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Indonesia Disaster Knowledge Update - December 2023



Disaster-related Research Publication in Indonesia of 2023 - A Year in Review

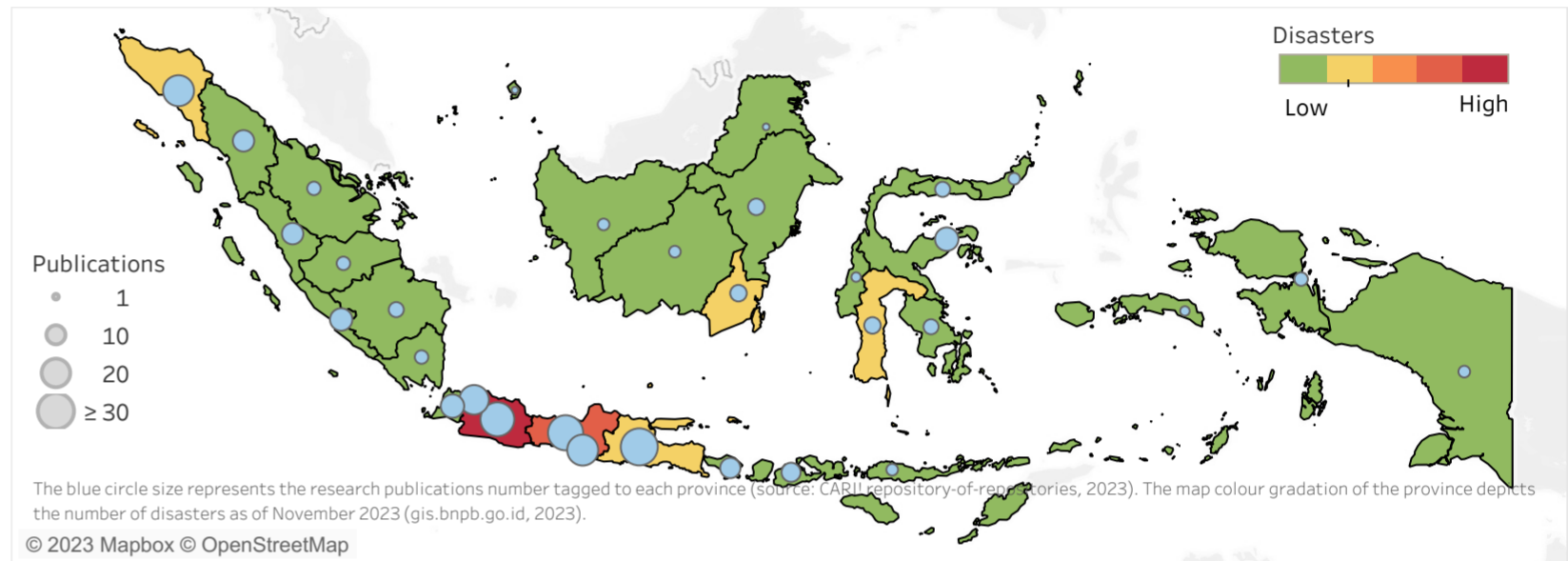
Introduction

In 2023, 3,593 disaster events occurred in Indonesia and caused hundreds of people to lose their lives, and 27,527 houses were damaged. On a monthly basis, hundreds of emergencies due to disasters in Indonesia. The month with the most disaster events was January, February, and March. Almost every month the country witnessed catastrophic disasters that substantially caused loss of lives or the economy. This situation highlights the importance of disaster risk management (DRM) strategies and implementation in the country.

Advancement on DRM is subject to the availability and quality of scientific basis. This shows the urgency of disaster-related knowledge management practices in Indonesia to provide the correct and timely information to all people who need it the most, especially decision-makers. Knowledge creation and management create an enabling environment for empirical and evidence-based problem-solving and decision-making, thus increasing the capacity toward stronger disaster resilience. Therefore, in this IDKU edition, we reviewed the disaster-related research literature published in 2023 to capture and identify the gap and the need for DRM strategies and actions in Indone..

