUAGE , "Afrikaans") OR EXCLUDE (LANGUAGE , "Swedish")) | |
| | Exclusion on subject area | AND (EXCLUDE (SUBJAREA , "ECON") OR EXCLUDE (SUBJAREA , "COMP") OR EXCLUDE (SUBJAREA , "BUSI") OR EXCLUDE (SUBJAREA , "MATH") OR EXCLUDE (SUBJAREA , "PSYC") OR EXCLUDE (SUBJAREA , "VETE") OR EXCLUDE (SUBJAREA , "HEAL")) | |
| | Exclusion on document type | AND (EXCLUDE (SRCTYPE , "d") OR EXCLUDE (SRCTYPE , "r")) AND (EXCLUDE (DOCTYPE , "cr") OR EXCLUDE (DOCTYPE , "no") OR EXCLUDE (DOCTYPE , "sh") OR EXCLUDE (DOCTYPE , "ed")) | |
| Third | Transfer | Transfer to XML and excel Form | 921 |
| | Exclusion | Topics too broad, e.g. mining, general climate science, minor mention or not directly on Indonesia | |

120 2.2 Data Analysis

The third/final list was analyzed in terms of topics and sub-topics of research citations, keywords, places of focus, types and time of publications, impact factors and authorships. The author used Scopus features to analyze search results such as the article metric module, citation overview, and author profile pages (SCOPUS, 2016b). The progress of Indonesian scholars is evaluated through counting total number of authors, research outputs and citations overall, and also comparing between papers first authored by Indonesians. The author cross-checked the number of citations from Scopus on the Internet through Google, and selected the higher citation counts. This was done because it is generally the case that data from a Google search for a publication and author leads to a higher and more up to date citation count. The author also consulted total citations and publications of researchers in Google Scholar, Research Gate or from other websites to make sure that the full list of publications was captured. There were also cases where the author had to specifically go back to Scopus and find particular author's works to make sure that all were captured.

3 Findings and Analysis

This section is structured into two main parts reflecting the objectives of the paper, first with progress of research in terms of key research topics, and second with progress of Indonesian researchers and organizations.

3.1 Research Topics and Timelines

135 This part presents the more detailed findings of each of the research topics. The author categorizes the final list into three groups (Table 2), natural hazard, risk, disaster assessments (HRD), disaster risk management and reduction (DRR), and climate change vulnerability, impacts and adaptation (CC), in order to show and outline how changes in directions on research have taken place over the years and to reduce unbalance towards findings on hazard and risks assessments toward earthquake and volcanic eruption research. In general, there are more research on the topic of HRD (56%), followed by those
140 in DRR (23%), and then CC (21%) (modified from SCOPUS, 2016a).

Table 2 Major Research Topics

| Major topics groups | Definitions (IPCC, 2012; UNISDR, 2009) | Number of publications (Percentage) |
|---|---|-------------------------------------|
| (1) Natural hazard, risks, disasters assessments (HRD) | Hazards: A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR). Risks: The combination of the probability of an event and its negative consequences. Disaster: A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (UNISDR). | 517 (56%) |
| (2) Disaster risk management or reduction (DRR) | The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster (UNISDR). The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNISDR). | 210 (23%) |
| (3) Climate change vulnerability, impacts and adaptation (CC) | A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (UNFCCC). The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (UNISDR). | 194 (21%) |
| Total | | 921 |

The paper further identifies key periods and timelines by which publications were published. Although the search timeline was set between 1900 and 2016, the years in which publications were found ranges from 1934 to 2016 (Figure 1).

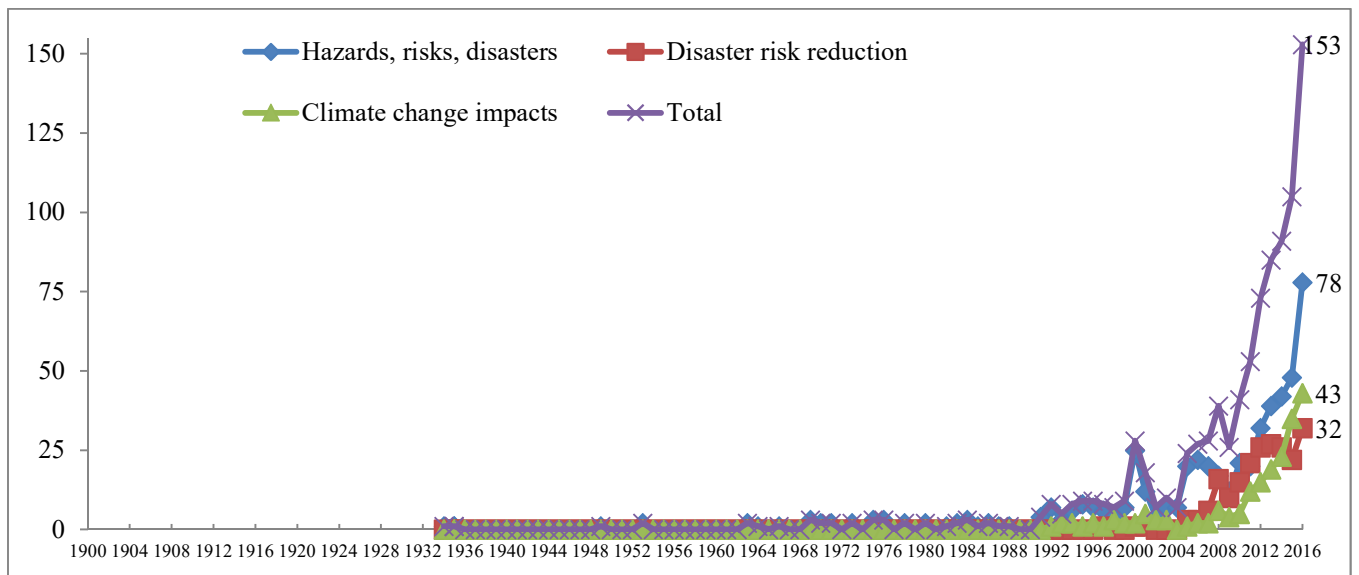


Figure 1 Number of Publications over the Year (modified from SCOPUS, 2016a)

The first period is from the 1934-1990s. There were no significant changes in the numbers of publications produced. The publications on the HRD are some of the earliest publications indexed in Scopus. It heavily focused on the topics of geophysical hazards and risks related to earthquakes and volcanic eruptions (SCOPUS, 2016a). Within this period, 22 out of 58 events recorded by EMDAT were earthquakes and volcanic activities (EMDAT, 2016). The Bali earthquakes occurred in 1976 and 1979, which in total caused 1764 deaths, affected 563,150 people, and caused 215,150 USD in damages (EMDAT, 2016). The year 1979 was also the year in which the earthquake occurred the most (6 times), in Bali, Lombok, and Biak (near Papua) (USGS, 2016).

The second period from the 1990s to 2000s shows a notable increase in the literature, up to an average there 10 publications per year. This gradual increase mainly corresponds to a rise in literature related to the assessments of HRD, and is followed by a sharp increase in literature to its highest point in 2000 (SCOPUS, 2016a).

The third period from 2000s-2010s was the most dynamic period for publications. While there was a sharp decline since it first peak in 2000, a surge of publications begun in 2004 in response to the Indian Ocean tsunami which devastated Indonesia especially. This increase has continued ever since. This is also a period characterized not only publications related to understanding the risks of earthquakes and tsunami, but also those related to DRR and CC. A peak occurs between 2010 and 2016 which shows soaring published materials in all topics. There were 153 publications in 2016 which is the highest ever produced in a single year. During this period, publications related to CC has started to be published. Both publications on HRD and CC are expected to rise (SCOPUS, 2016a).

The following sub-sections outline research issues discussed within the three topic groups. Within each, the paper discusses timelines, focus areas of the research, early contributors, and categorization of key topics discussed.

3.1.1 Natural hazards, risks and disasters assessments (HRD)

The first sub-section explains findings on the topic of hazards, risks and disasters assessments and identifications. The EMDAT-CRED (2016) categorization of HRD that is used in this study to help more detailed analysis related to major research topics. Natural-disaster groups only caused by geophysical, meteorological, hydrological, and climatological hazards are included since it is determined that these are the most frequent and impactful disasters in the country.

There are 535 publications in this category (SCOPUS, 2016a). The findings show that there has been a gradual increase in the number of published materials from 1934 to 2000. It first reached its first peak in 2000 that the research in this topic reached its first significant outputs of 25 publications, and reduced slightly after that. In 2004 the Indian Ocean tsunami occurred, initiated with the 9.8 M earthquake with the epicenter off the island of Sumatra, badly affecting Indonesian. Publications related to the tsunami continued to be published until it reached a peak in 2006. Then in 2009, the publications have increased rapidly ever since, reaching another peak in 2016 of 153 publications in a single year (SCOPUS, 2016a).

The literature in HRD category are mostly related to the study of volcanic eruptions, earthquakes and tsunami and the islands of Java and Sumatera are the two areas which receive most attention (more than 70%) (SCOPUS, 2016a). The oldest publications listed in Scopus are those by Reinout Willem van Bemmelen, a Dutch national born in Batavia (Netherlands East Indies/Indonesia), on *Ein Beispiel für Sekundärtektogenese auf Java* (An example of secondary isogenesis on Java) (van Bemmelen, 1934) and *Über die Deutung der Schwerkraftanomalien in Niederländisch-Indien* (On the Interpretation of the Gravity Anomalies in Dutch-India) (van Bemmelen, 1935), both from the *Geologische Rundschau* (now listed as the International Journal of Earth Sciences). Van Bemmelen continued to write extensively on theories in Tectonophysics, and on Indonesia (van Bemmelen, 1935, 1941, 1949b, 1953, 1963). He then wrote in English on the Origin and Mining of Bauxite in Netherlands-India (Van Bemmelen, 1941) and on the Report of Volcanic Activity and Volcanological Research in Indonesia (1936-1948) (van Bemmelen, 1949b) from the *Bulletin of Volcanologie*. These works formed his greatest contribution: The Geology of Indonesia (Van Bemmelen, 1949a; Van Bemmelen and Bourter, 1970). In addition, Rittman (1953) wrote specifically on the Magmatic Character and Tectonic Position of Indonesian Volcanoes. In terms of contributions by Indonesian researchers, John Ario Katili of the Bandung Institute of Technology (ITB), considered one the founding fathers of Indonesian Geology, wrote significant accounts on geotectonic knowledge of Indonesia from the period of 1963 to 1991 (Katili, 1975, 1991, 1974, 1967, 1971, 1989, 1969a, 1978, 1986, 1981b; 1963; 1969b, 1981a, 1980, 1973). Other early and significant contributions come from Mudaham Taufick Zen and Djajadi Hadikusumo, from the Geological Survey of Indonesia, who collaboratively wrote some of the earliest and most important accounts on volcanoes in Indonesia (Zen and Hadikusumo, 1965, 1964b, a; 1971, 1970, 1966; 1974). It is also important to mention, though not indexed in Scopus, the work by Kusumadinata (1979), of the Geological Survey of Indonesia, on the Catalogue of References on Indonesian Volcanoes with Eruptions in Historical Time, amongst others (Kusumadinata, 1963, 1964a, b, c; cited in Rampino and Self, 1982).

Publications that are related to volcanic eruptions are dominated by the study of volcanoes in Java (almost half) such as Merapi (Verstappen, 1988; Lavigne, 1999; Voight et al., 2000; Andreastuti et al., 2000; Charbonnier and Gertisser, 2008; Gertisser et al., 2012; Suryo and Clarke, 1985), Galunggung (Suryo and Clarke, 1985), Semeru (Siswowidjoyo et al., 1997; Carn, 1999; Thouret et al., 2007; Solikhin et al., 2012), Kelud (Lubis, 2014; Nakada et al., 2016) or Ijen (Heikens et al., 2005; Trunk and Bernard, 2008; van Hinsberg et al., 2010). The other hazard that receives many studies is related to the examination of earthquakes (more than 30%), how they happened, and methods to assess the impacts. The research on tsunami received gradual attention especially after 2004 (Nakamura, 1980; Nakamura, 1978; Latter, 1981; Koshimura et al., 2009; Imamura et al., 1995). There are also a small numbers of publications related to landslides (Fathani et al., 2016; Karnawati et al., 2011; Liao et al., 2010) (Figure 2).

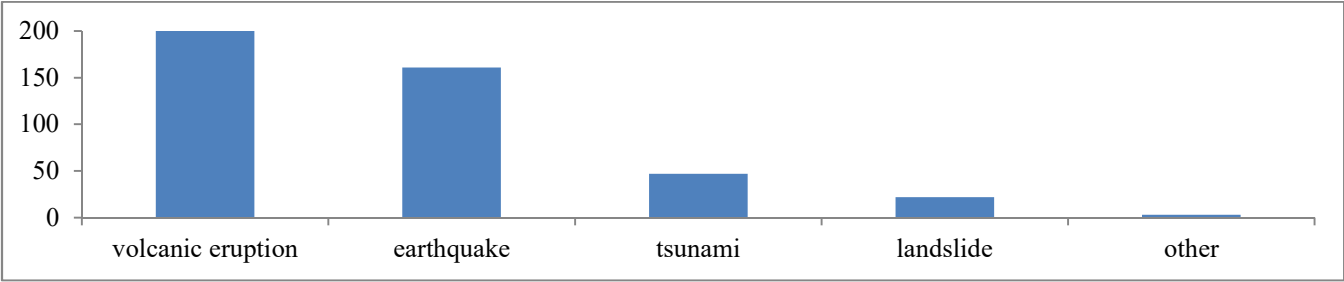


Figure 2 Key Topics in HRD Category (Source; modified from SCOPUS results)

3.3.2 Disaster risk management and reduction (DRR)

The second sub-section is on the topic of disasters risk reduction (DRR). In this study, DRR included those strategies that are aimed at reducing disaster risks and range from risk management, risk reduction and disaster preparedness activities. The definition is listed in Table 3. There are 206 publications in this category (SCOPUS, 2016a). There have been very few publications published before 2003. It is only after 2004 that there was a gradual increase of publications. This reached its peak in 2008, after which the number slightly reduced, before continuing to increase. More than half of the DRR publications focus on Sumatera and Java. However, there are also studies that examine Indonesia as part of worldwide, regional or national assessments (SCOPUS, 2016a).

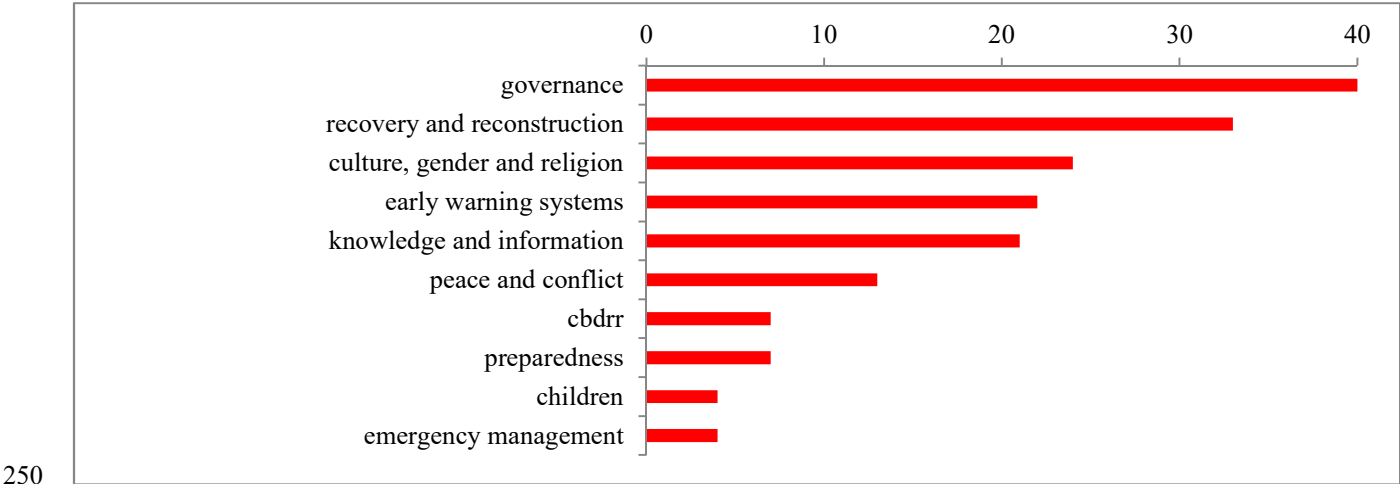
The earliest accounts that explicitly examine DRR include Suryo and Clarke (1985) who wrote on the Occurrence and Mitigation of Volcanic Hazards in Indonesia, and laid out strategies such as the prediction of volcanic activity, hazard zoning and maps, and control of hazards through engineering structures. They wrote that *'the main purpose of hazard maps is to assist the protection of people and their property in the vicinity of active volcanoes'* (Suryo and Clarke, 1985, p. 90). Verstappen (1994; 1993, p. 367) in his paper, the Volcanoes of Indonesia and Natural Disaster Reduction (with Some Examples), wrote that *'since emergency scenarios inevitably vary with intensity and type of land utilization, the compilation of vulnerability maps of the endangered areas merits consideration in the context of disaster reduction policy'*. An Indonesian notable scholar is Sudibyakto, from the Faculty of Geography, University of Gadjah Mada, and also the head of

the Indonesia Disaster Scientist Association (IABI), who wrote Natural Disaster Mitigation and Management in Indonesia (Sudibyakto and Haroonah, 1997) and examine disaster from geographical and social science perspectives (Sudibyakto and Haroonah, 1997; 1992; 1996).

