6/25/2022

Wen-Ying (Grace) Wu

Spring 2022 Research Assistantship Final Report

Supervisor: Aggeliki Barberopoulou

Start Data: March 4, 2022

End Date: June 31, 2022

Project Title: 28 September 2018 Palu-Donggala Mw 7.5 Earthquake

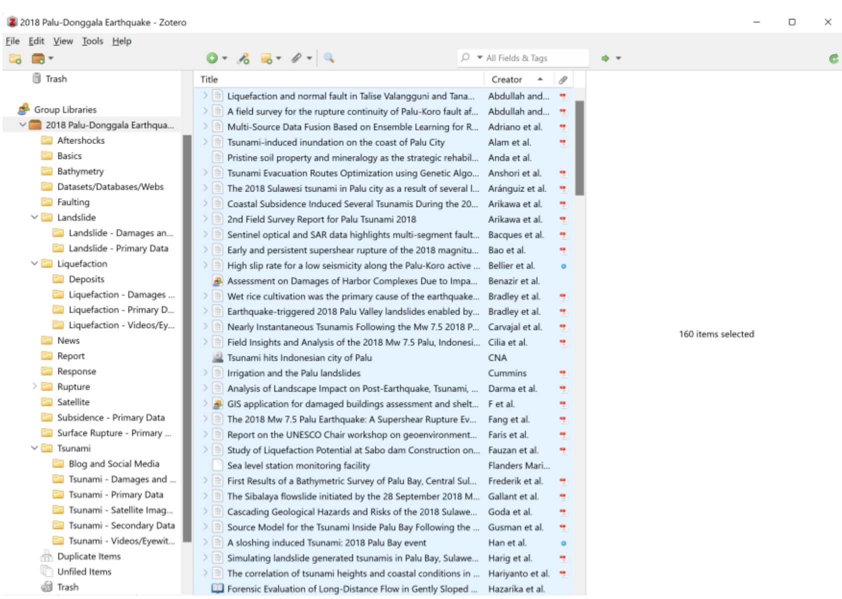
Introduction

The purpose of this project is to collect all published information on the geo-environmental effects of this earthquake and create a digital inventory in a web-GIS environment. The inventory will archive and preserve the locations and assigned intensities of liquefaction, landslides, surface ruptures, tsunami impact sites etc. This will be of great value to global databases and models that make use of ground data following large earthquakes such as the Palu M7.5 event.

Data and Methods

As a research assistant, I have selected around 160 relevant published articles, mostly journal articles including primary and secondary data sources. I organized primary data into an excel sheet and created maps with tsunami data. I would say that I have collected 90-100% of the tsunami data from online journal articles. However, this data compilation work is not complete and requires further investigation into the liquefaction, landslides, surface ruptures, etc. I would say I am halfway through collecting data relevant to liquefaction and landslides.

I conducted most of my research on Google Scholar. Once I found a relevant and credible journal article or source, I would read through its references at the end and look into other relevant sources. This process was repeated over and over again in my research. Some of the search terms include "Palu+2018+earthquake," "Palu+2018+tsunami," "Palu+Dongola+2018+earthquake+tsunami," "Sulawesi+2018+earthquake+and+tsunami." All sources were saved in a Zotero shared folder named "2018 Palu-Donggala Earthquake," as shown below.



6/25/2022

Tsunami

Within the search results, I was able to select and recognize the journal articles that include reliable primary data sources. These selected articles have been cited many times across their peers. A summary table of the articles and available data and a screenshot of an organized .csv file are as below. The .csv file was used to create initial maps that show the attributes of the tsunami (*See maps in the next section*). According to the articles, all runup heights were corrected to calculate heights above sea level at the time of the survey. Please not that Widiyanto et al. used inundation depth and flow depth interchangeably, and it might be the case that these two terms are used interchangeably in the field.

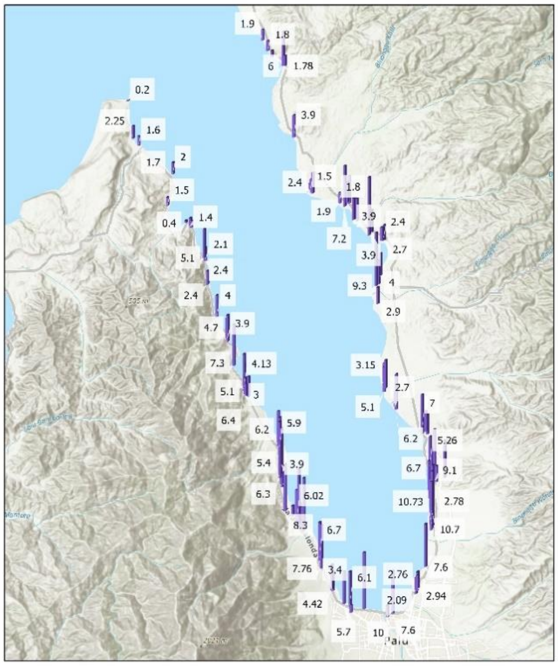
Study (highlighted in yellow in the Bibliography section)	***Available Data***					
	Runup Height	**Flow Depth**	**Inundation Height**	**Inundation Distance**	**Inundation Depth**	**Latitude & Longitude**
Arikawa et al. (2018)	X	X	X			X
Cilia, Mooney, and Nugroho (2021)	X			X		X
Imamura et al. (2018)			X		X	X
Mikami et al. (2019)	X	X	X			X
Muhari et al. (2018)		X	X	X		X
Omira et al. (2019)	X		X			X
Paulik et al. (2019)				X	X	X
Pribadi et al. (2019)	X			X		X
Putra et al. (2019)	X	X	X	X		
Syamsidik et al. (2019)		X				X
Widiyanto et al. (2019)	X			X	X	X
Total data point	**139**	**71**	**21**	**70**	**21**	N/A

Reference	Location	Longitude	Latitude	Date	RunupHeight	InundationHeight	InundationDistance	InundationDepth	Fl
Arikawa		119.821000	-0.117000	10/14/18	1.57				
Arikawa		119.810000	-0.140000	10/14/18	2.13				
Arikawa		119.812000	-0.629000	10/15/18	3.01				2.
Arikawa		119.745000	-0.667000	10/15/18		1.67			
Arikawa		119.859000	-0.711000	10/15/18		5.79			
Arikawa		119.870000	-0.797000	10/16/18		5.34			
Arikawa		119.806000	-0.803000	10/15/18	1.96	3.18			
Arikawa		119.790000	-0.748000	10/15/18		5.95			
Cilia	Panggang, Donggala	119.774556	-0.701895		5.10		106.70		
Cilia	Lolilondo, Donggala	119.780534	-0.747154		4.00		97.70		
Cilia	Lolipesua, Donggala	119.788484	-0.769695		7.30		75.60		
Cilia	Lolisaluran, Donggala	119.818903	-0.843634		9.60		101.00		
Cilia	Tipo, Palu Brt	119.810797	-0.817553		7.10		74.00		
Cilia	Silae, Palu Brt	119.828593	-0.860717		6.70		105.00		
Cilia	Lere, Palu Brt	119.834851	-0.874983		3.80		101.80		
Cilia	Lere, Palu Tmr	119.840053	-0.881112		5.60		0.00		
Cilia	Lere, Palu Tmr	119.842891	-0.882230		5.60		320.00		
Cilia	Lere, Palu Tmr	119.849500	-0.883610		9.20		468.80		
Cilia	Talise, Palu Tmr	119.862850	-0.885830		10.90		428.90		
Cilia	Talise, Palu Tmr	119.878140	-0.863900		7.10		75.00		