The number of studies are concentrated in Java regions

Research article distribution map



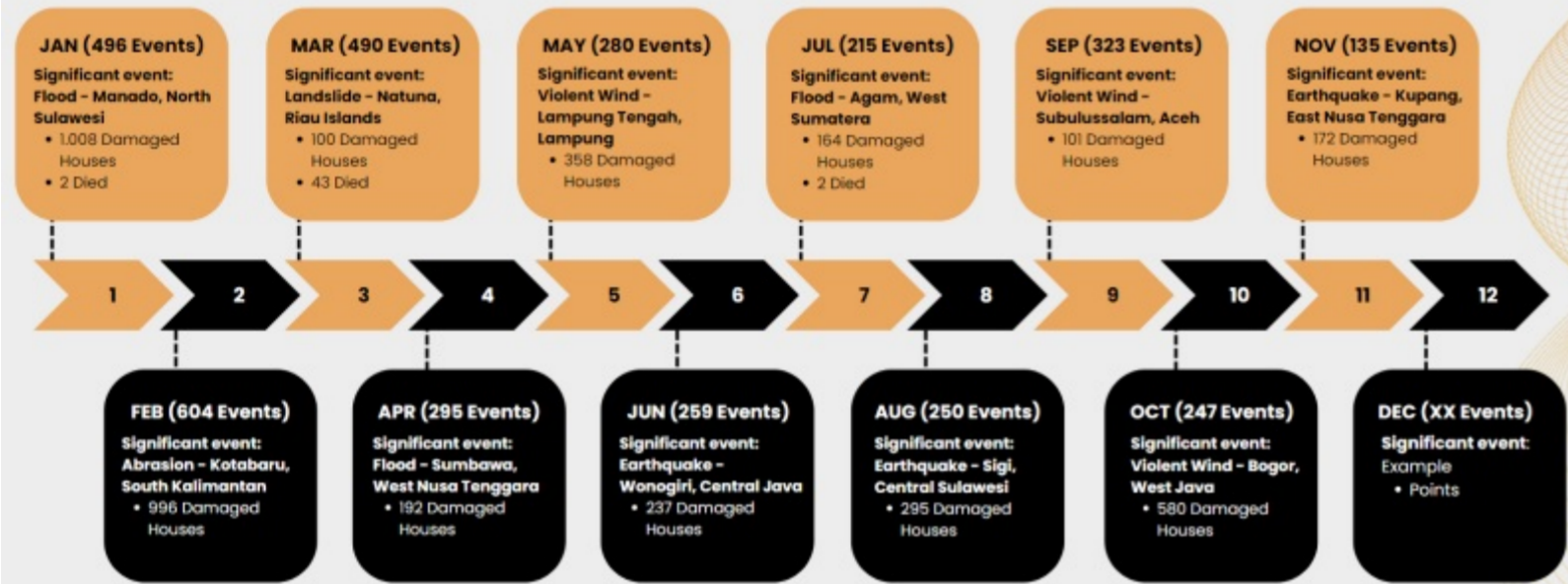
Volume of publications by municipality/regency



In 2023, the distribution map of research articles reveals a concentration of research activities in the provinces of Java and certain provinces of Sumatra. Conversely, research studies in the provinces of Kalimantan, Maluku, Sulawesi, Nusa Tenggara, Bali, and Papua are relatively scarce, with the exception of Central Sulawesi. Notably, East Java, Central Java, and West Java stand out for hosting a substantial number of studies, comprising 32, 27, and 25 publications, respectively. Additionally, in the Sumatra Region, Aceh leads with a total of 21 publications. The word cloud highlights numerous municipalities and regencies emerging as research focal points, particularly in the context of disasters. In 2023, Bengkulu City takes the lead with 8 research articles, followed by Sleman Regency with 7 research articles, Banda Aceh city with 4 research articles and Jakarta Barat City with 4 research articles. In total, 116 administrative areas are designated as study locations.