230 The topic that receive most attention in this category is related to the governance of DRR (Bakkour et al., 2015; Chang Seng, 2013; Djalante et al., 2013; Djalante et al., 2012; Guarnacci, 2012; Lassa, 2013). The next key topic is on the evaluation of recovery and reconstruction that have taken place after the 2004 Indian Ocean tsunami (Chang et al., 2011; Daly and Brassard, 2011; Godavitarne et al., 2006; Guarnacci, 2012; Karan and Subbiah, 2011; Telford and Cosgrave, 2007; Lassa, 2015). Other topics that are also related to the impacts of tsunami and disasters were the role of culture, gender , or

235 religion in helping community resilience when facing disasters, and impacts of disasters on different community groups including children and woman (Baumann, 2008; Donovan, 2010; Donovan et al., 2012; Gaillard et al., 2008b; Islam and Lim, 2015; Balgos et al., 2012; Guarnacci and Di Girolamo, 2012; Hiwasaki et al., 2015; Siagian et al., 2014; Sagala et al., 2009; Schlehe, 2010). Some topics were related to examination of tsunami early warning system (Schlurmann and Siebert, 2011; Steinmetz et al., 2010). There are also a large number of publications which examine the role of knowledge and

240 information to help communities be more prepared for disasters (Dicky et al., 2015; Hiwasaki et al., 2015; Rafliana, 2012). There are 13 publications comparing Indonesia and Sri Lanka in regards the impacts of the tsunami on how it either become the precursor for peace process in Indonesia but still take time for the process in Sri Lanka (Enia, 2008; Gaillard et al., 2008a; Hyndman, 2009; Kelman, 2005). Some lower numbers of papers examine community-based DRR which is strongly related to community preparedness (Adiyoso and Kanegae, 2013; Birkmann et al., 2015; Hidayati, 2012; James, 2008; Kusumasari and Alam, 2012), and others examine how children are affected psychologically from continuous exposures to hazards and disasters (Du et al., 2012; Lawler and Patel, 2012; Taylor and Peace, 2015; Vignato, 2012), and on emergency management at the local or national level (Esteban et al., 2013; Kusumasari and Alam, 2012; Djalante et al., 2012). Figure 3 summarizes the key topics in DRR category.



3.3.3 Climate change risks, vulnerability, impacts and adaptation (CC)

The third sub-section is related to climate change risks, vulnerability, impacts and adaptation (CC). The research on climate change is interpreted broadly in this paper. The author included all materials that discuss the impacts of climate change not only on disasters caused by natural hazards but also in different sectors such as agriculture, forestry, water and health. This has been done since the current Sendai Framework for Action calls for multi-risks perspectives (UNISDR, 2015). There are 182 publications in this category (SCOPUS, 2016a). There have only been a few publications within the period between 1978 and 1990. The second period between 1990 and 2000 saw a slight increase in the literature, and then there were 5 pieces published in 2001. These are related to examinations of the causes and impacts of forest fires in Indonesia. The numbers of publications did not change in general until 2008. It is only after 2010 that there was a sharp increase in the numbers of publications, reaching its peak in 2015 at 35 papers. The islands of Sumatera and Java has become the two major locations for the research of the climate impacts since they are the areas where the greatest number of paddy fields and crops production is concentrated (McCulloch and Peter Timmer, 2008). There are also increasing research related to climate change impacts on different sectors at various locations in Indonesia such as those in Sulawesi and in the eastern part of Indonesia (SCOPUS, 2016a).

Some earliest publication were written in 1992 by Subijakto (1992) who wrote Facts and Future Trends of Climate Change: A Case Study of the Eastern Part of the Indonesia Islands, and by Murdiyarso (1993) who examined the management of climate change impacts to reduce CO₂ release resulting from deforestation and biomass in Indonesia. The author categorizes the 182 publications in this group into three major discussions related to the impacts of climate change on Indonesia (almost 60%), the governance of climate change adaptation (less than 25%), and issues of deforestation and land degradation which had enormous impacts on the Indonesian rain forest. Indonesia houses some of the largest areas of rainforest in the world, especially on the islands of Sumatera and Kalimantan. Since the majority of materials published in this category are related to the review of the impacts on climate change in Indonesia, this paper takes a deeper on those literatures (Figure 4). The impact on crop production, particularly rice, has been the subject of the majority of climate impact researches (Caruso et al., 2016; D'Arrigo et al., 2011; D'Arrigo and Wilson, 2008; Kawanishi and Mimura, 2015; Keil et al., 2009; Naylor et al., 2001; Sano et al., 2013; Shofiyati et al., 2014). This is strongly related to the examination of flood (Marfai and King, 2008; Marfai et al., 2008; Marfai et al., 2015; Muis et al., 2015; Neolaka, 2013, 2012; Sarminingsih et al., 2014; Shrestha et al., 2014) or droughts in Indonesia (Aldrian and Djamil, 2008; D'Arrigo and Smerdon, 2008; D'Arrigo and Wilson, 2008; D'Arrigo et al., 2006; Keil et al., 2009; Keil et al., 2008). A high number of publications also concern the link between droughts (Salafsky, 1994; D'Arrigo et al., 2006; D'Arrigo and Smerdon, 2008; Shofiyati et al., 2014) and fire occurrences (Usman and Hartono, 1997; Fang and Huang, 1998; Brauer and Hisham-Hashim, 1998; Jim, 1999; Stolle and Tomich, 1999; Page et al., 2002; Stolle and Lambin, 2003), especially forest fires. There is also research on sea level rise and its impacts on coastal areas (Budyono et al., 2016; Ward et al., 2013; Firman et al., 2011; Wassmann et al., 2009; Nicholls et

al., 1995). A small number of research focuses on temperature, rainfall (D'Arrigo and Wilson, 2008; Aldrian and Djamil, 2008; Chrastansky and Rotstayn, 2012). The impact of climate change on health (Coughlan de Perez et al., 2015) and animal (Purnomo et al., 2011; Morwood et al., 2008) has also received some attention. Figure 4 summarizes the findings.

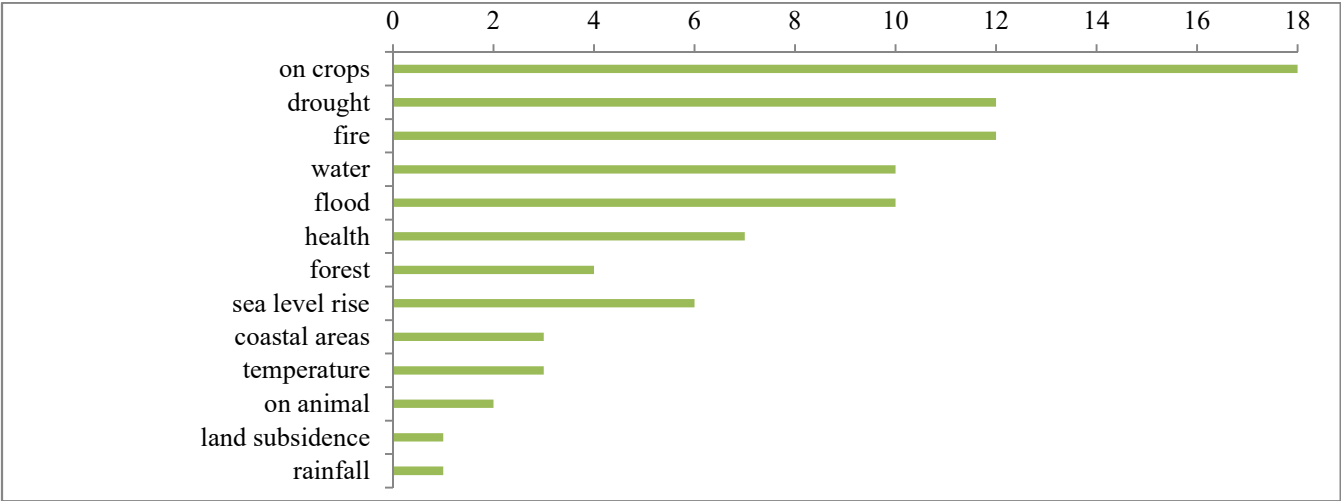


Figure 4 Key Topics in CC Category Researching on Impacts of Climate Change (Source; modified from SCOPUS results)

3.2 Roles of Indonesian Researchers and Organizations

This second section examines the roles of Indonesian researchers and organizations in contributing to the production of literature. It also address to what extent Indonesian researchers have been collaborating with other international/non-Indonesian researchers and organizations, and also in producing high impact English journal articles. The roles of authors are examined in general term, and also specifically looking at the 10 highly cited papers with Indonesian as first author.

3.2.1 Authorships

Figure 5 summarizes the roles of Indonesian authors within each publication category (HRD, DRR, and CC).The review finds that out of the 3,000 names obtained from the Scopus search, there are 68% of international authors compared to 32% Indonesian author. The contribution of international/non- Indonesian authors dominates the production of publications. The figure shows that there are more authors, including Indonesian authors, in DRR category than the other two categories. There are slightly more papers with at least one Indonesian author than those with no Indonesian authors. A more striking examination of Indonesia authors shows that there are less than 100 authors with more than 2 publications. The majority of authors work for organizations that are located in Java where the high quality education providers are mostly located (OECD and ADB, 2015), dominated by male researchers and only a small minority of these researchers have social media account such as Google Scholar (Google, 2016a) or Research Gate (Research Gate, 2016b) or professional and personal websites.

This implies that there is room for increasing the involvement of Indonesian authors writing about various issues related to DRR, and also a greater opportunity for developing social science in DRR. From this it is clear that more Indonesians need to be involved in international publications and specific interventions are needed to enhance writing, publication and outreach skills.

310

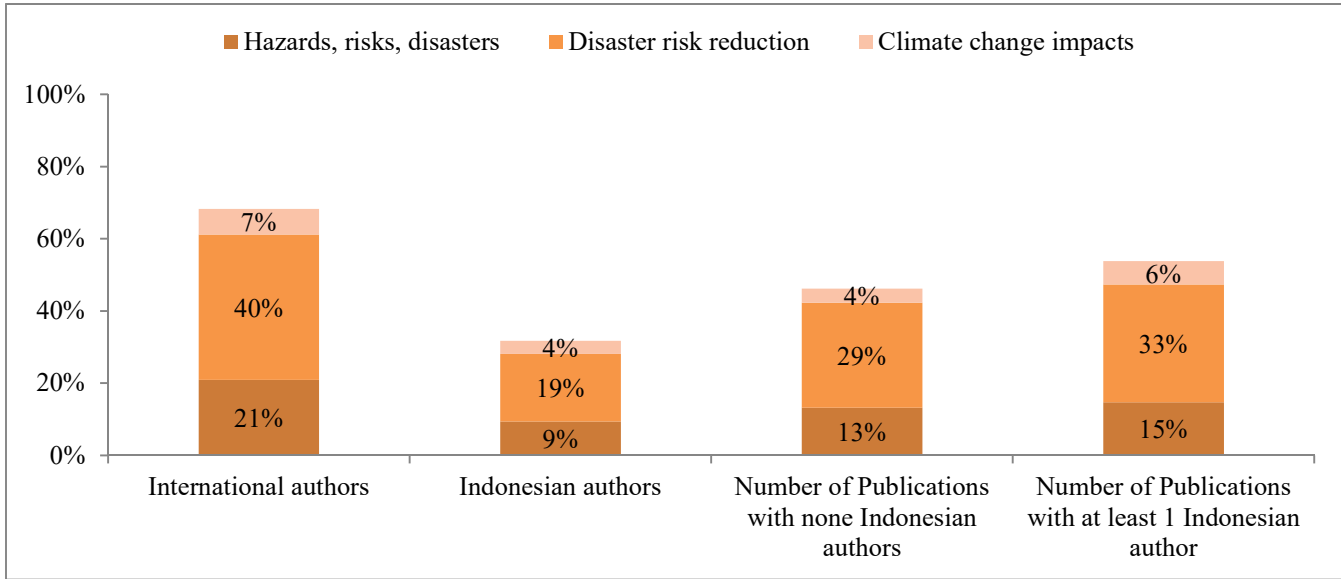


Figure 5 Comparing the Roles of International and Indonesian Authors in Each Publication category (source: modified from SCOPUS results)

Table 3 compares the list of the top ten authors with highest number of publications and also the Indonesian authors with the 10 highest publications. Highest in the list is Hasanuddin Zainal Abidin of the Bandung Institute of Technology (ITB), with 71 publications listed in Scopus, while his Google scholar profile shows that he has published 172, with 1709 citations (Google Scholar, 2016b). Franck Lavigne from Université Paris 1 Pantheon Sorbonne published the second highest numbers of papers (Google Scholar, 2016a). Lavigne worked closely with Jean-Claude Thouret from Laboratory Magmas et Volcanis (LMV, 2016). Ralf Gertisser is a senior lecturer in Keele University (Google Scholar, 2016d). Danny Hilman Natawidjaja works for Indonesian Institute of Science (LIPI) (Google Scholar, 2016c) but did his bachelor study from ITB. Kerry Sieh, from Earth Observatory of Singapore (EOS), has long collaborated with Natawidjaja on their works on seismology in Indonesia (EOS, 2016). Barry Voight is a renowned geologist and volcanologist in USA who has worked on the Mount Merapi since the 1980s (Google Scholar, 2016e). Bambang Widoyoko Suwargadi is affiliated with LIPI and Surono (1 name only) works for the Center for Volcanology and Geological Hazard Mitigation (PVMBG, 2016). In addition to the 5 Indonesians in the top 10 authors, Irwan Meilano, Heri Andreas and Irwan Gumilar have worked closely with Abidin, and are all affiliated with ITB. Muh Aris Marfai and Junjunan Sartohadi are from the Gadjah Mada University

(UGM). Muhammad Hendrasto collaborates closely with Surono and also works for the Center for Volcanology and Geological Hazard Mitigation (PVMBG, 2016).