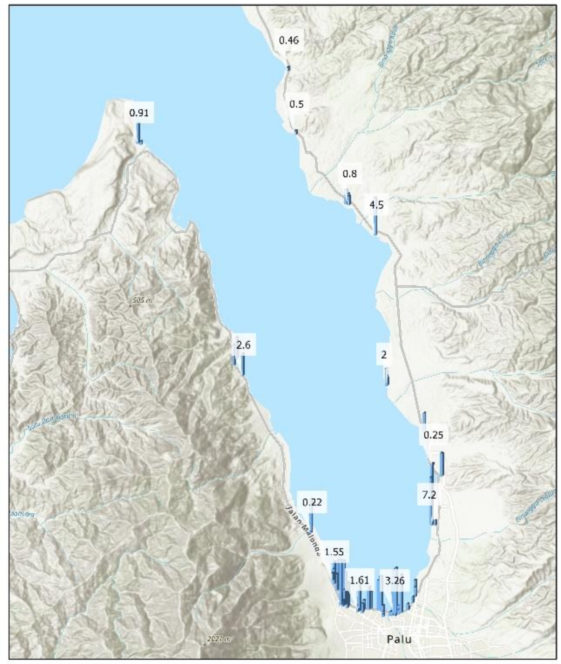
6/25/2022

Initial Tsunami Maps

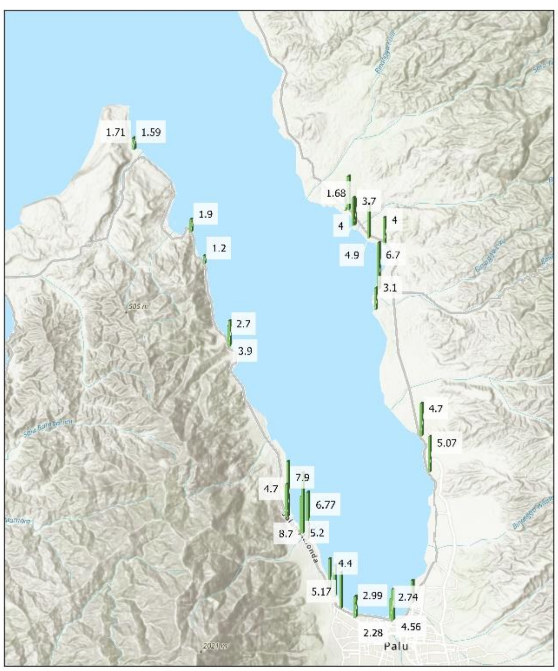
Runup Height



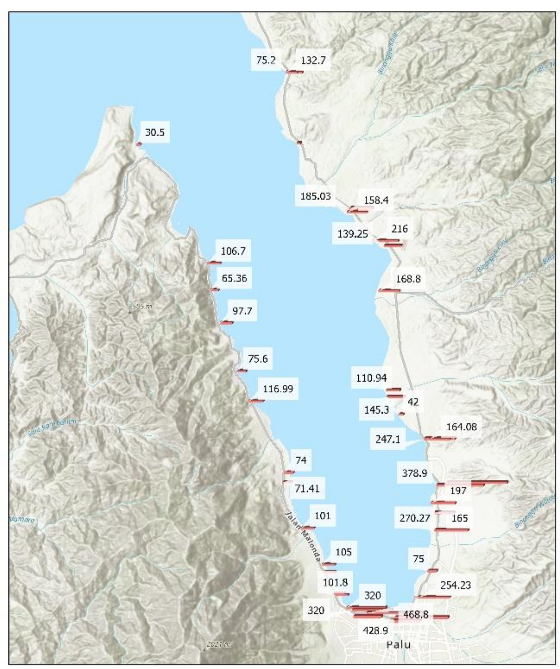
Flow Depth



Inundation Height



Inundation Distance



6/25/2022

Liquefaction & Landslides

As mentioned, literature review for liquefaction and landslides was complete and required a closer look at the data itself as not all of the studies below used primary source data. It is required to go back and trace the primary data source. It is also encouraged that future study digitize existing maps and create polygons for the known liquefaction and landslide areas. Below show some examples of available data and maps of liquefaction and landslides.

Study	Methodology	Available Data/Maps
Abdullah and Abdullah, 2021	The team identified the location of liquefaction based on the effect of deformation on the surface	Map of liquefaction and normal fault locations
Mitsu Okamura et al., 2020	Interviewed eyewitnesses and satellite images	Locations of major flow slide and houses in Sibalaya
Mitsu Okamura et al., 2020	AW3D digital elevation maps with a 0.5 m resolution; satellite imageries acquired by Geo-Eye-1 and WorldView-1, -2, -3 and -4	Contours of change in elevation
Mitsu Okamura et al., 2020	Direct observations	Locations of excavated trench
GEER, 2019	Unmanned aerial vehicle (UAV, or drone) high-resolution aerial photograph surveys; ground-based field surveys; eyewitness interviews with local residents; pre- and post-earthquake satellite images provided through the Digital Globe Open Data program	Locations of landslides in the Palu Basin

Bibliography

"2018 Sulawesi Tsunami Explained by Sub Marine Landslide." n.d. Deltares. Accessed May 6, 2022. https://www.deltares.nl/en/news/2018-sulawesi-tsunami-explained-sub-marine-landslide/.

"2018 年インドネシア・スラウェシ島地震| 東北大学 災害科学国際研究所." n.d. Accessed May 22, 2022. https://irides.tohoku.ac.jp/research/prompt_investigation/2018sulawesi-eq.html.

Abdullah, A I and Abdullah. 2020. "A Field Survey for the Rupture Continuity of Palu-Koro Fault after Donggala Earthquake on September 28 th , 2018." *Journal of Physics: Conference Series* 1434 (1): 012009. https://doi.org/10.1088/1742-6596/1434/1/012009.

Abdullah, and A I Abdullah. 2021. "Liquefaction and Normal Fault in Talise Valangguni and Tanamodindi Villages of Palu City; a Preliminary Observation of Impact MW 7.5 Earthquake in 2018 at Central Sulawesi Province, Indonesia." *Journal of Physics: Conference Series* 1763 (1): 012077. https://doi.org/10.1088/1742-6596/1763/1/012077.

Adriano, Bruno, Junshi Xia, Gerald Baier, Naoto Yokoya, and Shunichi Koshimura. 2019. "Multi-Source Data Fusion Based on Ensemble Learning for Rapid Building Damage Mapping during the 2018 Sulawesi

Earthquake and Tsunami in Palu, Indonesia." *Remote Sensing* 11 (7): 886. https://doi.org/10.3390/rs11070886.

Alam, R. R. R., M. B. Adityawan, M. Farid, A. Chrysanti, Widyaningtias, and M. A. Kusuma. 2021. "Tsunami-Induced Inundation on the Coast of Palu City." *IOP Conference Series: Earth and Environmental Science* 708 (1): 012003. https://doi.org/10.1088/1755-1315/708/1/012003.

Anda, Markus, Setiyo Purwanto, Erna Suryani, Husnain, and Muchtar. 2021. "Pristine Soil Property and Mineralogy as the Strategic Rehabilitation Basis in Post-Earthquake-Induced Liquefaction, Tsunami and Landslide in Palu, Indonesia." *CATENA* 203 (August): 105345. https://doi.org/10.1016/j.catena.2021.105345.

Anshori, Yusuf, Dwi Shinta Angreni, and Suci Ramadhani Arifin. 2020. "Tsunami Evacuation Routes Optimization Using Genetic Algorithms: A Case Study in Palu." *MATEC Web of Conferences* 331: 01008. https://doi.org/10.1051/matecconf/202033101008.

Aránguiz, Rafael, Miguel Esteban, Hiroshi Takagi, Takahito Mikami, Tomoyuki Takabatake, Matías Gómez, Juan González, et al. 2020. "The 2018 Sulawesi Tsunami in Palu City as a Result of Several Landslides and Coseismic Tsunamis." *Coastal Engineering Journal* 62 (4): 445–59. https://doi.org/10.1080/21664250.2020.1780719.

Arikawa, Taro, Abdul Muhari, Yoshihiro Okumura, Yuji Dohi, Bagus Afriyanto, and Karina Aprilia Sujatmiko. n.d. "2nd Field Survey Report for Palu Tsunami 2018," 30.

Arikawa, Taro, Abdul Muhari, Yoshihiro Okumura, Yuji Dohi, Bagus Afriyanto, Karina Aprilia Sujatmiko, Fumihiko Imamura, et al. 2018. "Coastal Subsidence Induced Several Tsunamis During the 2018 Sulawesi Earthquake." *Journal of Disaster Research* 13 (Scientific Communication): sc20181204. https://doi.org/10.20965/jdr.2018.sc20181204.