DISASTERS IN INDONESIA IN 2023: AN OVERVIEW

3,593 Disaster Events 218 Died 16 Lost 27,527 Damaged Houses

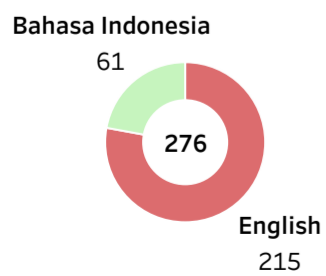


Source: gis.bnpp.go.id (data accessed on 23 November 2023)

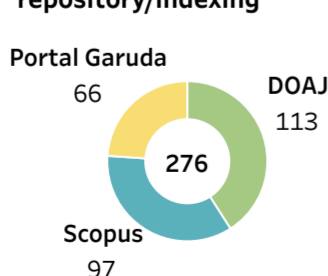
Research Articles Statistics

276 Publications 185 Publishers 271 Authors

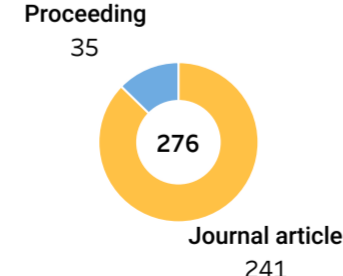
Publications by language



Publications by repository/indexing



Publications by type



For analytical purposes, we examined research articles related to disasters in Indonesia published in 2023. The scientific articles were obtained from CARI! Knowledge Engine sourced from Scopus, DOAJ, and Portal Garuda repositories. All journal articles and proceedings were included in this analysis. Also, only articles written in English and Bahasa Indonesia were included. In total, we selected 276 publications from 185 publishers to be reviewed in the subsequent analysis.

Top main author affiliations

Volume of publications by main author affiliations



The wordcloud illustrates the distribution of research publications based on the primary affiliations of the main authors. Educational and research institutions in Java emerged as the most prolific, with Institut Teknologi Bandung leading with 15 publications, followed by Institut Teknologi Sepuluh Nopember with 11 publications, Badan Riset dan Inovasi Nasional with 10 publications, and Universitas Gadjah Mada with 10 publications. In the Sumatra region, Universitas Syiah Kuala demonstrated notable productivity in disaster research publications, totaling 13 publications. Another noteworthy institution is Universitas Udayana, contributing significantly with a total of 8 publications. In total, there are 142 distinct affiliations, predominantly represented by Indonesian institutions, along with several foreign affiliations within this review corpus.

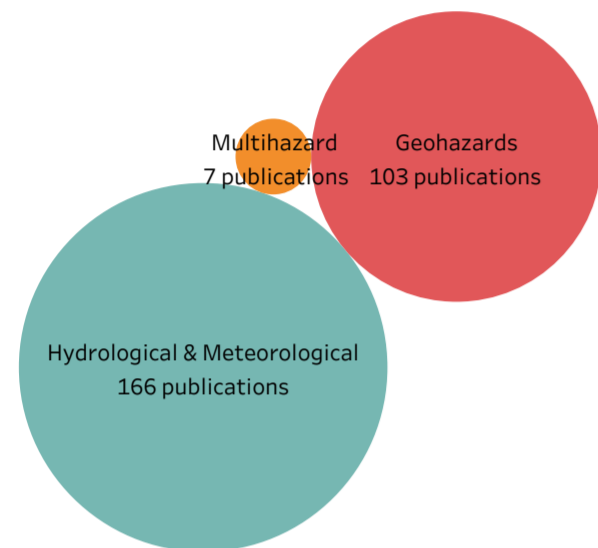
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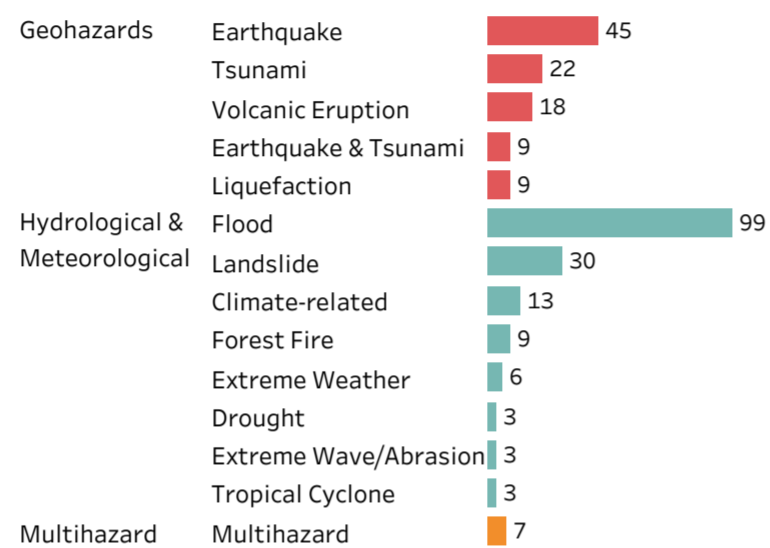
Research Growth & Descriptive Analysis