330 **Table 3 List of Top Ten Authors with Highest Number of Publications, and Top Ten Indonesian Authors (SCOPUS, 2016a; Google, 2016b; Research Gate, 2016a)**

Note: NoP =Number of Publications, SC= SCOPUS Profile (publications, citations, h-index, co-authors, most frequent collaborator), GS = Google Scholar profile (citations, h-index, i10-index), RG = Research Gate profile (publications, citations, impact points), N/A = Not Available

| Top 10 Author (I=Indonesian) | Country / Organization | NoP | SC | GS | RG | Top 10 Indonesian Author | Organization | NoP | SC | GS | RG |
|--|---|-----|---|-------------------|--------------------|--|--------------|-----|------------------------------------|-------------------|---------------------|
| Abidin, Hasanuddin Zainal (I) | Indonesia / Institute Teknologi Bandung (ITB) | 71 | 71, 571, 11, 150, Andreas H | 172, 1709, 21, 41 | 119,77 3,99.2 1 | Abidin, Hasanuddin Zainal | ITB | 71 | 71,493, 11, 121, Andreas H | N/A | 119,77 3,99.2 1 |
| Lavigne, Franck | France / Université Paris 1 Panthéon Sorbonne | 59 | 66, 1356, 20, Wassmer, P | 124, 1648, 21, 34 | 153, 1,430, 162.61 | Meilano, Irwan | ITB | 47 | 46,299,10, 143, Kimata, F | 514,1 1,14 | 24,69, 2788, 376.31 |
| Sieh, Kerry. | Singapore / Earth Observatory of Singapore | 54 | 120, 5752, 43, more than 150, Natawidjaja, DH | N/A | N/A | Natawidjaja, Danny Hilman | LIPI | 43 | 43,1913, 21, 123, Sieh KE | 147, 2964, 25, 33 | 123, 2788, 376.31 |
| Natawidjaja, Danny Hilman (I) | Indonesia / LIPI (Indonesian Institute of Science) | 43 | 42, 1913, 21, 123, Sieh KE | 147, 2964, 25, 33 | 123, 2788, 376.31 | Suwargadi, Bambang Widoyoko (I) | LIPI | 31 | 31, 1102, 17, 103, Natawidjaja, DH | 97, 1585, 20, 24 | N/A |
| Thouret, Jean-Claude | France / Laboratory Magmas et Volcanisme | 40 | 114, 1147, 20, More than 150, Gourgaud, A | N/A | N/A | Surono (I name only) | PVMBG | 28 | 28,348, 12, 125, Hendrasto M | N/A | N/A |
| Voight, Barry | USA / Pennsylvania State University | 36 | 313,8185,5 3,128 | 250 5,307 570.75 | | Andreas, Heri | ITB | 24 | 24,123, 6, 46, Abidin, H Z | N/A | N/A |
| Gertisser, Ralf | United Kingdom / Keele University | 32 | 42,684,468 ,14,abocel 50,Charbonnier SJ | 86,1009 , 19, 29 | 87 803 132,51 | Marfai, Muh.Aris | UGM | 21 | 183, 8, 36, King, Lorenz | 79, 517, 12, 14 | N/A |
| Suwargadi, Bambang Widoyoko (I) | Indonesia / LIPI | 31 | 31, 1102, 17, 103, Natawidjaja, DH | 97, 1585, 20, 24 | N/A | Gumilar, Irwan | ITB | 20 | 20,68,3,44 , Abidin HZ | N/A | N/A |
| Surono (I) | Indonesia / PVMBG (Center for Volcanology and Geological Hazard | 28 | 28, 448, 13, 129, Hendrasto M | N/A | N/A | Sartohadi, Junjunan | UGM | 19 | 19,378, 8, Lavigne, F | N/A | N/A |

| Top 10 Author (I=Indonesian) | Country / Organization | NoP | SC | GS | RG | Top 10 Indonesia Author | Organization | NoP | SC | GS | RG |
|------------------------------|------------------------|-----|-------------------------|-----|-----|-------------------------|--------------|-----|------------------|-----|-----|
| Andreas, Heri (I) | Mitigation) ITB | 24 | 123, 6, 46, Abidin, H Z | N/A | N/A | Hendrasto, Muhamad | PVMBG | 18 | 18,92, 4, Surono | N/A | N/A |
| Total Publications | | 416 | | | | | | 306 | | | |

3.2.2 Affiliations

This section systematically examines the place, from regional to national, and organizations by which the researchers are affiliated in Indonesia. The organizations which house the ten most productive publications related to this review are shown in Figure 6. In general, there are an equal number of organizations that are based in Indonesia, and their contributions comprised slightly more than half the overall contributions amongst these most productive agencies. This paper looks deeper at the contribution of different organizations within Indonesia. It is shown that the Bandung Institute of Technology (ITB) and Gadjah Mada University (UGM) dominate almost half the total publications. There are also more twice universities in Java that those outside Java, while the rest of publications are contributed by national level organizations such as the Indonesian Institute of Science (LIPI) and Center for Volcanology and Geological Hazard Mitigation (PVMBG).

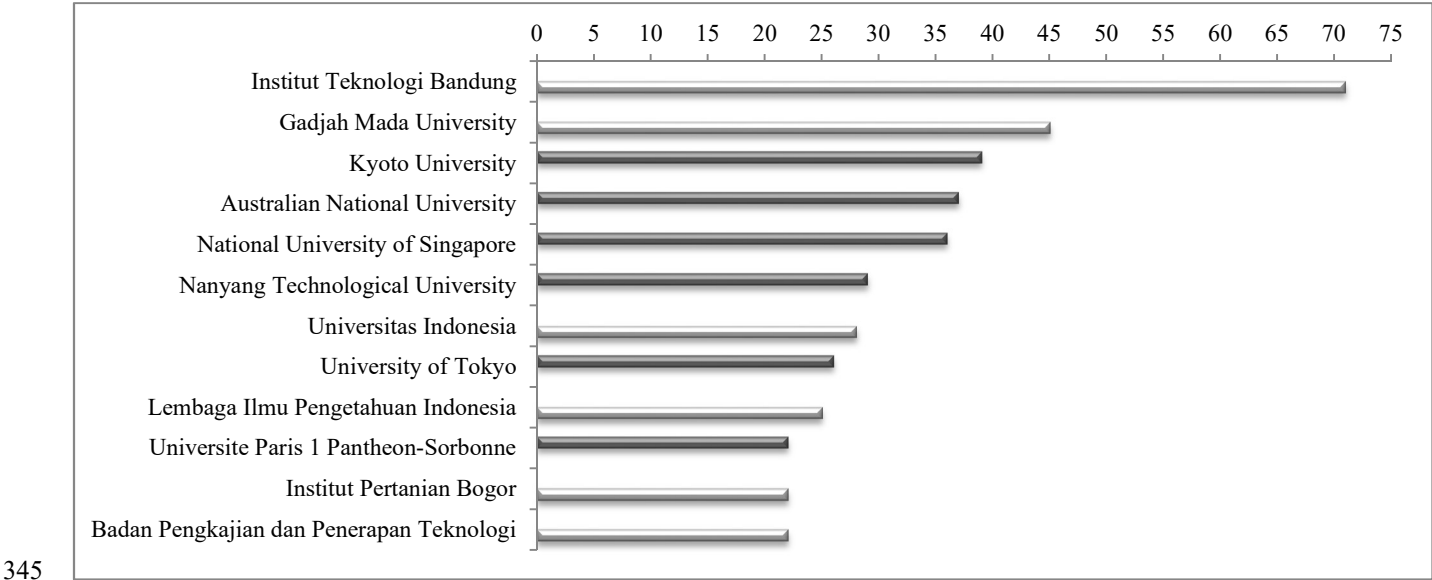


Figure 6 Organizations with Highest Number of Publications (Indonesian Organizations marked as Light bar) (source: modified from SCOPUS results)

3.2.3 Publications sources

This section presents the source of publications. It is clear that the great majority of publications from journals are those that indexed in SCOPUS, compared to conference proceedings, books, or others. A closer look at the journals shows those related to geophysical hazards (volcanoes, earthquakes, tsunami, etc) identification and assessments dominate the numbers of papers published on Indonesia (Table 4).

Table 4 List of 10 highest submitted journals (source: modified from SCOPUS results)

| Publications | Number of papers | IF (Impact Factor) | SJR (Scientific Journal Ranking) | Category | | |
|--|------------------|--------------------|----------------------------------|----------|-----|----|
| | | | | HRD | DRR | CC |
| 1. Journal of Volcanology and Geothermal Research | 75 | 2.543 | | x | | |
| 2. Natural Hazards | 39 | 1.719 | | x | x | |
| 3. Natural Hazards and Earth System Science | 27 | 1.735 | | x | x | |
| 4. Bulletin of Volcanology | 22 | 2.519 | | x | | |
| 5. Geophysical Research Letters | 17 | 4.196 | | x | | |
| 6. Earth and Planetary Science Letters | 16 | 4.734 | | x | | |
| 7. Pure and Applied Geophysics | 15 | 1.618 | | x | | |
| 8. Nature | 14 | 41.456 | | x | | x |
| 9. Journal of Disaster Research | 14 | - | 0.18 | | x | |
| 10. Journal of Geophysical Research: Solid Earth | 12 | 3.426 | | x | | |
| 11. International Journal of Disaster Risk Reduction | 12 | - | 0.510 | | x | x |
| 12. Bulletin of the International Institute of Seismology and Earthquake Engineering | 12 | - | 0.12 | x | | |

A very striking finding, however, the Indonesian Journal of Geography is the only Indonesian journal that discusses these three topics to be indexed by SCOPUS. The journal was established in 1961 by the Faculty of Geography, UGM in cooperation with the Association of Indonesian Geographers (UGM, 2016). There are no clear counts on the number of academic journals in Indonesia, however, there are 245 accredited by DIKTI (Higher education directorates of the Ministry of Education) (DIKTI, 2016b) and only 17 indexed in SCOPUS (DIKTI, 2016a). In addition, none of these journals have yet obtained an impact factor, and hence a Scientific Journal Ranking (SJR) Score is presented instead (SJR, 2016).

3.2.4 Citations

This section analyzes the citations for each topic category. Overall, the HRD category has the highest number of citations, in total more than two thirds (3945 of 5291) of all citations. A look of the citation averages, however, shows quite a different story. Whilst the CC literature category has the least number of papers published (194), the citation average is twice of the

365 DRR category (3,18). Figure 7 shows the comparison between the progress of Indonesian researchers in the 10 most cited papers overall and those first authored by Indonesians. The role of first author has been considered significant since they are traditionally assumed to lead the research and write most of the content, and therefore receive most credit (Riesenberg and Lundberg, 1990; Hu, 2009). It shows that there are more authors, mostly international authors in the 10 most cited papers, while there are more Indonesians in the 10 most cited papers first authored by Indonesians. This might suggest that
 370 Indonesian researchers tend to work with other Indonesians and hence needed to expand their collaborations with international scholars as a strategy to increase their number of citations and ability to submit for higher impact journals.

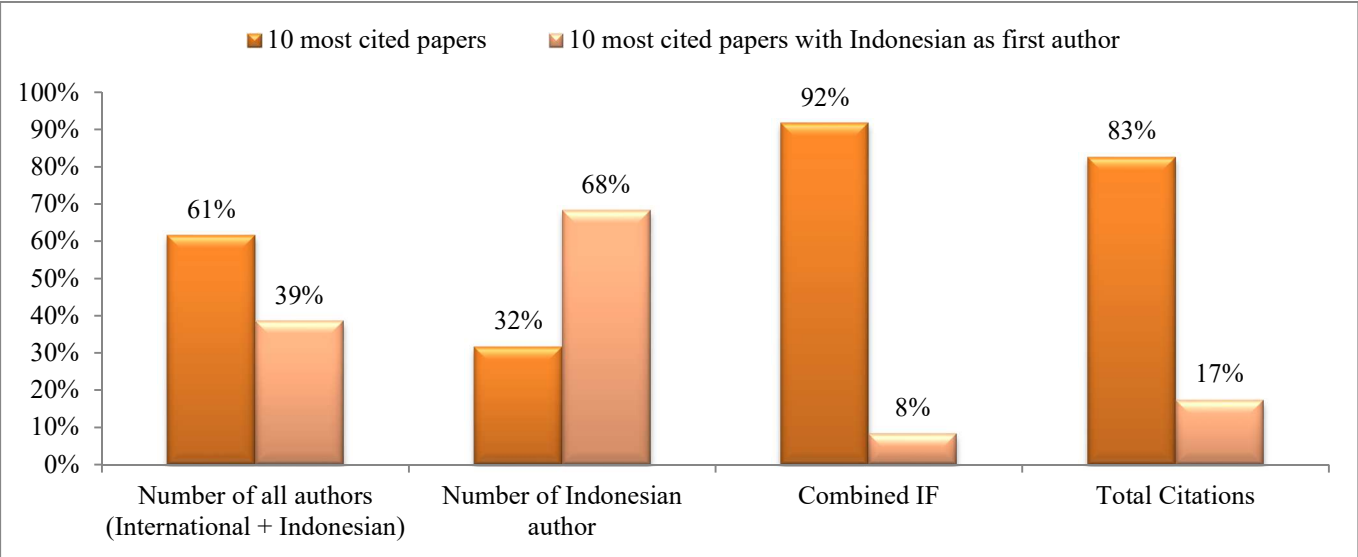


Figure 7 Comparing the Roles of Indonesian Researchers in the 10 Most Cited Papers (source: modified from SCOPUS results)

375 Table 5 shows the list of the 10 most cited papers of all publications. Within the 10 most cited papers, the total citations are 4,204 with a combined impact factor (IF) of 293.618, and only one third of the authors are Indonesian. The citation is three times of those first authored by Indonesians, and the IF is 4 times greater. It is shown that they are published in high impact factor journals such as Nature, Science, or those related to geophysical hazards. The two highest cited papers are published in Nature and discuss the impacts of forest fires in Indonesia. The paper related to the examination of the amount of carbon
 380 released from peat and forest fires in Indonesia in 1997 has the highest citation of 1287 by Page et al (2002). The majority of the papers discuss major hazards from the earthquake in Sumatera (Ishii et al., 2005; Briggs et al., 2006; Hsu et al., 2006; Konca et al., 2008), to the impacts of Toba (Rampino and Self, 1992) and Merapi volcanic eruptions (Voight et al., 2000). Eight papers were also contributed by Indonesians with Natawidjaja was involved in five of them. Jaya and Limin are both lecturers from the Palangkaraya University in Kalimantan, where forest fires frequently occurred across the rain forest and
 385 impacted not only Indonesia but also surrounding countries in the region such as Singapore (Tay, 1998) and Malaysia (Khandekar et al., 2000). Natawidjaja and Subarya, along with Sieh contributed the most (Briggs et al., 2006; Hill et al.,

2012; Horspool et al., 2014; Hsu et al., 2006; Konca et al., 2008; Muhari et al., 2010; Nalbant et al., 2005; Philibosian et al., 2012; Prayodhie et al., 2012; Schlurmann et al., 2010; Singh et al., 2010).

390 A closer examination of the list of ten most cited publications with Indonesian first authors shows a very striking picture. The total citations is only 1542, with a combined IF of only 70, 012, with 80% of all authors being Indonesian. The papers are much more varied in terms of topics they discussed. The first two most cited papers are related to impacts of climate change in Indonesia. Aldrian (2003), Susanto (2003; 2001) and also Amien et al (1996) authored papers related to climate change or its impacts on Indonesia. Natawidjaja (Natawidjaja et al., 2006; Natawidjaja et al., 2004) and Abidin (Abidin et al., 2001; Abidin et al., 2011) both have 2 papers to contribute each within the list of most cited papers first
395 authored by Indonesian on earthquakes and land subsidence assessments. One paper examines the impacts of volcanoes (Andreastuti et al., 2000). Marfai wrote extensively on coastal risks and disasters in cities such as Semarang or Jakarta (Marfai and King, 2008; Marfai et al., 2008; Marfai et al., 2015; Ward et al., 2013; Marfai, 2014; Marfai and King, 2007). This table shows that in generals, Indonesia authors' still write papers with fewer citations, and the organizations that house these authors are still extremely limited to ITB, UGM, LIPI, and PVMBG. Another significant finding here is that there is no
400 paper on DRR. This is an important finding that which also show how social science perspectives needed to be taken up by the Indonesia researchers in dealing with the management of disaster risks and disaster risks in Indonesia.