Bacques, Guillaume, Marcello de Michele, Michael Foumelis, Daniel Raucoules, Anne Lemoine, and Pierre Briole. 2020. "Sentinel Optical and SAR Data Highlights Multi-Segment Faulting during the 2018 Palu-Sulawesi Earthquake (Mw 7.5)." *Scientific Reports* 10 (1): 9103. https://doi.org/10.1038/s41598-020-66032-7.

Bao, Han, Jean-Paul Ampuero, Lingsen Meng, Eric J. Fielding, Cunren Liang, Christopher W. D. Milliner, Tian Feng, and Hui Huang. 2019. "Early and Persistent Supershear Rupture of the 2018 Magnitude 7.5 Palu Earthquake." *Nature Geoscience* 12 (3): 200–205. https://doi.org/10.1038/s41561-018-0297-z.

BBC News. 2018. "Why Sulawesi's Tsunami Is Puzzling Scientists," October 1, 2018, sec. Science & Environment. https://www.bbc.com/news/science-environment-45711190.

Bellier, Olivier, Michel Sébrier, Thierry Beaudouin, Michel Villeneuve, Régis Braucher, Didier Bourlès, Lionel Siame, Eka Putranto, and Indyo Pratomo. 2001. "High Slip Rate for a Low Seismicity along the Palu-Koro Active Fault in Central Sulawesi (Indonesia)." *Terra Nova* 13 (6): 463–70. https://doi.org/10.1046/j.1365-3121.2001.00382.x.

Benazir, Syamsidik, and Mumtaz Luthfi. 2020. "Assessment on Damages of Harbor Complexes Due to Impacts of the 2018 Palu-Donggala Tsunami, Indonesia." In *APAC 2019*, edited by Nguyen Trung Viet, Dou Xiping, and Tran Thanh Tung, 257–60. Singapore: Springer. https://doi.org/10.1007/978-981-15-0291-0_36.

Bradley, Kyle, Rishav Mallick, Dedy Alfian, Harisma Andikagumi, Benazir Benazir, Gilles Brocard, Guangcai Feng, Emma M. Hill, Judith Hubbard, and Jedrzej Majweski. 2019. "Wet Rice Cultivation Was the Primary Cause of the Earthquake-Triggered Palu Landslides," January. https://eartharxiv.org/repository/view/1098/.

Bradley, Kyle, Rishav Mallick, Harisma Andikagumi, Judith Hubbard, Ella Meilianda, Adam Switzer, Nairong Du, et al. 2019. "Earthquake-Triggered 2018 Palu Valley Landslides Enabled by Wet Rice Cultivation." *Nature Geoscience* 12 (11): 935–39. https://doi.org/10.1038/s41561-019-0444-1.

Carvajal, Matías, Cristian Araya-Cornejo, Ignacio Sepúlveda, Daniel Melnick, and Jennifer S. Haase. 2019. "Nearly Instantaneous Tsunamis Following the Mw 7.5 2018 Palu Earthquake." *Geophysical Research Letters* 46 (10): 5117–26. https://doi.org/10.1029/2019GL082578.

Cilia, Marcella G., Walter D. Mooney, and Cahyo Nugroho. 2021. "Field Insights and Analysis of the 2018 Mw 7.5 Palu, Indonesia Earthquake, Tsunami and Landslides." *Pure and Applied Geophysics* 178 (12): 4891–4920. https://doi.org/10.1007/s00024-021-02852-6.

CNA, dir. 2018. *Tsunami Hits Indonesian City of Palu*. https://www.youtube.com/watch?v=T7r6ex4WnkQ.

"Comparison of Land Use and Flowslide Incidence in Palu Valley Following the 2018 Mw 7.5 Palu-Donggala Earthquake - ProQuest." n.d. Accessed June 7, 2022. https://www.proquest.com/openview/b42754baf0a15a2c8e61277844585e61/1?pq-origsite=gscholar&cbl=18750&diss=y.

Cummins, Phil R. 2019. "Irrigation and the Palu Landslides." *Nature Geoscience* 12 (11): 881–82. https://doi.org/10.1038/s41561-019-0467-7.

"Damage in Palu." n.d. Reuters. Accessed May 22, 2022. https://fingfx.thomsonreuters.com/gfx/rngs/INDONESIA-QUAKE/010080MZ19R/index.html.

Darma, Y, B Sulistyantara, and Yonvitner. 2020. "Analysis of Landscape Impact on Post-Earthquake, Tsunami, and Liquefaction Disasters in Palu City, Central Sulawesi." *IOP Conference Series: Earth and Environmental Science* 501 (1): 012003. https://doi.org/10.1088/1755-1315/501/1/012003.

"Data Geospasial Palu Dan Donggala." n.d. BIG Cloud. Accessed May 6, 2022. https://cloud.big.go.id/index.php/s/sxb9TEStoDYT276.

"EBSCOhost | 140489165 | The Tsunami Deposits of the September 28, 2018 Palu Earthquake, Sulawesi, Indonesia." n.d. Accessed May 5, 2022. https://web.p.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=10297006&AN=140489165&h=cEUo8Ew2BA7v44xGy2AZ%2b0N2lO9NTJF%2f%2fuPi3q9Fw7mDkhLBb6ibGH%2fw%2fVTCtP2kAIH2x9wqebtQDhSQq9Fc%2fw%3d%3d&crl=c&resultNs=AdminWebAuth&resultLocal=ErrCrlNotAuth&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d10297006%26AN%3d140489165.

"EBSCOhost | 147820610 | ESTIMATION OF RUPTURE DIRECTIVITY, CMT AND EARTHQUAKE TSUNAMI PARAMETERS AND THEIR CORRELATION WITH THE MAIN SOURCE OF THE FIRST TSUNAMI WAVE, SEPTEMBER 28, 2018." n.d. Accessed May 5, 2022. https://web.p.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=87556839&AN=147820610&h=mpCRNIRU9RJpt3FPzDtM7it1oS8zRl4%2bsfT%2b%2bOEc4J7cNcBohTSkvD%2fi2Tki3ECLOtdQlp1Pt9gANIfkQEjeCA%3d%3d&crl=c&resultNs=AdminWebAuth&resultLocal=ErrCrlNotAuth&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d87556839%26AN%3d147820610.

"EBSCOhost | 154308393 | IMPACT ANALYSIS OF THE 2018 TSUNAMI ON SULAWESI ISLAND USING SATELLITE IMAGERY." n.d. Accessed May 4, 2022. https://web.s.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=87556839&AN=154308393&h=J8FhVehBDS57pwsbxXRsZT8ClgW3wyWlKmjDauR4UXiEeRrISVCyDGdlaImPZHvuQht1rJ1BFC4AjGOwAivyDw%3d%3d&crl=c&resultNs=AdminWebAuth&resultLocal=ErrCrlNotAuth&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d87556839%26AN%3d154308393.

F, Zealandia Sarah N., Sry Handini Puteri, Deha Agus Umarhadi, Ridho Dwi Dharmawan, and Nur Mohammad Farda. 2019. "GIS Application for Damaged Buildings Assessment and Shelter Distribution Analysis after Earthquake and Tsunami in Palu 2018." In *Sixth Geoinformation Science Symposium*, 11311:130–35. SPIE. https://doi.org/10.1117/12.2548660.

Fang, Jin, Caijun Xu, Yangmao Wen, Shuai Wang, Guangyu Xu, Yingwen Zhao, and Lei Yi. 2019. "The 2018 Mw 7.5 Palu Earthquake: A Supershear Rupture Event Constrained by InSAR and Broadband Regional Seismograms." *Remote Sensing* 11 (11): 1330. https://doi.org/10.3390/rs11111330.

Faris, Fikri, Teuku Faisal Fathani, and Fawu Wang. 2019. "Report on the UNESCO Chair Workshop on Geoenvironmental Disaster Reduction 28th April - 1st May, 2019, Palu - Jakarta, Indonesia." *Geoenvironmental Disasters* 6 (1): 12. https://doi.org/10.1186/s40677-019-0129-5.

Fauzan, A Rifa'i, and S Ismanti. 2021. "Study of Liquefaction Potential at Sabo Dam Construction on Poi and Bangga River, Sigi Regency, Central Sulawesi." *IOP Conference Series: Earth and Environmental Science* 930 (1): 012083. https://doi.org/10.1088/1755-1315/930/1/012083.