Both hydrometeorological and geohazard disasters capture the attention of researchers in 2023

Research publications by hazard cluster



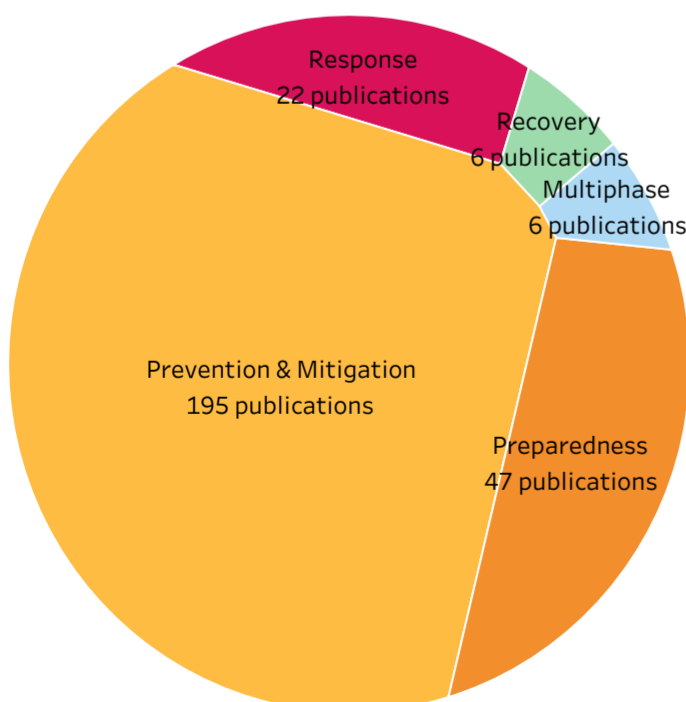
Research publications by hazard type



The hazard cluster and hazard type classification are based on the UNDRR/ISC Classification. Hydrometeorological hazards are the most extensively studied, with 166 publications, where flood and landslide hazards constitute the majority of the cluster. This is expected, given the frequent occurrence of hydrometeorological disasters in Indonesia. Geohazards rank second, with 103 publications, predominantly focusing on earthquakes, tsunamis, and volcanic eruptions. Concerning geohazards, many publications delve into major geohazard events, such as the 2018 Palu Earthquake and Tsunami, the 2018 Sunda Strait Tsunami, the 2018 Lombok Earthquake, and the status of Mount Merapi. Meanwhile, multihazard studies are covered by seven publications.