Table 5 Comparing Citations Authored in General and Those First Authored by Indonesian in 10 Most Cited Papers (source: modified from SCOPUS results)

| Overall | | | | | | First authored by Indonesian | | | | | |
|---|--|------|--------------------------------------|---------------|-------------------|---|--|------|--|---------------|-----------------------|
| Authors (Indonesian are marked I) | Title | Year | Journal Name | Citatio ns | Impact Factors | Authors (Indonesian are marked I) | Title | Year | Journal Name | Citation s | Impact Factor s |
| Page S.E., Siegert F., Rieley J.O., Boehm H.-D.V., Jaya A., (I) Limin S. (I) | The amount of carbon released from peat and forest fires in Indonesia during 1997 | 2002 | Nature | 1280 | 41.456 | Aldrian E. (I), Dwi Susanto R. (I) | Identification of three dominant rainfall regions within Indonesia and their relationship to sea surface temperature | 2003 | International Journal of Climatology | 344 | 3.609 |
| Siegert F., Ruecker G., Hinrichs A., Hoffmann A.A. | Increased damage from fires in logged forests during droughts caused by El Niño | 2001 | Nature | 519 | 41.456 | Subarya, C (I), Chlieh, M., Prawirodirdjo, L (I), Avouac, JP, Bock, Sieh, Meltzner, Natawidjaja (I), McCaffrey | Plate-boundary deformation associated with the great Sumatra-Andaman earthquake | 2006 | Nature | 343 | 41.456 |
| Ishii M., Shearer P.M., Houston H., Vidale J.E. | Extent, duration and speed of the 2004 Sumatra-Andaman earthquake imaged by the Hi-Net array | 2005 | Nature | 386 | 41.456 | Susanto R.D. (I), Gordon A.L., Zheng Q. | Upwelling along the coasts of Java and Sumatra and its relation to ENSO | 2001 | Geophysical Research Letters | 161 | 4.196 |
| Aldrian E. (I), Dwi Susanto R. (I) | Identification of three dominant rainfall regions within Indonesia and their relationship to sea surface temperature | 2003 | International Journal of Climatology | 343 | 3.157 | Danny Hilman Natawidjaja (I), Kerry Sieh, Mohamed Chlieh, John Galetzka, Bambang W Suwargadi (I), Hai Cheng, R Lawrence Edwards, Jean-Philippe Avouac, Steven N Ward | Source parameters of the great Sumatran megathrust earthquakes of 1797 and 1833 inferred from coral microatolls | 2006 | Journal of Geophysical Research: Solid Earth | 156 | 3.318 |
| Subarya, C (I), Chlieh, M., Prawirodirdjo, L (I), Avouac, JP, Bock, Sieh, Meltzner, Natawidjaja (I), McCaffrey | Plate-boundary deformation associated with the great Sumatra-Andaman earthquake | 2006 | Nature | 343 | 41.456 | Danny Hilman Natawidjaja (I), Kerry Sieh, Steven N Ward, Hai Cheng, R Lawrence Edwards, John Galetzka, | Paleogeodetic records of seismic and aseismic subduction from central Sumatran microatolls, Indonesia | 2004 | Journal of Geophysical Research: Solid Earth | 119 | 3.318 |

| Overall | | | | | |
|--|--|------|--|---------------|-------------------|
| Authors (Indonesian are marked I) | Title | Year | Journal Name | Citatio ns | Impact Factors |
| Rampino M.R., Self S. | Volcanic winter and accelerated glaciations following the Toba super- eruption | 1992 | Nature | 333 | 41.456 |
| Sieh, Natawidjaja (I) | Neotectonics of the Sumatran fault, Indonesia | 2000 | Journal of Geophy sical Researc h: Solid Earth | 317 | 3.426 |
| C Vigny, WJF Simons, S Abu, Ronnachai Bamphenyu, Chalermchon Satirapod, Nithiwatthn Choosakul, C Subarya, A Socquet, Kamaludin Omar, HZ Abidin, BAC Ambrosius | Insight into the 2004 Sumatra– Andaman earthquake from GPS measurements in southeast Asia | 2005 | Nature | 329 | 41.456 |
| Hsu Y.-J., Simons M., Avouac J.-P., Galeteka J., Sieh K., Chlieh M., Natawidjaja D. (I), Prawirodirdjo L. (I), Bock Y. | Frictional afterslip following the 2005 Nias- Simeulue earthquake, Sumatra | 2006 | Science | 271 | 33.61 |

| First authored by Indonesian | | | | | |
|--|---|------|--|---------------|-----------------------|
| Authors (Indonesian are marked I) | Title | Year | Journal Name | Citation s | Impact Factor s |
| Bambang W Suwargadi (I) | | | | | |
| Hasanuddin Z Abidin, Rochman Djaja, Dudy Darmawan, Samsul Hadi, Arifin Akbar, H Rajiyowiryono, Y Sudibyo, I Meilano, MA Kasuma, J Kahar, Cecep Subarya (All Indonesian) | Land subsidence of Jakarta (Indonesia) and its geodetic monitoring system | 2001 | Natural Hazards | 103 | 1.719 |
| Andreastuti S.D. (I), Alloway B.V., Smith I.E.M. | A detailed tephrostratigraphic framework at Merapi Volcano, Central Java, Indonesia: Implications for eruption predictions and hazard assessment | 2000 | Journal of Volcanolo gy and Geotherm al Research | 81 | 2.543 |
| Marfai, Muh Aris (I), and King, L | Monitoring land subsidence in Semarang, Indonesia | 2007 | Environm ental Geology Journal of Geophysi cal Research: Solid Earth | 68 | 3.318 |
| Marfai, Muh Aris (I), and King, L | Potential vulnerability implications of coastal inundation due to sea level rise for the coastal zone of Semarang city, Indonesia | 2008 | Environm ental Geology Journal of Geophysi cal Research: Solid | 59 | 3.318 |

| Overall | | | | | |
|--|---|------|-----------------|---------------|-------------------|
| Authors (Indonesian are marked I) | Title | Year | Journal Name | Citatio ns | Impact Factors |
| Briggs R.W., Sieh K., Meltzner A.J., Natawidjaja D. (I), Galetzka J., Suwargadi B. (I), Hsu Y.-J., Simons M., Hananto N. (I), Suprihanto I. (I), Prayudi D. (I), Avouac J.-P., Prawirodirdjo L. (I), Bock Y. | Deformation and slip along the Sunda megathrust in the great 2005 Nias-Simeulue earthquake | 2006 | Science | 226 | 33.61 |
| Konca A.O., Avouac J.-P., Sladen A., Meltzner A.J., Sieh K., Fang P., Li Z., Galetzka J., Genrich J., Chlieh M., Natawidjaja D.H. (I), Bock Y., Fielding E.J., Ji C., Helmberger D.V. | Partial rupture of a locked patch of the Sumatra megathrust during the 2007 earthquake sequence | 2008 | Nature | 207 | 41.456 |
| Total | - | - | - | 4547 | 296.775 |

| First authored by Indonesian | | | | | |
|--|--|------|---|---------------|-----------------------|
| Authors (Indonesian are marked I) | Title | Year | Journal Name | Citation s | Impact Factor s |
| Earth | | | | | |
| Marfai, Muh Aris, Hussein Almohammad, Sudip Dey, Budi Susanto, Lorenz King | Coastal dynamic and shoreline mapping: multi-sources spatial data analysis in Semarang Indonesia | 2008 | Environm ental Monitorin g and Assessme nt | 57 | 1.663 |
| Amien I. (I), Rejekiningrum P. (I), Pramudia A. (I), Susanti E (I). | Effects of interannual climate variability and climate change on rice yield in Java, Indonesia | 1996 | Water, Air, and Soil Pollution | 51 | 1.554 |
| Total | - | - | - | 1542 | 70,012 |

This paper has presented the results of a systematic literature review from Scopus to on the current research trends and progress related to natural hazards, disasters, and disaster risks reduction, as well as increasingly climate change impacts and governance in Indonesia. The paper also examines the roles of Indonesian authors and organizations in contributing to publications related to these topics. We have seen that some of the earliest publications were written in 1934 and
410 publications started to increase rapidly since 2000. It is found there are more publications on HRD, than those on DRR and CC. Moreover, there are twice international authors for every Indonesian author and the contribution of international authors dominates the production of publications. Most of the high impact publications and international collaborations were conducted with the key institutions centered on ITB, UGM, LIPI and PVMBG. Male and advanced career authors still dominate, compare to the numbers and roles of female and early career researchers (ECR). In addition, there are very few
415 researchers have social media accounts such as Google Scholar (Google, 2016a) or Research Gate (Research Gate, 2016b) or professional and personal websites.

The first part of the recommendations is related to future research topics. More research is needed on different hazards, different locations in Indonesia, and other topics in DRR and climate change. Majority of current research is still focused on geophysical hazards and those related to hydro-meteorological hazards have only received attention recently. Multi hazard,
420 risks and vulnerability assessments are suggested. It has been seen that majority of research focuses on the Islands of Java and Sumatera. This is expected since both islands are the most at risks from natural hazards in Indonesia. However, other islands in Kalimantan, Sulawesi, Maluku and Papua in the eastern part of Indonesia have also been impacted by droughts, floods or strong winds and needs to be addressed in the future. The impacts of sea level rise on small islands, drought on forests in Kalimantan and Papua, raising sea level and ocean acidification on fisheries industry in Sulawesi and eastern part
425 of Indonesia, are some of the increasingly worrisome issues expected from climate change. As the world is increasingly urbanized, there is strong international attention focusing and reducing risks in urban areas, in particular through concerted action in the New Urban Agenda (UN HABITAT, 2016). More research need to take into account the context of urban areas by which social risks and risks from natural hazards play out simultaneously, and the impacts on urban dwellers needs to be understood. Cities in Indonesia like Jakarta, Surabaya or Makassar are rapidly urbanizing and environmental and economic
430 pressures increase risks for the inhabitants (Firman et al., 2011; Larson et al., 2013; Santosa, 2000; Firman, 2016; van Voorst, 2016). Disaster risk governance has not received much research especially on the interplay with decentralization which places responsibility for DRR and risk management at the local government level (Lassa, 2013; Kusumasari et al., 2010). Strategies and actions for integrating DRR and CCA need to be explored further (Djalante and Thomalla, 2012; Lassa and Nugraha, 2015) There is still greater need for research on climate change topics related to linkages between poverty and
435 disaster vulnerability (Suryahadi and Sumarto, 2003), security (CSIS, 2016), loss and damages (Warner et al., 2012), impacts on key sectors such as fisheries (USAID Indonesia, 2015), coastal communities (Marfai, 2014; Marfai et al., 2008), food security (Measey, 2012; WFP, 2015) health (Ady Wirawan, 2010; Haryanto, 2009), migrations (Raleigh et al., 2008;

Reuveny, 2007), community-based DRR (Heijmans, 2012), and the role of ecosystems for DRR/CCA (Renaud et al, 2016). Many activities done by international and development agencies on their implementations for DRR or CCA programmes have focused on the community level. There is abundance of activity reports by donor and international agencies (e.g. USAID, 2016; USAID Indonesia, 2011, 2015); however, those reports are rarely made available or submitted for academic publications. There is abundance of materials within Indonesian repositories related to *bencana* (Indonesia word for disaster), especially within the repositories at ITB, UGM, and University of Syiah Kuala in Aceh. These materials and research activities done within the universities need to be reviewed and submitted for international journals in order to give a broader view on issues that have been discussed by scholars in Indonesia. The author acknowledges that there are also Indonesia local database from Kemenristek DIKTI Indonesia, such as Shinta and Portal Garuda, and materials from these databases should be made available and accessible internationally (RISTEKDIKTI, 2016).

The **second** part of the recommendation is on the need to strengthen the capacity of research collaborations between Indonesian and international researchers, multi disciplinarity research and publications in high impacts journals. It is clear that some of the very limited Indonesian research from key universities doing disaster research such as the Bandung Institute of Technology (ITB), Indonesia Institute of Science (LIPI), the Gadjah Mada University (UGM) have been involved in international collaborations and publications of high impacts journal (QS, 2016). There needs to be more collaboration between local universities (Indonesia) and universities partner (outside Indonesia) to promote International publications in Indonesia, particularly to enlarge the topics related to the disaster, hazard, and risk reduction. There are only nine universities in Indonesia that are within the list of QS World University Rankings, with University of Indonesia at the top of the list (QS, 2016). Other universities on the islands of Sumatra, Sulawesi, and Kalimantan and other locations need to address disaster issues as part of their research agendas (OECD and ADB, 2015).

There is a need for better targeting of scholars to do more collaboration for research and writing for high impact journals. This goes along with strengthening the capacity of researchers and lecturers at the universities to write and publish in international journals. In particular, there are a limited number of authors involved with publications in the highest IF journals such as Nature and Science. Indonesian authors beyond this 4 organizations largely lack experience in international collaboration and the language and writing skills necessary for submitting their works to internationally accredited journals. High impact articles and collaborations were only done through organizations centered on ITB, UGM, LIPI and PVMBG. Despite some Indonesian researchers who have been strongly influential within the study of hazards, DRR or climate change in Indonesia and could potentially contribute to the global development of knowledge in these fields, they have mostly published in Bahasa Indonesia and did not submit their works into international mostly English language journals. The Ministry of Education has indeed conducted a training scheme and provided incentives for lecturers that have published internationally (RISTEKDIKTI, 2016), however, the overall quality and quantity of papers by Indonesian researchers are still much less than those at comparable universities in Malaysia or Singapore (RISTEKDIKTI, 2016). The list from Scopus shows that there is still only small numbers of female and early career researchers (SCOPUS, 2016a). Studies on the roles of international and local authorships and collaborations show that although it rapidly increasing, there are still more efforts

needed to strengthen and advance those collaborations (Bordons et al., 1996; Wagner and Leydesdorff, 2005b, a; Gazni et al., 2012). It further shows that there is still imbalance in the ratio of male to female scientists, as the global trends also show (Sidhu et al., 2009; Lewison, 2001; Koppel et al., 2002; Sugimoto et al., 2013). The author could not find a repository of
475 researchers from the Ministry of Education website, let alone systematically determining their progress, history of schooling and research. Early career researchers (ECR) are defined as those who are within 8 years after completing PhDs or within 6 years of trainings (AHRC, 2016). While globally there has been some systematic efforts to strengthen the capacity of ECR such as through mentoring and connecting ECR with established researchers or organizations internationally (Clarke, 2004; Kram and Isabella, 1985), there are no clear similar strategies for the Indonesian ERC from the Indonesian governments.
480 Some initial activity by DIKTI is to connect and invite Indonesian researchers that have worked internationally to visit and mentor Indonesian researchers and universities (RISTEKDIKTI, 2016). Other activity was through the TWIN-SEA network between UNU-EHS, University Hannover and LIPI which aim to connect researchers on the topic of disasters and climate change, through activities such as collaborative writings, publications and research. Through the research school scheme, the TWIN-SEA connects the ECR from Indonesia to get access to expertise in Germany and also connects with DAAD
485 Indonesia and LPDP as the scholarship providers to support the ECS to do master and doctorate degrees in Germany (UNU-EHS, 2017). International journals (e.g. Elsevier, 2016), international and other national research council such as the United States of America have allocated research funding research specifically for international collaborations such as the Partnerships for Enhance Engagement in Research (PEER) (NSF, 2017) or the UK Government who allocates funding specifically for ECR (RCUK, 2016). The Indonesian Association of Disaster Experts was formed in 2014 and meets
490 annually to discuss their future research guidelines (IABI, 2016). IABI can be involved to review current publications in Bahasa Indonesia and collaborations undertaken by Indonesian experts which can enable better identification of research progress and hence research needs in the future. There is increasing call for more inter-disciplinary collaborations so that complex problems on social and environmental issues can be understood better and problems identifications can better target those in needs (Future Earth, 2016). Hence this implies increasing importance of social science adoption to study disasters
495 and their impacts. The roles of private business and the communities at risk have rarely been part of the research and collaborations. It is also not clear how collaborations amongst scientists from social and physical backgrounds have taken place in Indonesia. It is also not clear how or whether science (Wagner and Leydesdorff, 2005a), policy and industry (Lee, 1996) collaborations have taken place and were documented in these listed publications. These collaborations are important to face the complexities of future problems (Leydesdorff and Wagner, 2008), and also to help achieve the outcomes of the
500 Sustainable Development Goals (United Nations, 2015). The importance of science communication and the increasing demand for researchers to publish their works outside of traditional methods such as journal articles, but also through blogs, websites, policy briefs, and popular media is now encouraged (Gu and Widén-Wulff, 2011; Thelwall et al., 2013; Bik and Goldstein, 2013).

In conclusion this study has been able to determine the progress in research related to natural hazards, risks, and risk
505 reduction and climate change impacts in Indonesia. It has also been able to examine the roles of Indonesian scientists in

collaborations and towards high quality publications. The recommendations are outlined toward these two issues and it is the responsibility both of the Indonesian and international organizations that have worked and will work in Indonesia to be able to meet the needs in order for Indonesia to better understand, manage, and reduce its natural hazards and risks in the future and ultimately build a resilient and sustainable nation.

510 Acknowledgment

The author would like to acknowledge her Alexander von Humboldt Fellowship for Experienced Researchers which facilitates her research in Germany at the United Nations University Institute for Environment and Human Security. The author benefits enormously from the reviewers' comments and has greatly improved to quality of the paper.