Flanders Marine Institute (VLIZ), Belgium, and Intergovernmental Oceanographic Commission-UNESCO, France. 2021. "Sea Level Station Monitoring Facility." VLIZ. https://doi.org/10.14284/482.

Frederik, Marina C. G., Udrekh, Ramadhan Adhitama, Nugroho D. Hananto, Asrafil, Shahab Sahabuddin, Muhammad Irfan, Omar Moefti, Dimas B. Putra, and Bondan F. Riyalda. 2019. "First Results of a Bathymetric Survey of Palu Bay, Central Sulawesi, Indonesia Following the Tsunamigenic Earthquake of 28 September 2018." *Pure and Applied Geophysics* 176 (8): 3277–90. https://doi.org/10.1007/s00024-019-02280-7.

Gallant, Aaron P., Jack Montgomery, H. Benjamin Mason, Daniel Hutabarat, A. Nicole Reed, Joseph Wartman, Masyhur Irsyam, et al. 2020. "The Sibalaya Flowslide Initiated by the 28 September 2018 MW 7.5 Palu-Donggala, Indonesia Earthquake." *Landslides* 17 (8): 1925–34. https://doi.org/10.1007/s10346-020-01354-1.

"GEER_Palu_Version_1.Pdf." n.d. Accessed May 5, 2022. https://geerassociation.org/administrator/components/com_geer_reports/geerfiles/GEER_Palu_Version_1.pdf.

Goda, Katsuichiro, Nobuhito Mori, Tomohiro Yasuda, Adi Prasetyo, Ario Muhammad, and Daiki Tsujio. 2019. "Cascading Geological Hazards and Risks of the 2018 Sulawesi Indonesia Earthquake and Sensitivity Analysis of Tsunami Inundation Simulations." *Frontiers in Earth Science* 7 (October): 261. https://doi.org/10.3389/feart.2019.00261.

Gusman, Aditya Riadi, Pepen Supendi, Andri Dian Nugraha, William Power, Hamzah Latief, Haris Sunendar, Sri Widiyantoro, et al. 2019. "Source Model for the Tsunami Inside Palu Bay Following the 2018 Palu Earthquake, Indonesia." *Geophysical Research Letters* 46 (15): 8721–30. https://doi.org/10.1029/2019GL082717.

Han, Peida, Heng Yu, and Xiping Yu. 2021. "A Sloshing Induced Tsunami: 2018 Palu Bay Event." *Applied Ocean Research* 117 (December): 102915. https://doi.org/10.1016/j.apor.2021.102915.

Harig, Sven, Alexey Androsov, and Natalja Rakowsky. n.d. "Simulating Landslide Generated Tsunamis in Palu Bay, Sulawesi, Indonesia," 2.

Hariyanto, I. H., D. G. Pratomo, and M. R. Darminto. 2021. "The Correlation of Tsunami Heights and Coastal Conditions in Palu Bay Using the Contingency Coefficient Analysis." *IOP Conference Series: Materials Science and Engineering* 1052 (1): 012033. https://doi.org/10.1088/1757-899X/1052/1/012033.

Hazarika, Hemanta, Divyesh Rohit, Takashi Kiyota, Mitsu Okamura, Siavash Manafi Khajeh Pasha, and Sukiman Nurdin. 2021. "Forensic Evaluation of Long-Distance Flow in Gently Sloped Ground During the 2018 Sulawesi Earthquake, Indonesia." In *Latest Developments in Geotechnical Earthquake Engineering and Soil Dynamics*, edited by T.G. Sitharam, Ravi Jakka, and Sreevalsa Kolathayar, 247–80. Springer Transactions in Civil and Environmental Engineering. Singapore: Springer. https://doi.org/10.1007/978-981-16-1468-2_12.

Hazarika, Hemanta, Divyesh Rohit, Siavash Manafi Khajeh Pasha, Tsubasa Maeda, Irsyam Masyhur, Ardy Arsyad, and Sukiman Nurdin. 2021. "Large Distance Flow-Slide at Jono-Oge Due to the 2018 Sulawesi Earthquake, Indonesia." *Soils and Foundations* 61 (1): 239–55. https://doi.org/10.1016/j.sandf.2020.10.007.

Heidarzadeh, Mohammad, Abdul Muhari, and Antonius B. Wijanarto. 2019. "Insights on the Source of the 28 September 2018 Sulawesi Tsunami, Indonesia Based on Spectral Analyses and Numerical Simulations." *Pure and Applied Geophysics* 176 (1): 25–43. https://doi.org/10.1007/s00024-018-2065-9.

Higuera, Pablo, Ignacio Sepúlveda, and Philip L.-F. Liu. 2022. "Filling in the Gaps of the Tsunamigenic Sources in 2018 Palu Bay Tsunami." In *Civil Engineering for Disaster Risk Reduction*, edited by Sreevalsa Kolathayar, Indrajit Pal, Siau Chen Chian, and Arpita Mondal, 439–59. Springer Tracts in Civil Engineering. Singapore: Springer. https://doi.org/10.1007/978-981-16-5312-4_29.

Ho, Tung-Cheng, Kenji Satake, Shingo Watada, Ming-Che Hsieh, Ray Y. Chuang, Yosuke Aoki, Iyan E. Mulia, Aditya Riadi Gusman, and Chih-Heng Lu. 2021. "Tsunami Induced by the Strike-Slip Fault of the

2018 Palu Earthquake (Mw = 7.5), Sulawesi Island, Indonesia." *Earth and Space Science* 8 (6): e2020EA001400. https://doi.org/10.1029/2020EA001400.

Hui, Gege, Sanzhong Li, Pengcheng Wang, Yanhui Suo, Qian Wang, and Ian D. Somerville. 2018. "Linkage between Reactivation of the Sinistral Strike-Slip Faults and 28 September 2018 Mw7.5 Palu Earthquake, Indonesia." *Science Bulletin* 63 (24): 1635–40. https://doi.org/10.1016/j.scib.2018.11.021.

Imamura, Fumihiko, Sébastien Penmellen Boret, Anawat Suppasri, and Abdul Muhari. 2019. "Recent Occurrences of Serious Tsunami Damage and the Future Challenges of Tsunami Disaster Risk Reduction." *Progress in Disaster Science* 1 (May): 100009. https://doi.org/10.1016/j.pdisas.2019.100009.

Imamura, Fumihiko, Abdul Muhari, and Taro Arikawa. n.d. "Field Survey of Palu Tsunami, 20180928," 34.

J, Kurniawan D., Suriamihardja A. D, and Davey J. P. 2020. "Tsunami Evacuation Planning as a Tool for Tsunami Risk Reduction: A Case Study in Palu Bay, Central Sulawesi." *International Journal of Engineering and Science Applications* 7 (1): 11–26.

Jalil, A., T. F. Fathani, I. Satyarno, and W. Wilopo. 2021. "Nonlinear Site Response Analysis Approach to Investigate the Effect of Pore Water Pressure on Liquefaction in Palu." *IOP Conference Series: Earth and Environmental Science* 871 (1): 012053. https://doi.org/10.1088/1755-1315/871/1/012053.

Jalil, Abdul, Teuku Faisal Fathani, Iman Satyarno, and Wahyu Wilopo. 2021. "Liquefaction in Palu: The Cause of Massive Mudflows." *Geoenvironmental Disasters* 8 (1): 21. https://doi.org/10.1186/s40677-021-00194-y.

Jamelot, A., A. Gailler, Ph. Heinrich, A. Vallage, and J. Champenois. 2019. "Tsunami Simulations of the Sulawesi Mw 7.5 Event: Comparison of Seismic Sources Issued from a Tsunami Warning Context Versus Post-Event Finite Source." *Pure and Applied Geophysics* 176 (8): 3351–76. https://doi.org/10.1007/s00024-019-02274-5.

Jaya, Asri, Osamu Nishikawa, and Sahabuddin Jumadil. 2019. "Distribution and Morphology of the Surface Ruptures of the 2018 Donggala–Palu Earthquake, Central Sulawesi, Indonesia." *Earth, Planets and Space* 71 (1): 144. https://doi.org/10.1186/s40623-019-1126-3.