The pre-disaster phase dominates studies, surpassing those of the disaster and post-disaster phases

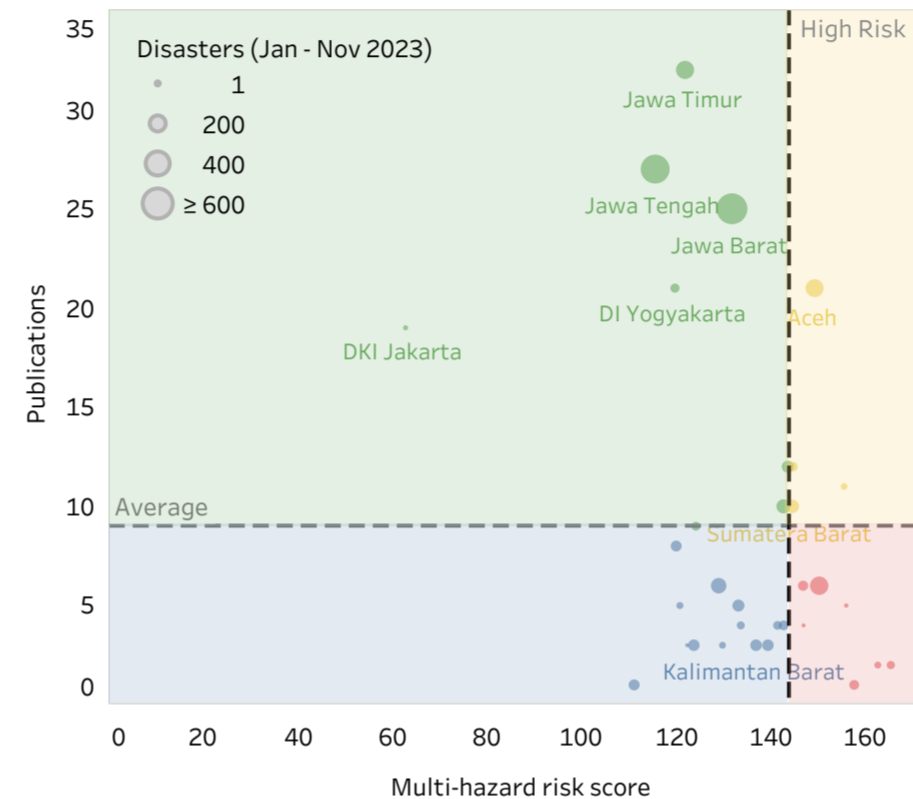
Proportion of publications by disaster management phase



The majority of research in disaster studies is focused on the pre-disaster phase, particularly in Prevention & Mitigation (195 publications) and Preparedness (47 publications). Numerous studies in these areas delve into the assessment of vulnerability, hazards, capacity, and risk aspects. Additionally, they explore topics such as mitigation, encompassing both structural and non-structural measures, as well as aspects of community preparedness and the utilization of early warning systems. However, the graph highlights a noticeable disparity in the knowledge base between studies addressing topics in the pre-disaster phase and those during and post disasters. Specifically, the number of publications related to Response is relatively low (22 publications). Similarly, the Recovery phase has a limited number of publications (6 publications). This suggests a relative minimum of research attention dedicated to understanding and addressing issues related to the Response and Recovery phases compared to the emphasis on Prevention, Mitigation, and Preparedness. Further exploration and study in these areas could contribute to a more comprehensive understanding of the entire disaster management continuum.

Numerous studies are located in regions experiencing a higher frequency of disaster events, irrespective of their risk level

Quadrant plot of number of publications vs multi-hazard risk score



Category

- Less publications, higher risk (Red)
- More publications, higher risk (Yellow)
- Less publications, lower risk (Blue)
- More publications, lower risk (Green)

We divided the provinces into four groups based on the average number of publications and the multi-hazard risk score. The cutoff risk score for the high-risk category is set at ≥ 144 , delineating the quadrant plot. The plot exhibits four categories: more publications & higher risk (yellow), more publications & lower risk (green), fewer publications & higher risk (red), and fewer publications & lower risk (blue). Additionally, we incorporated disaster event data based on administrative areas, represented by the circle size.