Reference

- 515 Abidin, H. Z., Djaja, R., Darmawan, D., Hadi, S., Akbar, A., Rajiyowiryono, H., Sudiby, Y., Meilano, I., Kasuma, M., and Kahar, J.: Land subsidence of Jakarta (Indonesia) and its geodetic monitoring system, *Natural Hazards*, 23, 365-387, 2001.
- Abidin, H. Z., Andreas, H., Gumilar, I., Fukuda, Y., Pohan, Y. E., and Deguchi, T.: Land subsidence of Jakarta (Indonesia) and its relation with urban development, *Natural Hazards*, 59, 1753-1771, 2011.
- 520 Adiyoso, W., and Kanegae, H.: Effectiveness of disaster-based school program on students' earthquake-preparedness, *Journal of Disaster Research*, 8, 1009-1017, 2013.
- Ady Wirawan, M.: Public Health Responses to Climate Change Health Impacts in Indonesia, *Asia-Pacific Journal of Public Health*, 22, 25-31, 10.1177/1010539509350912, 2010.
- Definition of eligibility for funding: <http://www.ahrc.ac.uk/skills/earlycareerresearchers/definitionofeligibility/>, access: June 28, 2016.
- 525 Aldrian, E., and Dwi Susanto, R.: Identification of three dominant rainfall regions within Indonesia and their relationship to sea surface temperature, *International Journal of Climatology*, 23, 1435-1452, 10.1002/joc.950, 2003.
- Aldrian, E., and Djamil, Y. S.: Spatio-temporal climatic change of rainfall in East Java Indonesia, *International Journal of Climatology*, 28, 435-448, 10.1002/joc.1543, 2008.
- 530 Aleotti, P., and Chowdhury, R.: Landslide hazard assessment: Summary review and new perspectives, *Bulletin of Engineering Geology and the Environment*, 58, 21-44, 1999.
- Amien, I., Rejekiingrum, P., Pramudia, A., and Susanti, E.: Effects of evterajnnual climate variability and climate change on rice yield in Java, Indonesia, *Water, Air, and Soil Pollution*, 92, 29-39, 1996.
- Andreastuti, S. D., Alloway, B. V., and Smith, I. E. M.: A detailed tephrostratigraphic framework at Merapi Volcano, Central Java, Indonesia: Implications for eruption predictions and hazard assessment, *Journal of Volcanology and Geothermal Research*, 100, 51-67, 2000.
- 535 Bakkalbasi, N., Bauer, K., Glover, J., and Wang, L.: Three options for citation tracking: Google Scholar, Scopus and Web of Science, *Biomed. Digit. Libr.*, 3, 10.1186/1742-5581-3-7, 2006.
- Bakkour, D., Enjolras, G., Thouret, J. C., Kast, R., Mei, E. T. W., and Prihatminingtyas, B.: The adaptive governance of natural disaster systems: Insights from the 2010 mount Merapi eruption in Indonesia, *International Journal of Disaster Risk Reduction*, 13, 167-188, 10.1016/j.ijdrr.2015.05.006, 2015.
- 540 Balgos, B., Gaillard, J. C., and Sanz, K.: The warias of Indonesia in disaster risk reduction: the case of the 2010 Mt Merapi eruption in Indonesia, *Gender Dev.*, 20, 337-348, 10.1080/13552074.2012.687218, 2012.
- Bar-Ilan, J.: Which h-index? - A comparison of WoS, Scopus and Google Scholar, *Scientometrics*, 74, 257-271, 10.1007/s11192-008-0216-y, 2008.
- 545

- Baumann, P. R.: Tsunami 2004: The villages of Birek and Seungko Mulat, Indonesia, *Geocarto International*, 23, 327-335, 10.1080/10106040701770727, 2008.
- Beerens, R. J. J., and Tehler, H.: Scoping the field of disaster exercise evaluation - A literature overview and analysis, *International Journal of Disaster Risk Reduction*, 19, 413-446, <http://dx.doi.org/10.1016/j.ijdrr.2016.09.001>, 2016.
- 550 Berrang-Ford, L., Ford, J. D., and Paterson, J.: Are we adapting to climate change?, *Global Environmental Change*, 21, 25-33, 10.1016/j.gloenvcha.2010.09.012, 2011.
- Berrang-Ford, L., Pearce, T., and Ford, J. D.: Systematic review approaches for climate change adaptation research, *Regional Environmental Change*, 15, 755-769, 10.1007/s10113-014-0708-7, 2015.
- Bik, H. M., and Goldstein, M. C.: An Introduction to Social Media for Scientists, *PLoS Biol*, 11, e1001535, 2013.
- 555 Birkmann, J., Setiadi, N., and Fiedler, G.: A culture of resilience and preparedness: The 'last mile' case study of tsunami risk in Padang, Indonesia, in: *Cultures and Disasters: Understanding Cultural Framings in Disaster Risk Reduction*, 235-254, 2015.
- Bordons, M., Gómez, I., Fernández, M. T., Zulueta, M. A., and Méndez, A.: Local, Domestic and International Scientific Collaboration in Biomedical Research, *Scientometrics*, 37, 279-295, 10.1007/bf02093625, 1996.
- 560 Brauer, M., and Hisham-Hashim, J.: Fires in Indonesia: Crisis and reaction, *Environmental Science and Technology*, 32, 404A-407A, 1998.
- Briggs, R. W., Sieh, K., Meltzner, A. J., Natawidjaja, D., Galetzka, J., Suwargadi, B., Hsu, Y. J., Simons, M., Hananto, N., Suprihanto, I., Prayudi, D., Avouac, J. P., Prawirodirdjo, L., and Bock, Y.: Deformation and slip along the Sunda megathrust in the great 2005 Nias-Simeulue earthquake, *Science*, 311, 1897-1901, 10.1126/science.1122602, 2006.
- 565 Brink, E., Aalders, T., Ádám, D., Feller, R., Henselek, Y., Hoffmann, A., Ibe, K., Matthey-Doret, A., Meyer, M., Negrut, N. L., Rau, A. L., Riewerts, B., von Schuckmann, L., Törnros, S., von Wehrden, H., Abson, D. J., and Wamsler, C.: Cascades of green: A review of ecosystem-based adaptation in urban areas, *Global Environmental Change*, 36, 111-123, 10.1016/j.gloenvcha.2015.11.003, 2016.
- Budiyono, Y., Aerts, J. C. J. H., Tollenaar, D., and Ward, P. J.: River flood risk in Jakarta under scenarios of future change, *Natural Hazards and Earth System Sciences*, 16, 757-774, 10.5194/nhess-16-757-2016, 2016.
- 570 Carn, S. A.: Application of synthetic aperture radar (SAR) imagery to volcano mapping in the humid tropics: A case study in East Java, Indonesia, *Bulletin of Volcanology*, 61, 92-105, 10.1007/s004450050265, 1999.
- Caruso, R., Petrarca, I., and Ricciuti, R.: Climate change, rice crops, and violence: Evidence from Indonesia, *Journal of Peace Research*, 53, 66-83, 10.1177/0022343315616061, 2016.
- 575 Chang Seng, D. S.: Tsunami resilience: Multi-level institutional arrangements, architectures and system of governance for disaster risk preparedness in Indonesia, *Environmental Science and Policy*, 29, 57-70, 10.1016/j.envsci.2012.12.009, 2013.
- Chang, Y., Wilkinson, S., Potangaroa, R., and Seville, E.: Donor-driven resource procurement for post-disaster reconstruction: Constraints and actions, *Habitat International*, 35, 199-205, 10.1016/j.habitatint.2010.08.003, 2011.
- 580 Charbonnier, S. J., and Gertisser, R.: Field observations and surface characteristics of pristine block-and-ash flow deposits from the 2006 eruption of Merapi Volcano, Java, Indonesia, *Journal of Volcanology and Geothermal Research*, 177, 971-982, 10.1016/j.jvolgeores.2008.07.008, 2008.
- Chiu, W.-T., and Ho, Y.-S.: Bibliometric analysis of tsunami research, *Scientometrics*, 73, 3-17, 10.1007/s11192-005-1523-1, 2007.
- 585 Chrastansky, A., and Rotstajn, L. D.: The effect of ENSO-induced rainfall and circulation changes on the direct and indirect radiative forcing from Indonesian biomass-burning aerosols, *Atmospheric Chemistry and Physics*, 12, 11395-11416, 10.5194/acp-12-11395-2012, 2012.
- Clarke, M.: Reconceptualising mentoring: reflections by an early career researcher, *Issues in Educational Research*, 14, 121, 2004.
- 590 Coughlan de Perez, E., Nerlander, L., Monasso, F., van Aalst, M., Mantilla, G., Muli, E., Nguyen, T., Rose, G., and Rumbaitis Del Rio, C.: Managing health risks in a changing climate: Red Cross operations in East Africa and Southeast Asia, *Climate and Development*, 7, 197-207, 10.1080/17565529.2014.951012, 2015.
- CSIS: CLIMATE CHANGE AND ITS POSSIBLE SECURITY IMPLICATIONS INDONESIA SUSTAINABLE DEVELOPMENTKNOWLEDGE PLATFORM, 2016.

- 595 D'Arrigo, R., Wilson, R., Palmer, J., Krusic, P., Curtis, A., Sakulich, J., Bijaksana, S., Zulaikah, S., and Ngkoimani, L. O.: Monsoon drought over Java, Indonesia, during the past two centuries, *Geophysical Research Letters*, 33, 10.1029/2005gl025465, 2006.
- D'Arrigo, R., and Smerdon, J. E.: Tropical climate influences on drought variability over Java, Indonesia, *Geophysical Research Letters*, 35, 10.1029/2007gl032589, 2008.
- 600 D'Arrigo, R., and Wilson, R.: El Niño and Indian Ocean influences on Indonesian drought: Implications for forecasting rainfall and crop productivity, *International Journal of Climatology*, 28, 611-616, 10.1002/joc.1654, 2008.
- D'Arrigo, R., Abram, N., Ummenhofer, C., Palmer, J., and Mudelsee, M.: Reconstructed streamflow for Citarum River, Java, Indonesia: Linkages to tropical climate dynamics, *Climate Dynamics*, 36, 451-462, 10.1007/s00382-009-0717-2, 2011.
- 605 Daly, P., and Brassard, C.: Aid accountability and participatory approaches in post-disaster housing reconstruction1, *Asian J. Soc. Sci.*, 39, 508-533, 10.1163/156853111x597305, 2011.
- Dicky, M., Haerani, E., Shibayama, M., Ueshima, M., Kagawa, N., and Hirnawan, F.: Disaster awareness education for children in schools around geological hazard prone areas in Indonesia, in: *Engineering Geology for Society and Territory - Volume 6: Applied Geology for Major Engineering Projects*, 107-111, 2015.
- 610 List of Indonesian Journals indexed in SCOPUS: <http://uilis.unsyiah.ac.id/jurnal-terakreditasi/index.php?id=scopus>, access: March 4, 2016a.
- Indonesian Scientific Journal Database: <http://isjd.pdii.lipi.go.id/index.php/Daftar-Jurnal-Hasil-Akreditasi-DIKTI.html>, access: March 4, 2016b.
- Djalante, R., and Thomalla, F.: Disaster risk reduction and climate change adaptation in Indonesia: Institutional challenges and opportunities for integration, *International Journal of Disaster Resilience in the Built Environment*, 3, 166-180, 10.1108/17595901211245260, 2012.
- 615 Djalante, R., Thomalla, F., Sinapoy, M. S., and Carnegie, M.: Building resilience to natural hazards in Indonesia: Progress and challenges in implementing the Hyogo Framework for Action, *Natural Hazards*, 62, 779-803, 10.1007/s11069-012-0106-8, 2012.
- 620 Djalante, R., Holley, C., Thomalla, F., and Carnegie, M.: Pathways for adaptive and integrated disaster resilience, *Natural Hazards*, 69, 2105-2135, 10.1007/s11069-013-0797-5, 2013.
- Donovan, K.: Doing social volcanology: Exploring volcanic culture in Indonesia, *Area*, 42, 117-126, 10.1111/j.1475-4762.2009.00899.x, 2010.
- Donovan, K., Suryanto, A., and Utami, P.: Mapping cultural vulnerability in volcanic regions: The practical application of social volcanology at Mt Merapi, Indonesia, *Environmental Hazards*, 11, 303-323, 10.1080/17477891.2012.689252, 2012.
- 625 Du, Y. B., Lee, C. T., Christina, D., Belfer, M. L., Betancourt, T. S., O'Rourke, E. J., and Palfrey, J. S.: The living environment and children's fears following the Indonesian tsunami, *Disasters*, 36, 495-513, 10.1111/j.1467-7717.2011.01271.x, 2012.
- 630 Early Career Researchers: <https://www.elsevier.com/connect/story/research-matters/early-career-researchers>, access: June 28, 2016.
- The International Disaster Database: Center for Research on the Epidemiology of Disasters (CRED): <http://www.emdat.be/>, access: June 28, 2016.
- Disaster Profile: Indonesia: http://www.emdat.be/country_profile/index.html, access: March 4th, 2016.
- 635 Enia, J. S.: Peace in its Wake? The 2004 Tsunami and internal conflict in Indonesia and Sri Lanka, *Journal of Public and International Affairs*, 19, 7-27, 2008.
- Kerry Sieh: <http://www.earthobservatory.sg/people/kerry-sieh>, access: March 4, 2016.
- Esteban, M., Tsimopoulou, V., Mikami, T., Yun, N. Y., Suppasri, A., and Shibayama, T.: Recent tsunamis events and preparedness: Development of tsunami awareness in Indonesia, Chile and Japan, *International Journal of Disaster Risk Reduction*, 5, 84-97, 10.1016/j.ijdrr.2013.07.002, 2013.
- 640 Fang, M., and Huang, W.: Tracking the Indonesian forest fire using NOAA/AVHRR images, *International Journal of Remote Sensing*, 19, 387-390, 1998.
- Fathani, T. F., Karnawati, D., and Wilopo, W.: An integrated methodology to develop a standard for landslide early warning systems, *Natural Hazards and Earth System Sciences*, 16, 2123-2135, 10.5194/nhess-16-2123-2016, 2016.