Khomsin, D. G. Pratomo, and L. O. F. Susanto. 2019. "Cut and Fill Analysis of Palu Bay Seabed Topography Pre and Post-Tsunami." *IOP Conference Series: Earth and Environmental Science* 389 (1): 012025. https://doi.org/10.1088/1755-1315/389/1/012025.

Kiyota, Takashi, Hisashi Furuichi, Risqi Faris Hidayat, Naoto Tada, and Hasbullah Nawir. 2020. "Overview of Long-Distance Flow-Slide Caused by the 2018 Sulawesi Earthquake, Indonesia." *Soils and Foundations* 60 (3): 722–35. https://doi.org/10.1016/j.sandf.2020.03.015.

Kongko, W., P. Prihartanto, Y. Yudhicara, P. Putra, and B. Santoso. 2018. "Rapid Survey on the Aftermath of Palu-Indonesia Tsunami 28 Sept. 2018 and the Plausible Genesis of Tsunami" 2018 (December): NH23F-3541.

Kosa, Kenji, Hendra Setiawan, Masakatsu Miyajima, Yusuke Ono, and Masaho Yoshida. 2020. "Damage to Teluk Palu Bridge in the 2018 Sulawesi Earthquake, Indonesia." *MATEC Web of Conferences* 331: 02003. https://doi.org/10.1051/matecconf/202033102003.

Krautwald, Clemens, Jacob Stolle, Ian Robertson, Hendra Achiari, Takahito Mikami, Ryota Nakamura, Tomoyuki Takabatake, et al. 2021. “Engineering Lessons from September 28, 2018 Indonesian Tsunami: Scouring Mechanisms and Effects on Infrastructure.” *Journal of Waterway, Port, Coastal, and Ocean Engineering* 147 (2): 04020056. https://doi.org/10.1061/(ASCE)WW.1943-5460.0000620.

Kurniawan, A., R. A. Satria, and M. B. Pratama. 2020. “Analyzing Tsunami Hazard Using Numerical Modelling: Study Case Palu, Sulawesi Tengah, Indonesia.” *IOP Conference Series: Materials Science and Engineering* 982 (1): 012036. https://doi.org/10.1088/1757-899X/982/1/012036.

Kusumawardani, Rini, Muhsiung Chang, Togani Cahyadi Upomo, Ren-Chung Huang, Muhammad Hamzah Fansuri, and Galih Ady Prayitno. 2021. “Understanding of Petobo Liquefaction Flowslide by 2018.09.28 Palu-Donggala Indonesia Earthquake Based on Site Reconnaissance.” *Landslides* 18 (9): 3163–82. https://doi.org/10.1007/s10346-021-01700-x.

Lacassin, Robin, Maud Devès, Stephen P. Hicks, Jean-Paul Ampuero, Remy Bossu, Lucile Bruhat, Daryono, et al. 2020. “Rapid Collaborative Knowledge Building via Twitter after Significant Geohazard Events.” *Geoscience Communication* 3 (1): 129–46. https://doi.org/10.5194/gc-3-129-2020.

Lagesse, R, A Brennan, and I Rusydy. 2020. “INVESTIGATION AND ANALYSIS OF LIQUEFACTION-INDUCED DEBRIS FLOWS IN PALU, INDONESIA FOLLOWING THE 28TH SEPTEMBER 2018 CENTRAL SULAWESI EARTHQUAKE,” 11.

Lagesse, Richard, Andrew Brennan, and Ibnu Rusdy. 2020. “Investigation and Analysis of Liquefaction-Induced Debris Flows in Palu, Indonesia Following the 28th September 2018 Central Sulawesi Earthquake: 17th World Conference on Earthquake Engineering (17WCEE).” In .

“Landslide Tsunamis from the Sulawesi Earthquake.” 2018. *The Landslide Blog* (blog). October 19, 2018. https://blogs.agu.org/landslideblog/2018/10/19/landslide-tsunamis-sulawesi-earthquake/.

“Landslide Types and Processes.” n.d. Accessed May 24, 2022. https://pubs.usgs.gov/fs/2004/3072/fs-2004-3072.html.

“Large-Scale Flowslide in Sibalaya Caused by the 2018 Sulawesi Earthquake - ScienceDirect.” n.d. Accessed June 12, 2022. https://www.sciencedirect.com/science/article/pii/S0038080620336878.

Li, Qi, Bin Zhao, Kai Tan, and Wenbin Xu. 2020. “Two Main Rupture Stages during the 2018 Magnitude 7.5 Sulawesi Earthquake.” *Geophysical Journal International* 221 (3): 1873–82. https://doi.org/10.1093/gji/ggaa115.

Liu, Jann-Yenq, Chi-Yen Lin, Yuh-Ing Chen, Tso-Ren Wu, Meng-Ju Chung, Tien-Chi Liu, Yu-Lin Tsai, et al. 2020. “The Source Detection of 28 September 2018 Sulawesi Tsunami by Using Ionospheric GNSS Total Electron Content Disturbance.” *Geoscience Letters* 7 (1): 11. https://doi.org/10.1186/s40562-020-00160-w.

Liu, P. L.-F., P. Higuera, S. Husrin, G. S. Prasetya, J. Prihantono, H. Diastomo, D. G. Pryambodo, and H. Susmoro. 2020. “Coastal Landslides in Palu Bay during 2018 Sulawesi Earthquake and Tsunami.” *Landslides* 17 (9): 2085–98. https://doi.org/10.1007/s10346-020-01417-3.

“M 7.5 - 72 Km N of Palu, Indonesia.” n.d. Accessed May 5, 2022. https://earthquake.usgs.gov/earthquakes/eventpage/us1000h3p4/executive#executive.

Mas, Erick, Ryan Paulik, Kwanchai Pakoksung, Bruno Adriano, Luis Moya, Anawat Suppasri, Abdul Muhari, et al. 2020. “Characteristics of Tsunami Fragility Functions Developed Using Different Sources of Damage Data from the 2018 Sulawesi Earthquake and Tsunami.” *Pure and Applied Geophysics* 177 (6): 2437–55. https://doi.org/10.1007/s00024-020-02501-4.

Mason, H. Benjamin, Jack Montgomery, Aaron P. Gallant, Daniel Hutabarat, A. Nicole Reed, Joseph Wartman, Masyhur Irsyam, et al. 2021. “East Palu Valley Flowslides Induced by the 2018 MW 7.5 Palu-Donggala Earthquake.” *Geomorphology* 373 (January): 107482. https://doi.org/10.1016/j.geomorph.2020.107482.

Meilano, Irwan, Achmad Ikbal Rahadian, Deni Suwardhi, Wulan Suminar, Fiza Wira Atmaja, Cecep Pratama, Euis Sunarti, and Setya Haksama. 2020. “Analysis of Damage to Buildings Affected by the Tsunami in the Palu Coastal Area Using Deep Learning.” In *2020 IEEE Asia-Pacific Conference on Geoscience, Electronics and Remote Sensing Technology (AGERS)*, 95–97. https://doi.org/10.1109/AGERS51788.2020.9452780.

Mikami, Takahito, Tomoya Shibayama, Miguel Esteban, Tomoyuki Takabatake, Ryota Nakamura, Yuta Nishida, Hendra Achiari, et al. 2019. “Field Survey of the 2018 Sulawesi Tsunami: Inundation and Run-up Heights and Damage to Coastal Communities.” *Pure and Applied Geophysics* 176 (8): 3291–3304. https://doi.org/10.1007/s00024-019-02258-5.

Miyajima, Masakatsu, Hendra Setiawan, Masaho Yoshida, Yusuke Ono, Kenji Kosa, Ida Sri Oktaviana, Martini, and Irdhiani. 2019. “Geotechnical Damage in the 2018 Sulawesi Earthquake, Indonesia.” *Geoenvironmental Disasters* 6 (1): 6. https://doi.org/10.1186/s40677-019-0121-0.

“Modeling the Sources of the 2018 Palu, Indonesia, Tsunami Using Videos From Social Media - Sepúlveda - 2020 - Journal of Geophysical Research: Solid Earth - Wiley Online Library.” n.d. Accessed May 5, 2022. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019JB018675.