Administrative areas with higher disaster events have prompted more research publications on those regions. Seven regions fall into the green category: Central Java, East Java, West Java, Jakarta, Central Sulawesi, North Sumatera, and the Special Region of Yogyakarta. Four regions are classified as yellow, namely West Sumatera, Banten, Aceh, Bengkulu. This indicates that some regions with a high incidence of disasters and high risk category already possess an above-average knowledge base. However, many regions still fall into the red category, signifying a lack of knowledge base for disaster studies in these areas, despite the relatively smaller number of disasters compared to the yellow and green categories.

Top Research Article

Top 5 publications based on citation count

Vulnerability assessment of Balikpapan (Indonesia) for climate change-induced urban flooding

Ariyaningsih | International Journal of Disaster Resilience in the Built Environment
cited by 5 articles

The Godean Debris Avalanche Deposit From a Sector Collapse of Merapi Volcano

Bronto S. | Active Volcanoes of the World
cited by 4 articles

Distribution and characteristics of shallow landslides triggered by the 2018 Mw 7.5 Palu earthquake, Indonesia

Shao X. | Landslides
cited by 3 articles

The Scientific Discovery of Merapi: From Ancient Javanese Sources to the 21st Century

Gertisser R. | Active Volcanoes of the World
cited by 3 articles

Assessing the Pyroclastic Density Current Hazards at Merapi: From Field Data to Numerical Simulations and Hazard Maps

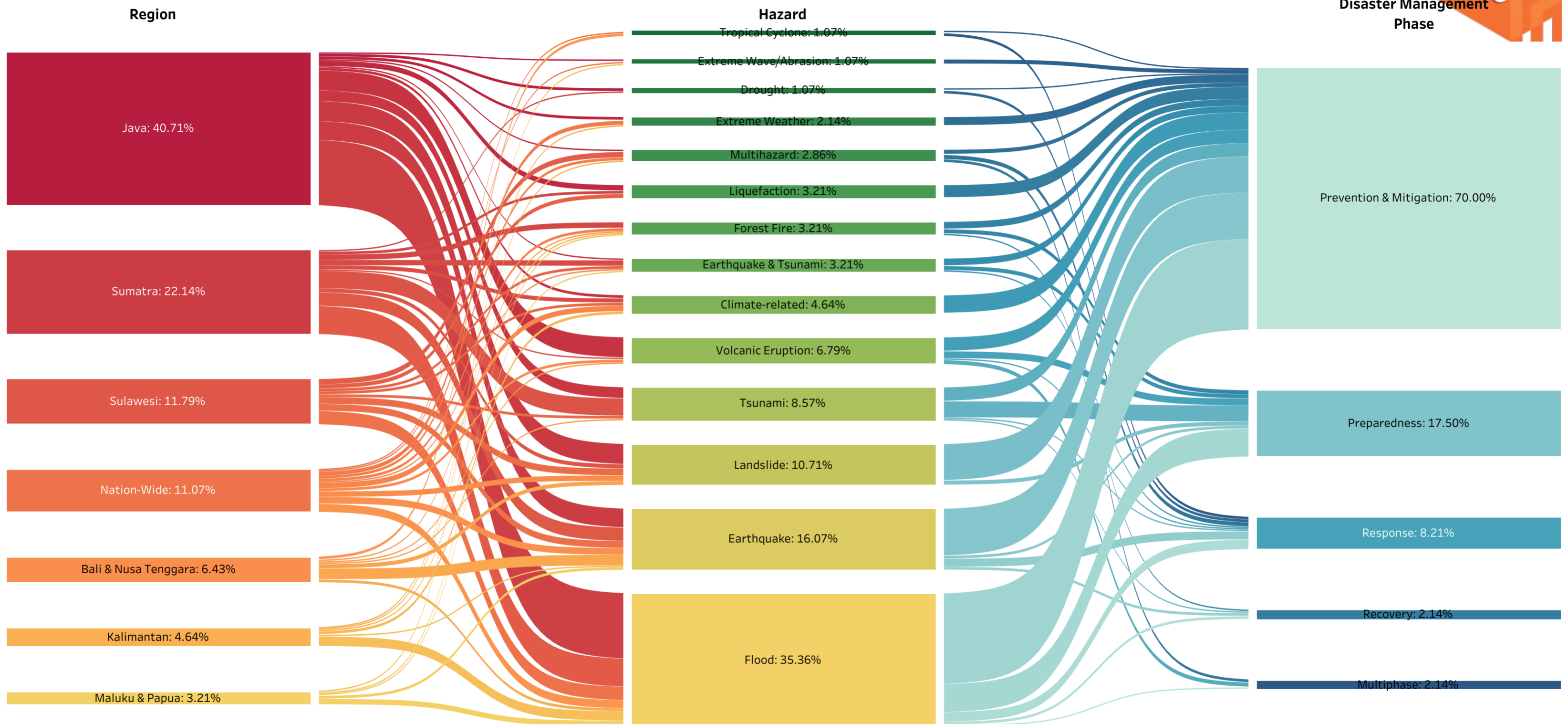
Charbonnier S.J. | Active Volcanoes of the World
cited by 2 articles