- 645 Firman, T., Surbakti, I. M., Idroes, I. C., and Simarmata, H. A.: Potential climate-change related vulnerabilities in Jakarta: Challenges and current status, *Habitat International*, 35, 372-378, 10.1016/j.habitatint.2010.11.011, 2011.
- Firman, T.: Demographic Patterns of Indonesia's Urbanization, 2000–2010: Continuity and Change at the Macro Level, in: *Contemporary Demographic Transformations in China, India and Indonesia*, Springer, 255-269, 2016.
- Ford, J. D., Vanderbilt, W., and Berrang-Ford, L.: Authorship in IPCC AR5 and its implications for content: Climate change and Indigenous populations in WGII, *Climatic Change*, 113, 201-213, 10.1007/s10584-011-0350-z, 2012.
- 650 Ford, J. D., Berrang-Ford, L., Biesbroek, R., Araos, M., Austin, S. E., and Lesnikowski, A.: Adaptation tracking for a post-2015 climate agreement, *Nature Climate Change*, 5, 967-969, 10.1038/nclimate2744, 2015.
- Research for Global sustainability: <http://www.futureearth.org/>, access: June 28, 2016.
- Gaillard, J. C., Clavé, E., and Kelman, I.: Wave of peace? Tsunami disaster diplomacy in Aceh, Indonesia, *Geoforum*, 39, 511-526, 10.1016/j.geoforum.2007.10.010, 2008a.
- 655 Gaillard, J. C., Clavé, E., Vibert, O., Azhari, D., Denain, J. C., Efendi, Y., Grancher, D., Liamzon, C. C., Sari, D. R., and Setiawan, R.: Ethnic groups' response to the 26 December 2004 earthquake and tsunami in Aceh, Indonesia, *Natural Hazards*, 47, 17-38, 10.1007/s11069-007-9193-3, 2008b.
- Gall, M., Nguyen, K. H., and Cutter, S. L.: Integrated research on disaster risk: Is it really integrated?, *International Journal of Disaster Risk Reduction*, 12, 255-267, <http://dx.doi.org/10.1016/j.ijdrr.2015.01.010>, 2015.
- 660 Research Gate: <https://www.researchgate.net/>, access: March 4, 2016.
- Gazni, A., Sugimoto, C. R., and Didegah, F.: Mapping world scientific collaboration: Authors, institutions, and countries, *Journal of the American Society for Information Science and Technology*, 63, 323-335, 2012.
- Gertisser, R., Cassidy, N. J., Charbonnier, S. J., Nuzzo, L., and Preece, K.: Overbank block-and-ash flow deposits and the impact of valley-derived, unconfined flows on populated areas at Merapi volcano, Java, Indonesia, *Natural Hazards*, 60, 623-648, 10.1007/s11069-011-0044-x, 2012.
- 665 Gill, J. C., and Malamud, B. D.: Reviewing and visualizing the interactions of natural hazards, *Reviews of Geophysics*, 52, 680-722, 10.1002/2013rg000445, 2014.
- Godavitarne, C., Udu-Gama, N., Sreetharan, M., Preuss, J., and Krimgold, F.: Social and political prerequisites for recovery in Sri Lanka after the December 2004 Indian Ocean tsunami, *Earthquake Spectra*, 22, S845-S861, 10.1193/1.2210006, 2006.
- 670 GoI: Peraturan Menteri Pendidikan Dan Kebudayaan Republik Indonesia Nomor 92 Tahun 2014 Tentang Petunjuk Teknis Pelaksanaan Penilaian Angka Kredit Jabatan Fungsional Dosen (Regulations of the Ministry of Education and Culture on the Calculations for Credit Values for Lecturers Status), Government of Indonesia, 2014.
- 675 Google Scholar: <https://scholar.google.com/>, access: November 11, 2016a.
- Google Scholar: <https://scholar.google.com/>, access: June 28, 2016b.
- Goggle Scholar: <https://scholar.google.com/>, access: March 4, 2016c.
- Frank Lavigne: <https://scholar.google.fr/citations?user=Fw6zzHsAAAAJ&hl=fr>, access: March 4, 2016a.
- Hasanuddin Z. Abidin: <https://scholar.google.de/citations?user=hMwcQRoAAAAJ&hl=de>, access: March 4, 2016b.
- 680 Danny Hilman Natawidjaja: <https://scholar.google.de/citations?user=B4LeOOAAAAAJ&hl=de>, access: March 4, 2016c.
- Ralf Gertisser: <https://scholar.google.co.uk/citations?user=2vtX1PIAAAAJ>, access: March 4, 2016d.
- Barry Voight: <https://scholar.google.com/citations?user=rdxooXgAAAAJ&hl=en>, access: March 4, 2016e.
- Gosling, J., and Naim, M. M.: Engineer-to-order supply chain management: A literature review and research agenda, *International Journal of Production Economics*, 122, 741-754, 10.1016/j.ijpe.2009.07.002, 2009.
- 685 Gu, F., and Widén-Wulff, G.: Scholarly communication and possible changes in the context of social media: A Finnish case study, *The Electronic Library*, 29, 762-776, doi:10.1108/02640471111187999, 2011.
- Guarnacci, F. A. U., and Di Girolamo, S. B. A.: Risk, altruism and resilience in post-tsunami Indonesia: A gendered perspective, *Proceedings of the 4th International Disaster and Risk Conference: Integrative Risk Management in a Changing World - Pathways to a Resilient Society*, IDRC Davos 2012, 2012, 273-277,
- 690 Guarnacci, U.: Governance for sustainable reconstruction after disasters: Lessons from Nias, Indonesia, *Environmental Development*, 2, 73-85, 10.1016/j.envdev.2012.03.010, 2012.
- Hadikusumo, D.: The rise and drop of Mt. Kelut crater bottom after paroxysmal eruptions, *Tectonophysics*, 23, 341-347, 10.1016/0040-1951(74)90070-5, 1974.

- 695 Harada, N., Shigemura, J., Tanichi, M., Kawaida, K., Takahashi, S., and Yasukata, F.: Mental health and psychological impacts from the 2011 Great East Japan Earthquake Disaster: a systematic literature review, *Disaster and Military Medicine*, 1, 17, 10.1186/s40696-015-0008-x, 2015.
- Haryanto, B.: *Climate Change and Public Health in Indonesia Impacts and Adaptation*, Nautilus Institute Australia, 2009.
- Heijmans, A.: *Risky Encounters: Institutions and interventions in response to recurrent disasters and conflict*, 2012.
- 700 Heikens, A., Sumarti, S., Van Bergen, M., Widianarko, B., Fokkert, L., Van Leeuwen, K., and Seinen, W.: The impact of the hyperacid Ijen Crater Lake: Risks of excess fluoride to human health, *Science of the Total Environment*, 346, 56-69, 10.1016/j.scitotenv.2004.12.007, 2005.
- Hidayati, D.: Striving to reduce disaster risk: Vulnerable communities with low levels of preparedness in Indonesia, *Journal of Disaster Research*, 7, 75-82, 2012.
- 705 Hill, E. M., Borrero, J. C., Huang, Z., Qiu, Q., Banerjee, P., Natawidjaja, D. H., Elosegui, P., Fritz, H. M., Suwargadi, B. W., Pranantyo, I. R., Li, L., Macpherson, K. A., Skanavis, V., Synolakis, C. E., and Sieh, K.: The 2010 M_w 7.8 Mentawai earthquake: Very shallow source of a rare tsunami earthquake determined from tsunami field survey and near-field GPS data, *Journal of Geophysical Research: Solid Earth*, 117, 10.1029/2012jb009159, 2012.
- Hiwasaki, L., Luna, E., Syamsidik, and Marçal, J. A.: Local and indigenous knowledge on climate-related hazards of coastal and small island communities in Southeast Asia, *Climatic Change*, 128, 35-56, 10.1007/s10584-014-1288-8, 2015.
- 710 Horspool, N., Pranantyo, I., Griffin, J., Latief, H., Natawidjaja, D. H., Kongko, W., Cipta, A., Bustaman, B., Anugrah, S. D., and Thio, H. K.: A probabilistic tsunami hazard assessment for Indonesia, *Natural Hazards and Earth System Sciences*, 14, 3105-3122, 10.5194/nhess-14-3105-2014, 2014.
- Hsu, Y. J., Simons, M., Avouac, J. P., Galetka, J., Sieh, K., Chlieh, M., Natawidjaja, D., Prawirodirdjo, L., and Bock, Y.: Frictional afterslip following the 2005 Nias-Simeulue earthquake, Sumatra, *Science*, 312, 1921-1926, 10.1126/science.1126960, 2006.
- 715 Hu, X.: Loads of special authorship functions: Linear growth in the percentage of "equal first authors" and corresponding authors, *Journal of the American Society for Information Science and Technology*, 60, 2378-2381, 2009.
- Hunt, A., and Watkiss, P.: Climate change impacts and adaptation in cities: a review of the literature, *Climatic Change*, 104, 13-49, 10.1007/s10584-010-9975-6, 2011.
- 720 Hyndman, J.: Siting conflict and peace in post-tsunami Sri Lanka and Aceh, Indonesia, *Norsk Geografisk Tidsskrift*, 63, 89-96, 10.1080/00291950802712178, 2009.
- History of Indonesia Disaster Expert Association: <http://www.iabi-indonesia.org/#!/home/mainPage>, access: June 28, 2016.
- Imamura, F., Gica, E., Takahashi, T., and Shuto, N.: Numerical simulation of the 1992 Flores tsunami: Interpretation of tsunami phenomena in northeastern Flores Island and damage at Babi Island, *Pure and Applied Geophysics*
- 725 *PAGEOPH*, 144, 555-568, 10.1007/bf00874383, 1995.
- Ishii, M., Shearer, P. M., Houston, H., and Vidale, J. E.: Extent, duration and speed of the 2004 Sumatra-Andaman earthquake imaged by the Hi-Net array, *Nature*, 435, 933-936, 10.1038/nature03675, 2005.
- Islam, M. S., and Lim, S. H.: When "Nature" strikes: A sociology of climate change and disaster vulnerabilities in Asia, *Nature and Culture*, 10, 57-80, 10.3167/nc.2015.100104, 2015.
- 730 James, E.: Getting ahead of the next disaster: Recent preparedness efforts in Indonesia, *Development in Practice*, 18, 424-429, 10.1080/09614520802030607, 2008.
- Jim, C. Y.: The forest fires in Indonesia 1997-98: Possible causes and pervasive consequences, *Geography*, 84, 251-260, 1999.
- Johnson, V. A., Ronan, K. R., Johnston, D. M., and Peace, R.: Evaluations of disaster education programs for children: A methodological review, *International Journal of Disaster Risk Reduction*, 9, 107-123, <http://dx.doi.org/10.1016/j.ijdr.2014.04.001>, 2014.
- 735 Kabisch, N., Qureshi, S., and Haase, D.: Human-environment interactions in urban green spaces - A systematic review of contemporary issues and prospects for future research, *Environmental Impact Assessment Review*, 50, 25-34, 10.1016/j.eiar.2014.08.007, 2015.
- 740 Karan, P. P., and Subbiah, S. P.: The Indian Ocean tsunami: The global response to a natural disaster, *The Indian Ocean Tsunami: The Global Response to a Natural Disaster*, 1-310 pp., 2011.

- Karnawati, D., Fathani, T. F., Ignatius, S., Andayani, B., Legono, D., and Burton, P. W.: Landslide hazard and community-based risk reduction effort in Karanganyar and the surrounding area, central Java, Indonesia, *Journal of Mountain Science*, 8, 149-153, 10.1007/s11629-011-2107-6, 2011.
- 745 Katili, J. A., Kartaadiputra, L., and Surio: Magma type and tectonic position of the Una-Una Island, Indonesia, *Bulletin Volcanologique*, 26, 431-454, 10.1007/bf02597303, 1963.
- Katili, J. A.: Structure and age of the Indonesian tin belt with special reference to Bangka, *Tectonophysics*, 4, 403-418, 1967.
- Katili, J. A.: Permian volcanism and its relation to the tectonic development of Sumatra, *Bulletin Volcanologique*, 33, 530-540, 10.1007/bf02596522, 1969a.
- 750 Katili, J. A.: Large transcurrent faults in Southeast Asia with special reference to Indonesia, *Geol Rundsch*, 59, 581-600, 10.1007/bf01823809, 1969b.
- Katili, J. A.: A review of the geotectonic theories and tectonic maps of Indonesia, *Earth Science Reviews*, 7, 143-163, 10.1016/0012-8252(71)90006-7, 1971.
- Katili, J. A.: Geochronology of West Indonesia and its implication on plate tectonics, *Tectonophysics*, 19, 195-212, 10.1016/0040-1951(73)90019-x, 1973.
- 755 Katili, J. A.: Volcanism and plate tectonics in the Indonesian island arcs, *Tectonophysics*, 26, 165-188, 10.1016/0040-1951(75)90088-8, 1975.
- Katili, J. A.: Past and present geotectonic position of Sulawesi, Indonesia, *Tectonophysics*, 45, 289-322, 10.1016/0040-1951(78)90166-x, 1978.
- 760 Katili, J. A.: GEOLOGY OF SOUTHEAST ASIA WITH PARTICULAR REFERENCE TO THE SOUTH CHINA SEA, *Energy (Oxford)*, 6, 1077-1091, 1980.
- Katili, J. A.: Geology of Southeast Asia with particular reference to the South China Sea, *Energy*, 6, 1075, 1077-1091, 10.1016/0360-5442(81)90026-8, 1981a.
- Katili, J. A.: Mineral resources in Indonesia: policies and potential, *Asian Mining '81*, 1-11, 1981b.
- 765 Katili, J. A.: On understanding the geological environment of the southeast Asian mineral and hydrocarbon deposits in relation to the progressive development of plate tectonic concepts, *Memoir of the Geological Society of China (Taiwan)*, 7, 45-68, 1986.
- Katili, J. A.: Review of past and present geotectonic concepts of eastern Indonesia, *Netherlands Journal of Sea Research*, 24, 103-129, 10.1016/0077-7579(89)90143-9, 1989.
- 770 Katili, J. A.: Tectonic evolution of eastern Indonesia and its bearing on the occurrence of hydrocarbons, *Mar. Pet. Geol.*, 8, 70-83, 10.1016/0264-8172(91)90046-4, 1991.
- Kawanishi, M., and Mimura, N.: Assessment of insurance for paddy production: a case study in Indonesia, *Climate and Development*, 7, 257-266, 10.1080/17565529.2014.951022, 2015.
- 775 Keil, A., Zeller, M., Wida, A., Sanim, B., and Birner, R.: What determines farmers' resilience towards ENSO-related drought? An empirical assessment in Central Sulawesi, Indonesia, *Climatic Change*, 86, 291-307, 10.1007/s10584-007-9326-4, 2008.
- Keil, A., Teufel, N., Gunawan, D., and Leemhuis, C.: Vulnerability of smallholder farmers to ENSO-related drought in Indonesia, *Climate Research*, 38, 155-169, 10.3354/cr00778, 2009.
- 780 Kelman, I.: Tsunami diplomacy: Will the 26 December, 2004 bring peace to the affected countries?, *Sociological Research Online*, 10, 2005.
- Khan, K. S., Daya, S., and Jadad, A. R.: The importance of quality of primary studies in producing unbiased systematic reviews, *Archives of Internal Medicine*, 156, 661-666, 1996.
- Khandekar, M. L., Murty, T. S., Scott, D., and Baird, W.: The 1997 El Nino, Indonesian Forest fires and the Malaysian Smoke problem: A deadly combination of natural and man-made hazard, *Natural Hazards*, 21, 131-144, 2000.
- 785 Kitchenham, B., Pearl Brereton, O., Budgen, D., Turner, M., Bailey, J., and Linkman, S.: Systematic literature reviews in software engineering - A systematic literature review, *Information and Software Technology*, 51, 7-15, 10.1016/j.infsof.2008.09.009, 2009.
- Kölves, K., Kölves, K. E., and De Leo, D.: Natural disasters and suicidal behaviours: A systematic literature review, *Journal of Affective Disorders*, 146, 1-14, 10.1016/j.jad.2012.07.037,

- 790 Konca, A. O., Avouac, J. P., Sladen, A., Meltzner, A. J., Sieh, K., Fang, P., Li, Z., Galetzka, J., Genrich, J., Chlieh, M., Natawidjaja, D. H., Bock, Y., Fielding, E. J., Ji, C., and Helmberger, D. V.: Partial rupture of a locked patch of the Sumatra megathrust during the 2007 earthquake sequence, *Nature*, 456, 631-635, 10.1038/nature07572, 2008.
- Koppel, M., Argamon, S., and Shimoni, A. R.: Automatically Categorizing Written Texts by Author Gender, *Literary and Linguistic Computing*, 17, 401-412, 10.1093/lilc/17.4.401, 2002.
- 795 Koshimura, S., Oie, T., Yanagisawa, H., and Imamura, F.: Developing fragility functions for tsunami damage estimation using numerical model and post-tsunami data from banda aceh, Indonesia, *Coastal Engineering Journal*, 51, 243-273, 10.1142/s0578563409002004, 2009.
- Kram, K. E., and Isabella, L. A.: Mentoring alternatives: The role of peer relationships in career development, *Academy of management Journal*, 28, 110-132, 1985.
- 800 Kusumadinata, K.: Letusan Gunung Agung di Bali tahun 1963 (The eruption of the Agung volcano in Bali, in 1963), Geological Survey of Indonesia, Bandung, 1963.
- Kusumadinata, K.: Letusan Gunung Agung di Bali tahun 1963 (The eruption of the Agung volcano in Bali, in 1963), *Bulletin of Geological Survey Indonesia*, 1, 12-15, 1964a.
- Kusumadinata, K.: Lanjutan Kegiatan Gunung Agung bulan Januari 1965 (Renewed activity of the Agung volcano in January 1964), *Bulletin of Geological Survey Indonesia*, 1, 38, 1964b.
- 805 Kusumadinata, K.: Lahars of the Agung volcano as a secondary destructive element, *Bulletin of Geological Survey Indonesia*, 1, 1964c.
- Kusumasari, B., Alam, Q., and Siddiqui, K.: Resource capability for local government in managing disaster, *Disaster Prevention and Management: An International Journal*, 19, 438-451, 2010.
- 810 Kusumasari, B., and Alam, Q.: Bridging the gaps: The role of local government capability and the management of a natural disaster in Bantul, Indonesia, *Natural Hazards*, 60, 761-779, 10.1007/s11069-011-0016-1, 2012.
- Larivière, V., Ni, C., Gingras, Y., Cronin, B., and Sugimoto, C. R.: Bibliometrics: Global gender disparities in science, *Nature*, 504, 2013.
- Larson, S., Alexander, K. S., Djalante, R., and Kirono, D. G. C.: The Added Value of Understanding Informal Social Networks in an Adaptive Capacity Assessment: Explorations of an Urban Water Management System in Indonesia, *Water Resources Management*, 27, 4425-4441, 10.1007/s11269-013-0412-2, 2013.
- 815 Lassa, J. A.: Disaster Policy Change in Indonesia 1930-2010: From Government to Governance?, *International Journal of Mass Emergencies & Disasters*, 31, 2013.
- Lassa, J. A.: Post disaster governance, complexity and network theory, *PLoS Currents*, 7, 10.1371/4f7972ecec1b6, 2015.
- 820 Lassa, J. A., and Nugraha, E.: From shared learning to shared action in building resilience in the city of Bandar Lampung, Indonesia, *Environment and Urbanization*, 27, 161-180, 10.1177/0956247814552233, 2015.
- Latter, J. H.: Tsunamis of volcanic origin: Summary of causes, with particular reference to Krakatoa, 1883, *Bulletin Volcanologique*, 44, 467-490, 10.1007/bf02600578, 1981.
- Lavigne, F.: Lahar hazard micro-zonation and risk assessment in Yogyakarta city, Indonesia, *GeoJournal*, 49, 173-183, 10.1023/a:1007035612681, 1999.
- 825 Lawler, J., and Patel, M.: Exploring children's vulnerability to climate change and their role in advancing climate change adaptation in East Asia and the Pacific, *Environmental Development*, 3, 123-136, 10.1016/j.envdev.2012.04.001, 2012.
- Lee, Y. S.: 'Technology transfer' and the research university: a search for the boundaries of university-industry collaboration, *Research Policy*, 25, 843-863, [http://dx.doi.org/10.1016/0048-7333\(95\)00857-8](http://dx.doi.org/10.1016/0048-7333(95)00857-8), 1996.
- 830 Lettieri, E., Masella, C., and Radaelli, G.: Disaster management: findings from a systematic review, *Disaster Prevention and Management: An International Journal*, 18, 117-136, 2009.
- Lewison, G.: The quantity and quality of female researchers: A bibliometric study of Iceland, *Scientometrics*, 52, 29-43, 10.1023/a:1012794810883, 2001.
- 835 Leydesdorff, L., and Wagner, C. S.: International collaboration in science and the formation of a core group, *Journal of Informetrics*, 2, 317-325, 2008.
- Leydesdorff, L., De Moya-Anegón, F., and Guerrero-Bote, V. P.: Journal maps on the basis of scopus data: A comparison with the journal citation reports of the ISI, *J. Am. Soc. Inf. Sci. Technol.*, 61, 352-369, 10.1002/asi.21250, 2010.