Montgomery, Jack, Joseph Wartman, A. Nicole Reed, Aaron P. Gallant, Daniel Hutabarat, and H. Benjamin Mason. 2021. “Field Reconnaissance Data from GEER Investigation of the 2018 MW 7.5 Palu-Donggala Earthquake.” *Data in Brief* 34 (February): 106742. https://doi.org/10.1016/j.dib.2021.106742.

Muhari, Abdul, Fumihiko Imamura, Taro Arikawa, Aradea R. Hakim, Bagus Afriyanto, Ministry of Marine Affairs and Fisheries Jl. Medan Merdeka Timur No.16, Jakarta, Indonesia, International Research Institute of Disaster Sciences (IRIDeS), Tohoku University, Miyagi, Japan, Chuo University, Tokyo, Japan, and Botram Ocean Technology Research and Management, Bandung, Indonesia. 2018. “Solving the Puzzle of the September 2018 Palu, Indonesia, Tsunami Mystery: Clues from the Tsunami Waveform and the Initial Field Survey Data.” *Journal of Disaster Research* 13 (Scientific Communication): sc20181108. https://doi.org/10.20965/jdr.2018.sc20181108.

Mulchandani, Harish Kumar. n.d. “Released: January 15, 2019 NHERI DesignSafe Project ID: PRJ-2128,” 71.

Nagai, Kaori, Abdul Muhari, Kwanchai Pakoksung, Masashi Watanabe, Anawat Suppasri, Taro Arikawa, and Fumihiko Imamura. 2021. “Consideration of Submarine Landslide Induced by 2018 Sulawesi Earthquake and Tsunami within Palu Bay.” *Coastal Engineering Journal* 63 (4): 446–66. https://doi.org/10.1080/21664250.2021.1933749.

Nakata, Kenji, Akio Katsumata, and Abdul Muhari. 2020. “Submarine Landslide Source Models Consistent with Multiple Tsunami Records of the 2018 Palu Tsunami, Sulawesi, Indonesia.” *Earth, Planets and Space* 72 (1): 44. https://doi.org/10.1186/s40623-020-01169-3.

Natawidjaja, D. H., M. R. Daryono, A. Pamumpuni, E. Gunawan, S. Hidayati, M. Irsyam, S. Supartoyo, and L. Faizal. 2018. “Surface Ruptures of the 29 September 2018 Earthquake (Mw7.4) on the Palukoro Major Strike-Slip Fault in Central Sulawesi, Indonesia” 2018 (December): NH22B-03.

Natawidjaja, Danny Hilman, Mudrik R Daryono, Gegar Prasetya, Udrekh, Philip L-F Liu, Nugroho Dwi Hananto, Widjo Kongko, et al. 2021. “The 2018 Mw7.5 Palu ‘Supershear’ Earthquake Ruptures Geological Fault’s Multisegment Separated by Large Bends: Results from Integrating Field Measurements, LiDAR, Swath Bathymetry and Seismic-Reflection Data.” *Geophysical Journal International* 224 (2): 985–1002. https://doi.org/10.1093/gji/ggaa498.

National Geophysical Data Center. n.d. “Global Historical Tsunami Database.” NOAA National Centers for Environmental Information. Accessed May 6, 2022. https://doi.org/10.7289/V5PN93H7.

“NHESS - Characteristics of Building Fragility Curves for Seismic and Non-Seismic Tsunamis: Case Studies of the 2018 Sunda Strait, 2018 Sulawesi–Palu, and 2004 Indian Ocean Tsunamis.” n.d. Accessed May 5, 2022. https://nhess.copernicus.org/articles/21/2313/2021/.

Nurdin, S., A. Arsyad, F. A. Marhum, and H. Setiawan. 2021. “Forensic Investigation of Gumbasa Irrigation Main Canal Damage Due to Large-Scale Flow Liquefaction in Sibalaya Caused by the 2018 Sulawesi Earthquake.” *IOP Conference Series: Earth and Environmental Science* 930 (1): 012079. https://doi.org/10.1088/1755-1315/930/1/012079.

Okamura, Mitsu, Kohei Ono, Ardy Arsyad, Utari S. Minaka, and Sukiman Nurdin. 2020. “Large-Scale Flowslide in Sibalaya Caused by the 2018 Sulawesi Earthquake.” *Soils and Foundations* 60 (4): 1050–63. https://doi.org/10.1016/j.sandf.2020.03.016.

Omira, R., G. G. Dogan, R. Hidayat, S. Husrin, G. Prasetya, A. Annunziato, C. Proietti, et al. 2019. “The September 28th, 2018, Tsunami In Palu-Sulawesi, Indonesia: A Post-Event Field Survey.” *Pure and Applied Geophysics* 176 (4): 1379–95. https://doi.org/10.1007/s00024-019-02145-z.

“Open Data Program | Disaster Response Geospatial Analytics.” n.d. Accessed May 22, 2022. https://www.maxar.com/open-data.

“Overview of Long-Distance Flow-Slide Caused by the 2018 Sulawesi Earthquake, Indonesia | Elsevier Enhanced Reader.” n.d. Accessed June 12, 2022. https://doi.org/10.1016/j.sandf.2020.03.015.

Pakoksung, Kwanchai, Anawat Suppasri, Fumihiko Imamura, Cipta Athanasius, Amalfi Omang, and Abdul Muhari. 2019. “Simulation of the Submarine Landslide Tsunami on 28 September 2018 in Palu Bay, Sulawesi Island, Indonesia, Using a Two-Layer Model.” *Pure and Applied Geophysics* 176 (8): 3323–50. https://doi.org/10.1007/s00024-019-02235-y.

Patriaman, F., T. F. Fathani, and W. Wilopo. 2021. “Liquefaction Potential Analysis in Palu Bay Area.” *IOP Conference Series: Earth and Environmental Science* 930 (1): 012077. https://doi.org/10.1088/1755-1315/930/1/012077.

Paulik, Ryan, Aditya Gusman, James H. Williams, Gumbert Maylda Pratama, Sheng-lin Lin, Alamsyah Prawirabhakti, Ketut Sulendra, et al. 2019. “Tsunami Hazard and Built Environment Damage Observations from Palu City after the September 28 2018 Sulawesi Earthquake and Tsunami.” *Pure and Applied Geophysics* 176 (8): 3305–21. https://doi.org/10.1007/s00024-019-02254-9.

Polcari, Marco, Cristiano Tolomei, Christian Bignami, and Salvatore Stramondo. 2019. “SAR and Optical Data Comparison for Detecting Co-Seismic Slip and Induced Phenomena during the 2018 Mw 7.5 Sulawesi Earthquake.” *Sensors* 19 (18): 3976. https://doi.org/10.3390/s19183976.

Pratama, A., T. F. Fathani, and I. Satyarno. 2021. “Liquefaction Potential Analysis on Gumbasa Irrigation Area in Central Sulawesi Province after 2018 Earthquake.” *IOP Conference Series: Earth and Environmental Science* 930 (1): 012093. https://doi.org/10.1088/1755-1315/930/1/012093.

Pribadi, Sugeng, Indra Gunawan, Jimmy Nugraha, Tri Haryono, Erwan Susanto, Candra Basri, Alhusen Mustarang, and Hari Jumat. n.d. “MEREKAM JEJAK TSUNAMI TELUK PALU 2018,” 7.

“Proceeding-23rd-Annual-National-Conference-on-Geotechnical-Engineering-SUKIMANOK.Pdf.” n.d. Accessed May 24, 2022a. https://www.researchgate.net/profile/Sukiman-Nurdin/publication/337285458_Proceeding_23rd_Annual_National_Conference_on_Geotechnical_Engineering_SUKIMANOK/links/5dceb1ab92851c382f3f6348/Proceeding-23rd-Annual-National-Conference-on-Geotechnical-Engineering-SUKIMANOK.pdf.

“———.” n.d. Accessed May 24, 2022b. https://www.researchgate.net/profile/Sukiman-Nurdin/publication/337285458_Proceeding_23rd_Annual_National_Conference_on_Geotechnical_Engineering_SUKIMANOK/links/5dceb1ab92851c382f3f6348/Proceeding-23rd-Annual-National-Conference-on-Geotechnical-Engineering-SUKIMANOK.pdf.