The list provided represents the top five publications on disaster studies in 2023, ranked by citation numbers recorded by Scopus as of November 2023. Each of these five studies addresses distinct topics. The first publication delves into the subject of vulnerability assessment for climate change-induced urban flooding in Balikpapan City. The second publication focuses on investigating debris avalanche deposits from a sector collapse of Merapi Volcano. The third publication explores the distribution and characteristics of shallow landslides triggered by the 2018 Palu Earthquake. The fourth publication incorporates scientific discoveries of Merapi Volcano based on ancient and modern sources. The fifth publication delves into the subject of hazard assessment and numerical modeling of pyroclastic density current hazards at Merapi Volcano.

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Sankey Diagram of Publications: Research Location to Hazard to Disaster Management Phase



The Sankey diagram visually represents the number of publications in proportion. Larger box sizes and wider lines correspond to a greater number of publications. The diagram illustrates the distribution of research articles and their relationships across studied locations, hazard type, and disaster management phases.

The Sankey diagram is employed to elucidate the co-analysis relationship among research locations, hazard type, and disaster management phases investigated in each research article. Of all research conducted, 40.71% or 114 articles are focused on the Java region, followed by the Sumatra region with 22.14% or 62 articles, and the Sulawesi region with 11.79% or 33 articles. The distribution of research locations correlates with the existence of major research institutions in Java, coupled with higher number of disasters compared to other regions. Meanwhile, the Sumatra region is enriched by researchers, notably from institutions such as Syiah Kuala University, who demonstrate a deep concern for disasters. Moreover, this region has a history marked by significant geological disasters that have had substantial impacts, thus motivating extensive research on disaster-related topics. A similar trend is observed in the Sulawesi region, where the 2018 Palu Earthquake and Tsunami disaster served as a catalyst for a considerable amount of research in the area.

Regarding hazard types, all regions contribute substantially to flood-related publications (35.36%), while geological disasters like earthquakes and tsunamis are predominantly addressed by Java, Sumatra, and Sulawesi. However, a significant knowledge gap is evident in disaster management phases. The Prevention & Mitigation phase dominates with 196 publications (70%), followed by Preparedness with 49 articles (17.50%). These pre-disaster phases account for 87.50%, emphasizing a considerable emphasis disparity in other phases. The Response phase contributes only 8.21%, and the Recovery phase is represented by 2.14%. The remaining publications, constituting 2.14%, are multiphase. This stark contrast underscores the need for increased attention and research focus on the Response and Recovery phases within the broader context of disaster management. Addressing these knowledge gaps could significantly enhance our understanding and preparedness across all facets of disaster management.