- Liao, Z., Hong, Y., Wang, J., Fukuoka, H., Sassa, K., Karnawati, D., and Fathani, F.: Prototyping an experimental early warning system for rainfall-induced landslides in Indonesia using satellite remote sensing and geospatial datasets, *Landslides*, 7, 317-324, 10.1007/s10346-010-0219-7, 2010.
- Thouret Jean-Claude: <http://lmv.univ-bpclermont.fr/thouret-jean-claude/>, access: March 4, 2016.
- Lubis, A. M.: Uplift of kelud volcano prior to the november 2007 eruption as observed by L-band insar, *Journal of Engineering and Technological Sciences*, 46, 245-257, 10.5614/j.eng.technol.sci.2014.46.3.1, 2014.
- Mallett, R., Hagen-Zanker, J., Slater, R., and Duvendack, M.: The benefits and challenges of using systematic reviews in international development research, *Journal of Development Effectiveness*, 4, 445-455, 10.1080/19439342.2012.711342, 2012.
- Marfai, M. A., and King, L.: Monitoring land subsidence in Semarang, Indonesia, *Environmental Geology*, 53, 651-659, 2007.
- Marfai, M. A., and King, L.: Coastal flood management in Semarang, Indonesia, *Environmental Geology*, 55, 1507-1518, 10.1007/s00254-007-1101-3, 2008.
- Marfai, M. A., King, L., Sartohadi, J., Sudrajat, S., Budiani, S. R., and Yulianto, F.: The impact of tidal flooding on a coastal community in Semarang, Indonesia, *Environmentalist*, 28, 237-248, 10.1007/s10669-007-9134-4, 2008.
- Marfai, M. A.: Impact of sea level rise to coastal ecology: A case study on the northern part of java island, indonesia, *Quaestiones Geographicae*, 33, 107-114, 10.2478/quageo-2014-0008, 2014.
- Marfai, M. A., Sekaranom, A. B., and Ward, P.: Community responses and adaptation strategies toward flood hazard in Jakarta, Indonesia, *Natural Hazards*, 75, 1127-1144, 10.1007/s11069-014-1365-3, 2015.
- McCulloch, N., and Peter Timmer, C.: Rice policy in Indonesia: a special issue, *Bulletin of Indonesian Economic Studies*, 44, 33-44, 2008.
- Measey, M.: Indonesia: A Vulnerable Country in the Face of Climate Change Global Majority E-Journal, 1, 31-45, 2012.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Altman, D., Antes, G., Atkins, D., Barbour, V., Barrowman, N., Berlin, J. A., Clark, J., Clarke, M., Cook, D., D'Amico, R., Deeks, J. J., Devereaux, P. J., Dickersin, K., Egger, M., Ernst, E., Gøtzsche, P. C., Grimshaw, J., Guyatt, G., Higgins, J., Ioannidis, J. P. A., Kleijnen, J., Lang, T., Magrini, N., McNamee, D., Moja, L., Mulrow, C., Napoli, M., Oxman, A., Pham, B., Rennie, D., Sampson, M., Schulz, K. F., Shekelle, P. G., Tovey, D., and Tugwell, P.: Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement, *PLoS Med.*, 6, 10.1371/journal.pmed.1000097, 2009a.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., and the, P. G.: Preferred reporting items for systematic reviews and meta-analyses: The prisma statement, *Annals of Internal Medicine*, 151, 264-269, 2009b.
- Morwood, M. J., Sutikna, T., Saptomo, E. W., Westaway, K. E., Jatmiko, Awe Due, R., Moore, M. W., Yuniawati, D. Y., Hadi, P., Zhao, J. x., Turney, C. S. M., Fifield, K., Allen, H., and Soejono, R. P.: Climate, people and faunal succession on Java, Indonesia: evidence from Song Gupuh, *Journal of Archaeological Science*, 35, 1776-1789, 10.1016/j.jas.2007.11.025, 2008.
- Muhari, A., Imamura, F., Natawidjaja, D. H., Diposaptono, S., Latief, H., Post, J., and Ismail, F. A.: Tsunami mitigation efforts with pTA in west Sumatra province, Indonesia, *Journal of Earthquake and Tsunami*, 4, 341-368, 10.1142/s1793431110000790, 2010.
- Muis, S., Güneralp, B., Jongman, B., Aerts, J. C. J. H., and Ward, P. J.: Flood risk and adaptation strategies under climate change and urban expansion: A probabilistic analysis using global data, *Science of the Total Environment*, 538, 445-457, 10.1016/j.scitotenv.2015.08.068, 2015.
- Murdiyarso, D.: Policy options to reduce CO2 release resulting from deforestation and biomass burning in indonesia, *Chemosphere*, 27, 1109-1120, 10.1016/0045-6535(93)90071-c, 1993.
- Nakada, S., Zaennudin, A., Maeno, F., Yoshimoto, M., and Hokanishi, N.: Credibility of volcanic ash thicknesses reported by the media and local residents following the 2014 eruption of Kelud volcano, Indonesia, *Journal of Disaster Research*, 11, 53-59, 2016.
- Nakamura, S.: On statistics of tsunamis in Indonesia, *Southeast Asian Studies*, 16, 664-674, 1978.
- Nakamura, S.: NOTE ON STATISTICS OF HISTORICAL TSUNAMIS IN SOUTH EAST ASIA, *Eng for Prot from Nat Disasters, Proc of the Int Conf*, 883-894, 1980.
- Nalbant, S. S., Steacy, S., Sieh, K., Natawidjaja, D., and McCloskey, J.: Seismology: Earthquake risk on the Sunda trench, *Nature*, 435, 756-757, 10.1038/nature435756a, 2005.

- 890 Natawidjaja, D. H., Sieh, K., Ward, S. N., Cheng, H., Edwards, R. L., Galetzka, J., and Suwargadi, B. W.: Paleogeodetic records of seismic and aseismic subduction from central Sumatran microatolls, Indonesia, *Journal of Geophysical Research: Solid Earth*, 109, 2004.
- Natawidjaja, D. H., Sieh, K., Chlieh, M., Galetzka, J., Suwargadi, B. W., Cheng, H., Edwards, R. L., Avouac, J. P., and Ward, S. N.: Source parameters of the great Sumatran megathrust earthquakes of 1797 and 1833 inferred from coral microatolls, *Journal of Geophysical Research: Solid Earth*, 111, 2006.
- 895 Naylor, R. L., Falcon, W. P., Rochberg, D., and Wada, N.: Using El Niño/Southern Oscillation climate data to predict rice production in Indonesia, *Climatic Change*, 50, 255-265, 10.1023/a:1010662115348, 2001.
- Neale, T., and Weir, J. K.: Navigating scientific uncertainty in wildfire and flood risk mitigation: A qualitative review, *International Journal of Disaster Risk Reduction*, 13, 255-265, <http://dx.doi.org/10.1016/j.ijdrr.2015.06.010>, 2015.
- Neolaka, A.: Flood disaster risk in Jakarta, Indonesia, *WIT Transactions on Ecology and the Environment*, 159, 107-118, 10.2495/friar120091, 2012.
- 900 Neolaka, A.: Stakeholder participation in flood control of Ciliwung river, Jakarta, Indonesia, *WIT Transactions on Ecology and the Environment*, 171, 275-285, 10.2495/wrm130251, 2013.
- Nicholls, R. J., Mimura, N., and Topping, J. C.: Climate change in south and south-east Asia: some implications for coastal areas, *Journal of Global Environment Engineering*, 1, 137-154, 1995.
- 905 OECD, and ADB: *Reviews of National Policies for Education in Indonesia: Rising to the Challenge*, 2015.
- NSF (2017). "Partnerships for Enhanced Engagement in Research (PEER)." Retrieved May 3, 2017, from https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504726.
- Page, S. E., Siegert, F., Rieley, J. O., Boehm, H. D. V., Jaya, A., and Limin, S.: The amount of carbon released from peat and forest fires in Indonesia during 1997, *Nature*, 420, 61-65, 10.1038/nature01131, 2002.
- 910 Philibosian, B., Sieh, K., Natawidjaja, D. H., Chiang, H. W., Shen, C. C., Suwargadi, B. W., Hill, E. M., and Edwards, R. L.: An ancient shallow slip event on the Mentawai segment of the Sunda megathrust, Sumatra, *Journal of Geophysical Research: Solid Earth*, 117, 2012.
- Prayoeidhie, S., Fujii, Y., and Shibasaki, B.: Numerical simulations for Tsunami forecasting at Padang city using offshore Tsunami sensors, *Bulletin of the International Institute of Seismology and Earthquake Engineering*, 46, 97-102, 2012.
- 915 Purnomo, H., Herawati, H., and Santoso, H.: Indicators for assessing Indonesia's Javan rhino National Park vulnerability to climate change, *Mitigation and Adaptation Strategies for Global Change*, 16, 733-747, 10.1007/s11027-011-9291-0, 2011.
- Volcanology Survey Indonesia: <http://www.vsi.esdm.go.id/>, access: March 4, 2016.
- 920 QS World University Rankings® 2015/16: <http://www.topuniversities.com/university-rankings/world-university-rankings/2015#sorting=rank+region+=+country+=+faculty+=+stars=false+search=>, access: June 28, 2016.
- Rafliana, I.: Disaster education in Indonesia: Learning how it works from six years of experience after Indian ocean tsunami in 2004, *Journal of Disaster Research*, 7, 83-91, 2012.
- 925 Raleigh, C., Jordan, L., and Salehyan, I.: Assessing the impact of climate change on migration and conflict, Paper commissioned by the World Bank Group for the Social Dimensions of Climate Change workshop, Washington, DC, 2008, 5-6,
- Rampino, M. R., and Self, S.: Historic eruptions of Tambora (1815), Krakatau (1883), and Agung (1963), their stratospheric aerosols, and climatic impact, *Quaternary Research*, 18, 127-143, [http://dx.doi.org/10.1016/0033-5894\(82\)90065-5](http://dx.doi.org/10.1016/0033-5894(82)90065-5), 1982.
- 930 Rampino, M. R., and Self, S.: Volcanic winter and accelerated glaciation following the Toba super-eruption, *Nature*, 359, 50-52, 1992.
- Early Career Researchers: <http://www.rcuk.ac.uk/international/funding/fundingopps/earlycareer/>, access: June 28, 2016.
- Research Gate: <https://www.researchgate.net/>, access: March 4, 2016a.
- Research Gate: <https://www.researchgate.net/home>, access: November 11, 2016b.
- 935 Renaud, F. G., U. Nehren, et al. (2016). *Developments and Opportunities for Ecosystem-Based Disaster Risk Reduction and Climate Change Adaptation. Ecosystem-Based Disaster Risk Reduction and Adaptation in Practice*. F. G. Renaud, K. Sudmeier-Rieux, M. Estrella and U. Nehren. Cham, Springer International Publishing: 1-20.
- Reuveny, R.: Climate change-induced migration and violent conflict, *Political Geography*, 26, 656-673, 2007.