Pudjaprasetya, S. R., D. Adytia, and N. Subasita. 2021. “Analysis of Bay Bathymetry Elements on Wave Amplification: A Case Study of the Tsunami in Palu Bay.” *Coastal Engineering Journal* 63 (4): 433–45. https://doi.org/10.1080/21664250.2021.1930749.

Purnama, M. R., M. B. Adityawan, M. Farid, A. Chrysanti, B. T. Rayadi, and Y. Suryadi. 2021. “Development of Tsunami Inundation Map for the Coast of Palu City.” *IOP Conference Series: Earth and Environmental Science* 737 (1): 012049. https://doi.org/10.1088/1755-1315/737/1/012049.

Putra, I Made Edy Kusuma, and Hanna Prillysca Chernovita. 2020. “Mapping of Tsunami Disaster Evacuation Pathways Based on Tsunami Altitude Scenario Using Network Analyst Method (Case Study: Palu City, Central Sulawesi).” *Journal of Applied Geospatial Information* 4 (1): 304–11. https://doi.org/10.30871/jagi.v4i1.2012.

Putra, Purna Sulastya, Aswan Aswan, Khoiril Anwar Maryunani, Eko Yulianto, and Widjo Kongko. 2019. “Field Survey of the 2018 Sulawesi Tsunami Deposits.” *Pure and Applied Geophysics* 176 (6): 2203–13. https://doi.org/10.1007/s00024-019-02181-9.

Putra, Purna Sulastya, Aswan Aswan, Khoiril Anwar Maryunani, Eko Yulianto, Septriono Hari Nugroho, Rikza Nur Faqih An Nahar, Irma Amanda, Eki Naidania Dida, Jakah Jakah, and Amar Amar. 2022. “Characterization of Sedimentary Features of the 2018 Palu Tsunami Event, Sulawesi, Indonesia.” *Pure and Applied Geophysics*, April. https://doi.org/10.1007/s00024-022-03011-1.

Rahardjo, Paulus P. 2021. “Study on the Phenomena of Liquefaction Induced Massive Landslides in 28 September 2018 Palu-Donggala Earthquake.” In *Understanding and Reducing Landslide Disaster Risk: Volume 5 Catastrophic Landslides and Frontiers of Landslide Science*, edited by Vít Vilímek, Fawu Wang, Alexander Strom, Kyoji Sassa, Peter T. Bobrowsky, and Kaoru Takara, 25–48. ICL Contribution to Landslide Disaster Risk Reduction. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-60319-9_2.

Rahmawati, H. A., W. A. Prakoso, and A. Rahayu. 2020. “Vs and CPT Based Evaluation of Location with High Liquefaction Damage during 2018 Palu Earthquake.” *IOP Conference Series: Materials Science and Engineering* 930 (1): 012034. https://doi.org/10.1088/1757-899X/930/1/012034.

Reuters. n.d. “Indonesia’s Quake-Hit Sulawesi Island from above | Reuters.Com.” Accessed May 22, 2022. https://www.reuters.com/news/picture/indonesias-quake-hit-sulawesi-island-fro-idUSRTS23SN1.

Robertson, Ian, Miguel Esteban, Jacob Stolle, Tomoyuki Takabatake, Harish Mulchandani, Tracy Kijewski-Correa, David Prevatt, David Roueche, and Khalid Mosalam. 2019. “StEER - PALU EARTHQUAKE AND TSUNAMI, SUWALESI, INDONESIA: FIELD ASSESSMENT TEAM 1 (FAT-1) EARLY ACCESS RECONNAISSANCE REPORT (EARR).” DesignSafe-CI. https://doi.org/10.17603/DS2JD7T.

Sabhan, Sabhan, Badaruddin, Mauludin Kurniawan, and Muhammad Rusydi. 2021. “Tidal and Bathymetry Characteristics after the 2018 Earthquake and Tsunami in Watusampu Waters, Palu Bay, Central Sulawesi.” *Natural Science: Journal of Science and Technology* 10 (1): 26–30. https://doi.org/10.22487/25411969.2021.v10.i1.15505.

Sahadewa, A., M. Irsyam, R. Hanifa, R. Mikhail, Astyka Pamumpuni, R. Nazir, S. Pramono, et al. 2019. “Overview of the 2018 Palu Earthquake.” In *Earthquake Geotechnical Engineering for Protection and Development of Environment and Constructions*. CRC Press.

Sassa, Shinji. 2020. “Cascading Mechanisms Behind the 2018 Indonesia Sulawesi Earthquake and Tsunami Disasters: Inland/Coastal Liquefaction, Landslides and Tsunami.” In *Dam Breach Modelling and Risk Disposal*, edited by Jian-Min Zhang, Limin Zhang, and Rui Wang, 36–46. Springer Series in Geomechanics and Geoengineering. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-46351-9_4.

Sassa, Shinji, and Tomohiro Takagawa. 2019. “Liquefied Gravity Flow-Induced Tsunami: First Evidence and Comparison from the 2018 Indonesia Sulawesi Earthquake and Tsunami Disasters.” *Landslides* 16 (1): 195–200. https://doi.org/10.1007/s10346-018-1114-x.

Sauri, S, A Rifa’i, and H C Hardiyatmo. 2021. “Liquefaction Vulnerability Analysis Using N-SPT Value and Grain Size Analysis on Gumbasa Irrigation Canal in the Post-Disaster Petobo Area, Sulawesi.” *IOP Conference Series: Earth and Environmental Science* 930 (1): 012081. https://doi.org/10.1088/1755-1315/930/1/012081.

Schambach, Lauren, Stephan T. Grilli, and David R. Tappin. 2021. “New High-Resolution Modeling of the 2018 Palu Tsunami, Based on Supershear Earthquake Mechanisms and Mapped Coastal Landslides, Supports a Dual Source.” *Frontiers in Earth Science* 8. https://www.frontiersin.org/article/10.3389/feart.2020.598839.

"SEISMIC ANALYSIS OF DAMAGED BUILDINGS BASED ON POSTEARTHQUAKE INVESTIGATION OF THE 2018 PALU EARTHQUAKE | GEOMATE Journal." 2021, November. https://geomatejournal.com/geomate/article/view/625.

Sepulveda, I., M. Carvajal, J. S. Haase, P. L. F. Liu, X. Xu, C. Araya-Cornejo, and D. Melnick. 2020. "Modeling the Sources of the 2018 Palu Tsunami, Indonesia, with the Help of Social Media Videos." 2020 (December): SY011-0017.

Sihombing, Yeremia Immanuel, Mohammad Bagus Adityawan, Asrini Chrysanti, Widyaningtias, Mohammad Farid, Joko Nugroho, Arno Adi Kuntoro, and Mipi Ananta Kusuma. 2020. "Tsunami Overland Flow Characteristic and Its Effect on Palu Bay Due to the Palu Tsunami 2018." *Journal of Earthquake and Tsunami* 14 (02): 2050009. https://doi.org/10.1142/S1793431120500098.

"SITUATION UPDATE No. 15 - Sulawesi Earthquake - 26 October 2018." 2018. *AHA Centre* (blog). October 26, 2018. https://ahacentre.org/situation-update/situation-update-no-15-sulawesi-earthquake-26-october-2018/.

Socquet, Anne, James Hollingsworth, Erwan Pathier, and Michel Bouchon. 2019. "Evidence of Supershear during the 2018 Magnitude 7.5 Palu Earthquake from Space Geodesy." *Nature Geoscience* 12 (3): 192–99. https://doi.org/10.1038/s41561-018-0296-0.

Somphong, Chatuphorn, Anawat Suppasri, Kwanchai Pakoksung, Tsuyoshi Nagasawa, Yuya Narita, Ryunosuke Tawatari, Shohei Iwai, et al. 2022. "Submarine Landslide Source Modeling Using the 3D Slope Stability Analysis Method for the 2018 Palu, Sulawesi, Tsunami." *Natural Hazards and Earth System Sciences* 22 (3): 891–907. https://doi.org/10.5194/nhess-22-891-2022.