- Riesenber, D., and Lundberg, G. D.: The order of authorship: who's on first?, JAMA, 264, 1857-1857, 1990.
- 940 Sistem Informasi Penelitian dan Pengabdian Kepada Masyarakat: <http://simlitabmas.ristekdikti.go.id/>, access: June 28, 2016.
- Rittmann, A.: Magmatic character and tectonic position of the Indonesia Volcanoes, Bulletin Volcanologique, 14, 45-58, 10.1007/bf02596004, 1953.
- Sagala, S., Okada, N., and Paton, D.: Predictors of intention to prepare for volcanic risks in Mt Merapi, Indonesia, Journal of Pacific Rim Psychology, 3, 47-54, 2009.
- 945 Salafsky, N.: Drought in the rain forest: Effects of the 1991 El Niño-Southern Oscillation event on a rural economy in West Kalimantan, Indonesia, Climatic Change, 27, 373-396, 10.1007/bf01096268, 1994.
- Sano, D., Prabhakar, S. V. R. K., Kartikasari, K., and Irawan, D. J.: Developing Adaptation Policies in the Agriculture Sector: Indonesia's Experience, in: Climate Change Adaptation in Practice: From strategy development to implementation, 269-281, 2013.
- 950 Santosa, H.: Environmental management in Surabaya with reference to National Agenda 21 and the social safety net programme, Environment and Urbanization, 12, 175-184, 2000.
- Sarminingsih, A., Soekarno, I., Hadihardaja, I. K., and Syahril B.K, M.: Flood vulnerability assessment of Upper Citarum River Basin, West Java, Indonesia, International Journal of Applied Engineering Research, 9, 22921-22940, 2014.
- Schlehe, J.: Anthropology of religion: Disasters and the representations of tradition and modernity, Religion, 40, 112-120, 10.1016/j.religion.2009.12.004, 2010.
- 955 Schlurmann, T., Kongko, W., Goseberg, N., Natawidjaja, D. H., and Sieh, K.: Near-field tsunami hazard map Padang, West Sumatra: Utilizing high resolution geospatial data and reseasonable source scenarios, Proceedings of the Coastal Engineering Conference, 2010,
- Schlurmann, T., and Siebert, M.: The Capacity Building programmes of GITEWS - Visions, goals, lessons learned, and reiterated needs and demands, Natural Hazards and Earth System Science, 11, 293-300, 10.5194/nhess-11-293-2011, 2011.
- 960 (TITLE-ABS-KEY (hazard*) OR TITLE-ABS-KEY (risk*) OR TITLE-ABS-KEY (disaster*) OR TITLE-ABS-KEY (disaster management*) OR TITLE-ABS-KEY (disaster risk reduction*) OR TITLE-ABS-KEY (climate change*) OR TITLE-ABS-KEY (climate change adaptation*) OR TITLE-ABS-KEY (resilien*) AND TITLE-ABS-KEY (indonesia)): https://www.scopus.com/results/results.uri?sort=plf-f&src=s&sid=1C5305614F830F9A7366A627D7C2F6B0.y7ESLndDIsN8cE7qwvy6w%3a40&sot=a&sdt=a&sl=295&s=%28TITLE-ABS-KEY%28hazard*%29+OR+TITLE-ABS-KEY%28risk*%29+OR+TITLE-ABS-KEY%28disaster*%29+OR+TITLE-ABS-KEY%28disaster+management*%29+OR+TITLE-ABS-KEY%28disaster+risk+reduction*%29+OR+TITLE-ABS-KEY%28climate+change*%29+OR+TITLE-ABS-KEY%28climate+change+adaptation*%29+OR+TITLE-ABS-KEY%28resilien*%29+AND+TITLE-ABS-KEY%28Indonesia%29%29.&origin=searchadvanced&editSaveSearch=&txGid=0, access: May 15, 2016a.
- 970 SCOPUS Features: <https://www.elsevier.com/solutions/scopus/features>, access: June 13th, 2016b.
- Shofiyati, R., Takeuchi, W., Sofan, P., Darmawan, S., Awaluddin, and Supriatna, W.: Indonesian drought monitoring from space. A report of SAFE activity: Assessment of drought impact on rice production in Indonesia by satellite remote sensing and dissemination with web-GIS, IOP Conference Series: Earth and Environmental Science, 2014,
- 975 Shrestha, B. B., Okazumi, T., Miyamoto, M., Nabesaka, S., Tanaka, S., and Sugiura, A.: Fundamental analysis for flood risk management in the selected river basins of Southeast Asia, Journal of Disaster Research, 9, 858-869, 2014.
- Siagian, T. H., Puhadi, P., Suhartono, S., and Ritonga, H.: Social vulnerability to natural hazards in Indonesia: Driving factors and policy implications, Natural Hazards, 70, 1603-1617, 10.1007/s11069-013-0888-3, 2014.
- 980 Sidhu, R., Rajashekhar, P., Lavin, V. L., Parry, J., Attwood, J., Holdcroft, A., and Sanders, D. S.: The gender imbalance in academic medicine: a study of female authorship in the United Kingdom, Journal of the Royal Society of Medicine, 102, 337-342, 10.1258/jrsm.2009.080378, 2009.
- Singh, S. C., Hananto, N. D., Chauhan, A. P. S., Permana, H., Denolle, M., Hendriyana, A., and Natawidjaja, D.: Evidence of active backthrusting at the NE Margin of Mentawai Islands, SW Sumatra, Geophysical Journal International, 180, 703-714, 10.1111/j.1365-246X.2009.04458.x, 2010.
- 985 Siswawidjoyo, S., Sudarsono, U., and Wirakusumah, A. D.: The threat of hazards in the Semeru volcano region in East Java, Indonesia, Journal of Asian Earth Sciences, 15, 185-194, 1997.
- Scientific Journal Ranking <http://www.scimagojr.com/journalrank.php>, access: March 4, 2016.

- 990 Solikhin, A., Thouret, J. C., Gupta, A., Harris, A. J. L., and Liew, S. C.: Geology, tectonics, and the 2002-2003 eruption of the Semeru volcano, Indonesia: Interpreted from high-spatial resolution satellite imagery, *Geomorphology*, 138, 364-379, 10.1016/j.geomorph.2011.10.001, 2012.
- Steinmetz, T., Raape, U., Teßmann, S., Strobl, C., Friedemann, M., Kukofka, T., Riedlinger, T., Mikusch, E., and Dech, S.: Tsunami early warning and decision support, *Natural Hazards and Earth System Science*, 10, 1839-1850, 10.5194/nhess-10-1839-2010, 2010.
- 995 Stolle, F., and Tomich, T. P.: The 1997-1998 fire event in Indonesia, *Nature and Resources*, 35, 22-30, 1999.
- Stolle, F., and Lambin, E. F.: Interprovincial and interannual differences in the causes of land-use fires in Sumatra, Indonesia, *Environmental Conservation*, 30, 375-387, 10.1017/s0376892903000390, 2003.
- Sudibyakto: Facts and future trends of climate change: a case study of the eastern part of the Indonesia islands, *Indonesian Journal of Geography*, 23-25, 59-69, 1992.
- 1000 Sudibyakto, and Abasi, S. H.: The eruption of Merapi volcano, November 22, 1994: a geographical review, *Indonesian Journal of Geography*, 28, 1-10, 1996.
- Sudibyakto, and Haroonah, N.: Natural disaster mitigation and management in Indonesia, *Indonesian Journal of Geography*, 29, 37-48, 1997.
- Sugimoto, C. R., Lariviere, V., Ni, C., Gingras, Y., and Cronin, B.: Global gender disparities in science, *Nature*, 504, 211-213, 2013.
- 1005 Suryahadi, A., and Sumarto, S.: Poverty and Vulnerability in Indonesia Before and After the Economic Crisis, *Asian Economic Journal*, 17, 45-64, 10.1111/1351-3958.00161, 2003.
- Surjo, I., and Clarke, M. C. G.: The occurrence and mitigation of volcanic hazards in Indonesia as exemplified at the Mount Merapi, Mount Kelut and Mount Galunggung volcanoes, *Quarterly Journal of Engineering Geology*, 18, 79-98, 1985.
- 1010 Susanto, R. D., Gordon, A. L., and Zheng, Q.: Upwelling along the coasts of Java and Sumatra and its relation to ENSO, *Geophysical Research Letters*, 28, 1599-1602, 10.1029/2000gl011844, 2001.
- Tay, S. S. C.: South East Asian forest fires: haze over ASEAN and international environmental law, *Review of European Community and International Environmental Law*, 7, 202-208, 1998.
- 1015 Taylor, H., and Peace, R.: Children and cultural influences in a natural disaster: Flood response in Surakarta, Indonesia, *International Journal of Disaster Risk Reduction*, 13, 76-84, 10.1016/j.ijdrr.2015.04.001, 2015.
- Telford, J., and Cosgrave, J.: The international humanitarian system and the 2004 Indian Ocean earthquake and tsunamis, *Disasters*, 31, 1-28, 10.1111/j.1467-7717.2007.00337.x, 2007.
- Thelwall, M., Haustein, S., Larivière, V., and Sugimoto, C. R.: Do altmetrics work? Twitter and ten other social web services, *PLoS ONE*, 8, e64841, 2013.
- 1020 Thouret, J. C., Lavigne, F., Suwa, H., Sukatja, B., and Surono: Volcanic hazards at Mount Semeru, East Java (Indonesia), with emphasis on lahars, *Bulletin of Volcanology*, 70, 221-244, 10.1007/s00445-007-0133-6, 2007.
- Trunk, L., and Bernard, A.: Investigating crater lake warming using ASTER thermal imagery: Case studies at Ruapehu, Poás, Kawah Ijen, and Copahué Volcanoes, *Journal of Volcanology and Geothermal Research*, 178, 259-270, 10.1016/j.jvolgeores.2008.06.020, 2008.
- 1025 Indonesian Journal of Geography: <http://jurnal.ugm.ac.id/ijg/>, access: March 4, 2016.
- ZERO DRAFT OF THE NEW URBAN AGENDA: <https://www.habitat3.org/zerodraft>, access: June 18, 2016.
- Sendai Framework for Disaster Risk Reduction (SFDRR): <http://www.unisdr.org/we/coordinate/sendai-framework>, access: March 17, 2015.
- 1030 Terminology: <https://www.unisdr.org/we/inform/terminology>, access: jUNE "(2009).
- UNISDR: Sendai Framework for Disaster Risk Reduction, The United Nations Office for Disaster Risk Reduction, Sendai, 2015.
- UNU-EHS (2017). "TWIN-SEA: "Expert network and twinning institute on climate and societal change for Southeast Asia". Retrieved May 3, 2017, from <https://ehs.unu.edu/research/twin-sea-expert-network-and-twinning-institute-on-climate-and-societal-change-for-southeast-asia.html#outline>.
- 1035 INDONESIA: DISASTER RESPONSE AND RISK REDUCTION: <https://www.usaid.gov/indonesia/fact-sheets/disaster-response-and-risk-reduction-oct-24-2014>, access: June 28, 2016.

- USAID Indonesia: ASSESSMENT AND OPTIONS FOR DISASTER RISK REDUCTION AND CLIMATE CHANGE ADAPTATION PROGRAM IN INDONESIA, Jakarta, 2011.
- 1040 USAID Indonesia: IMPROVING SUSTAINABLE FISHERIES AND CLIMATE RESILIENCE, INDONESIA MARINE AND CLIMATE SUPPORT (IMACS) PROJECT, FINAL REPORT, Chemonics, Jakarta, 2015.
- SIGNIFICANT EARTHQUAKES OF THE WORLD, 1979: http://earthquake.usgs.gov/earthquakes/eqarchives/significant/sig_1979.php, access: June 28, 2016.
- 1045 Usman, A. B., and Hartono: Forest fire monitoring using subresolution dimension of NOAA/AVHRR images in Kalimantan - 1995, *Indonesian Journal of Geography*, 29, 67-77, 1997.
- van Bemmelen, R. W.: Ein Beispiel für Sekundärtektogenese auf Java, *Geol Rundsch*, 25, 175-194, 10.1007/bf01809925, 1934.
- van Bemmelen, R. W.: Über die Deutung der Schwerkraftanomalien in Niederländisch-Indien, *Geol Rundsch*, 26, 199-226, 10.1007/bf01807729, 1935.
- 1050 Van Bemmelen, R. W.: Origin and mining of Bauxite in Netherlands-India, *Econ. Geol.*, 36, 630-640, 10.2113/gsecongeo.36.6.630, 1941.
- Van Bemmelen, R. W.: The Geology of Indonesia, General Geology of Indonesia and Adjacent Archipelagoes, Government Printing, The Hague, 1949a.
- van Bemmelen, R. W.: Report on the volcanic activity and volcanological research in indonesia during the period 1936–1948, *Bulletin Volcanologique*, 9, 3-29, 10.1007/bf02596089, 1949b.
- 1055 van Bemmelen, R. W.: Relations entre le volcanisme et la tectogénèse en Indonésie: Résumé d'un discours pour l'Association Internationale de Volcanologie à Bruxelles, août 1951, *Bulletin Volcanologique*, 13, 57-62, 10.1007/bf02596791, 1953.
- van Bemmelen, R. W.: Volcanology and geology of ignimbrites in Indonesia, North Italy, and the U.S.A, *Bulletin Volcanologique*, 25, 151-173, 10.1007/bf02596548, 1963.
- 1060 Van Bemmelen, R. W., and Bourter, E. A. d.: The Geology of Indonesia, General Geology of Indonesia, Government Printing, The Hague, 1970.
- van Hinsberg, V., Berlo, K., Sumarti, S., van Bergen, M., and Williams-Jones, A.: Extreme alteration by hyperacidic brines at Kawah Ijen volcano, East Java, Indonesia: II. Metasomatic imprint and element fluxes, *Journal of Volcanology and Geothermal Research*, 196, 169-184, 10.1016/j.jvolgeores.2010.07.004, 2010.
- 1065 van Voorst, R.: Formal and informal flood governance in Jakarta, Indonesia, *Habitat International*, 52, 5-10, 10.1016/j.habitatint.2015.08.023, 2016.
- Verstappen, H. T.: Geomorphological surveys and natural hazard zoning, with special reference to volcanic hazards in central Java, *Zeitschrift für Geomorphologie, Supplementband*, 68, 81-101, 1988.
- 1070 Verstappen, H. T.: Volcanic geomorphology and natural disaster reduction - the volcanoes of Indonesia, some examples, *Bulletin - Association de Géographes Français*, 1993, 367-376, 1993.
- Verstappen, H. T.: The volcanoes of Indonesia and natural disaster reduction (with some examples), *Indonesian Journal of Geography*, 26, 27-35, 1994.
- Vignato, S.: Devices of oblivion: How Islamic schools rescue 'orphaned' children from traumatic experiences in Aceh (Indonesia), *South East Asia Research*, 20, 239-261, 10.5367/sear.2012.0107, 2012.
- 1075 Voight, B., Constantine, E. K., Siswawidjono, S., and Torley, R.: Historical eruptions of Merapi Volcano, Central Java, Indonesia, 1768-1998, *Journal of Volcanology and Geothermal Research*, 100, 69-138, 2000.
- Wagner, C. S., and Leydesdorff, L.: Network structure, self-organization, and the growth of international collaboration in science, *Research Policy*, 34, 1608-1618, <http://dx.doi.org/10.1016/j.respol.2005.08.002>, 2005a.
- 1080 Wagner, C. S., and Leydesdorff, L.: Mapping the network of global science: comparing international co-authorships from 1990 to 2000, *International Journal of Technology and Globalisation*, 1, 185-208, 10.1504/ijtg.2005.007050, 2005b.
- Ward, P. J., Pauw, W. P., van Buuren, M. W., and Marfai, M. A.: Governance of flood risk management in a time of climate change: The cases of Jakarta and Rotterdam, *Environ. Polit.*, 22, 518-536, 10.1080/09644016.2012.683155, 2013.
- 1085 Warner, K., van der Geest, K., Kreft, S., Huq, S., Harmeling, S., Kusters, K., and De Sherbinin, A.: Evidence from the frontlines of climate change: loss and damage to communities despite coping and adaptation, UNU-EHS, Bonn, 2012.
- WFP: Food Security and Vulnerability Atlas of Indonesia, Jakarta, 2015.

- Whittaker, J., McLennan, B., and Handmer, J.: A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges, *International Journal of Disaster Risk Reduction*, 13, 358-368, <http://dx.doi.org/10.1016/j.ijdrr.2015.07.010>, 2015.
- 2015 is Hottest Year on Record: <http://public.wmo.int/en/media/press-release/2015-hottest-year-record>, 2016.
- Woodhouse, C. A., and Overpeck, J. T.: 2000 Years of Drought Variability in the Central United States, *Bulletin of the American Meteorological Society*, 79, 2693-2714, 1998.
- Zen, M. T., and Hadikusumo, D.: Recent changes in the Anak-Krakatau volcano, *Bulletin Volcanologique*, 27, 259-268, 10.1007/bf02597525, 1964a.
- Zen, M. T., and Hadikusumo, D.: Preliminary report on the 1963 eruption of Mt. Agung in Bali (Indonesia), *Bulletin Volcanologique*, 27, 269-299, 10.1007/bf02597526, 1964b.
- Zen, M. T., and Hadikusumo, D.: The future danger of Mt. Kelut (Eastern Java — Indonesia), *Bulletin Volcanologique*, 28, 275-282, 10.1007/bf02596932, 1965.
- Zen, M. T.: The formation of various ash flows in Indonesia, *Bulletin Volcanologique*, 29, 77-78, 10.1007/bf02597144, 1966.
- Zen, M. T.: Growth and state of Anak Krakatau in September 1968, *Bulletin Volcanologique*, 34, 205-215, 10.1007/bf02597786, 1970.
- Zen, M. T.: Structural origin of Lake Singkarak in central Sumatra, *Bulletin Volcanologique*, 35, 453-461, 10.1007/bf02596966, 1971.

List of Tables

- Table 1 Multi-Stage Processes for Inclusion and Exclusions for Search Terms
- Table 2 Classifications of Findings Based on Topics of Research
- Table 3 List of top ten authors with highest number of publications, and top ten Indonesian authors (SCOPUS, 2016a; Google, 2016a; Research Gate, 2016a)
- Table 4 List of most submitted journals (source: modified from SCOPUS results)
- Table 5 Comparing Citations Authored in General and Those First Authored by Indonesian in 10 Most Cited Papers (source: modified from SCOPUS results)

List of Figures

- Figure 1 Number of Publications over the Year (modified from SCOPUS, 2016a)
- Figure 2 Key topics in HRD group (Source; modified from SCOPUS results)
- Figure 3 Key topics in DRR group (Source; modified from SCOPUS results)
- Figure 4 Key Topics in CC Category Researching on Impacts of Climate Change (Source; modified from SCOPUS results)
- Figure 5 Comparing the Roles of International and Indonesian Authors in Each Publication category (source: modified from SCOPUS results)
- Figure 6 Organizations with Highest Number of Publications (Indonesian Organizations marked in Red) (source: modified from SCOPUS results)

1125 Figure 7 Comparing the Roles of Indonesian Researchers in the 10 Most Cited Papers (source: modified from SCOPUS results)