Sotiris Valkaniotis [@SotisValkan]. 2018. "Displacement from #Sentinel2 @CopernicusEU Image Frames for the Whole Length of the #Palu #earthquake Sequence. There Is Displacement on the Northern Part (Partially Clouded) as Reported from #InSAR Results. Dotted Faults Are Inferred. Processed w/MPIC-OPT in @esa_gep. Https://T.Co/Ns6ELBYGPD." Tweet. *Twitter*. https://twitter.com/SotisValkan/status/1047515941570007042.

Stolle, J., C. Krautwald, I. Robertson, H. Achiari, T. Mikami, R. Nakamura, T. Takabatake, et al. 2020. "Engineering Lessons from the 28 September 2018 Indonesian Tsunami: Debris Loading." *Canadian Journal of Civil Engineering* 47 (1): 1–12. https://doi.org/10.1139/cjce-2019-0049.

Sujatmiko, Karina A., and Koji Ichii. 2021. "VELOCITY OF LIQUEFACTION-INDUCED LANDSLIDE IN JONO-OGE TRIGGERED BY 7.5 Mw PALU EARTHQUAKE." *土木学会論文集 α1（構造・地震工学）* 77 (4): I_436-I_445. https://doi.org/10.2208/jscejseee.77.4_I_436.

Sulistiawati, D, Z R Ya'la, Jumiyatun, and dan Z Mubaraq. 2020. "Water Quality Study in Several Seaweeds Culture Sites in the Post-Earthquake-Tsunami Palu Central, Sulawesi Province." *Journal of Physics: Conference Series* 1434 (January): 012035. https://doi.org/10.1088/1742-6596/1434/1/012035.

Sunny, Richards C., Wei Cheng, and Juan Horrillo. 2019. "Video Content Analysis of the 2018 Sulawesi Tsunami, Indonesia: Impact at Palu Bay." *Pure and Applied Geophysics* 176 (10): 4127–38. https://doi.org/10.1007/s00024-019-02325-x.

Supendi, P, A D Nugraha, S Widiyantoro, J D Pesicek, C H Thurber, C I Abdullah, D Daryono, S H Wiyono, H A Shiddiqi, and S Rosalia. 2020. “Relocated Aftershocks and Background Seismicity in Eastern Indonesia Shed Light on the 2018 Lombok and Palu Earthquake Sequences.” *Geophysical Journal International* 221 (3): 1845–55. https://doi.org/10.1093/gji/ggaa118.

Supendi, Pepen, Andri Dian Nugraha, Sri Widiyantoro, Chalid Idham Abdullah, Nanang T. Puspito, Kadek Hendrawan Palgunadi, D. Daryono, and Samsul Hadi Wiyono. 2019. “Hypocenter Relocation of the Aftershocks of the Mw 7.5 Palu Earthquake (September 28, 2018) and Swarm Earthquakes of Mamasa, Sulawesi, Indonesia, Using the BMKG Network Data.” *Geoscience Letters* 6 (1): 18. https://doi.org/10.1186/s40562-019-0148-9.

Suppasri, Anawat, Elizabeth Maly, Miwako Kitamura, Syamsidik, Gianluca Pescaroli, David Alexander, and Fumihiko Imamura. 2021. “Cascading Disasters Triggered by Tsunami Hazards: A Perspective for Critical Infrastructure Resilience and Disaster Risk Reduction.” *International Journal of Disaster Risk Reduction* 66 (December): 102597. https://doi.org/10.1016/j.ijdrr.2021.102597.

Syamsidik, Benazir, Muksin Umar, Giordano Margaglio, and Afri Fitrayansyah. 2019. “Post-Tsunami Survey of the 28 September 2018 Tsunami near Palu Bay in Central Sulawesi, Indonesia: Impacts and Challenges to Coastal Communities.” *International Journal of Disaster Risk Reduction* 38 (August): 101229. https://doi.org/10.1016/j.ijdrr.2019.101229.

Syamsidik, Syamsidik, and Benazir Benazir. 2019. “Tsunami Flow Depths from the September 28, 2018 Palu Tsunami around Palu Bay-Central Sulawesi, Indonesia” 1 (July). https://doi.org/10.17632/vd8yk9crdn.1.

Syifa, Mutiara, Prima Riza Kadavi, and Chang-Wook Lee. 2019. “An Artificial Intelligence Application for Post-Earthquake Damage Mapping in Palu, Central Sulawesi, Indonesia.” *Sensors* 19 (3): 542. https://doi.org/10.3390/s19030542.

Takabatake, Tomoyuki, Tomoya Shibayama, Miguel Esteban, Hendra Achiari, Nanda Nurisman, Mustarakh Gelfi, Trika Agnestasia Tarigan, et al. 2019. “Field Survey and Evacuation Behaviour during the 2018 Sunda Strait Tsunami.” *Coastal Engineering Journal* 61 (4): 423–43. https://doi.org/10.1080/21664250.2019.1647963.

Takagi, Hiroshi, Munawir Bintang Pratama, Shota Kurobe, Miguel Esteban, Rafael Aránguiz, and Bowei Ke. 2019. “Analysis of Generation and Arrival Time of Landslide Tsunami to Palu City Due to the 2018 Sulawesi Earthquake.” *Landslides* 16 (5): 983–91. https://doi.org/10.1007/s10346-019-01166-y.

“The 2018 Sulawesi Island, Indonesia Earthquake: Crustal Deformation Detected by ALOS-2 Data | GSI HOME PAGE.” n.d. Accessed May 6, 2022. https://www.gsi.go.jp/cais/topic181005-index-e.html.

The Ekliptika Institute [@marufins]. 2018. “Wave Record from the Tidal Station of the Pantoloan Port, Palu City at the Time of Tsunami Event. Tidal Station Operated by Agency of Geospatial Information, Indonesia. Timezone: WITA = UTC + 8. Hopefully Useful 🙏 Https://T.Co/GIEL2xUbv9.” Tweet. *Twitter*. https://twitter.com/marufins/status/1047467798996242433.

“The Role of Emergency Medical Team: Experience Acute Response in Earthquakes and Tsunami at Palu, Central Sulawesi, Indonesia, 2018 - ProQuest.” n.d. Accessed May 5, 2022.

https://www.proquest.com/openview/a1995bb260d6e29dad14de47bcb3b1da/1?pq-origsite=gscholar&cbl=105403.

Tohari, Adrin, Dadan Dani Wardhana, Muhammad Hanif, and Keigo Koizumi. 2021. “Understanding of Subsurface Conditions Controlling Flow Liquefaction Occurrence during the 2018 Palu Earthquake Based on Resistivity Profiles.” *E3S Web of Conferences* 331: 03002. https://doi.org/10.1051/e3sconf/202133103002.

Trias, Angelo Paolo L., and Alistair D. B. Cook. 2021. “Future Directions in Disaster Governance: Insights from the 2018 Central Sulawesi Earthquake and Tsunami Response.” *International Journal of Disaster Risk Reduction* 58 (May): 102180. https://doi.org/10.1016/j.ijdrr.2021.102180.

Tunas, I Gede, Arody Tanga, and Siti Oktavia. 2020. “Impact of Landslides Induced by the 2018 Palu Earthquake on Flash Flood in Bangga River Basin, Sulawesi, Indonesia.” *Journal of Ecological Engineering* 21 (2): 190–200. https://doi.org/10.12911/22998993/116325.

Valenzuela, Paolo, Anisa Shafiyya Harnantyari, Rusli, Hendra Achiari, Tomoya Shibayama, Yuta Nishida, Muhammad Fadel Hidayat Marzuki, et al. 2020. “Tsunami Awareness and Evacuation Behaviour during the 2018 Sulawesi Earthquake Tsunami.” *Https://Doi.Org/10.1016/j.Ijdrr.2019.101389*, February. http://repositoriodigital.ucsc.cl/handle/25022009/1976.

Van Dongeren, A., D. Vatvani, and M. Van Ormondt. 2018. “Simulation of 2018 Tsunami along the Coastal Areas in the Palu Bay” 2018 (December): NH22B-07.

“View of INVESTIGATION OF POTENTIAL LANDSLIDES DUE TO LIQUEFACTION ON THE BALAROA ROAD SECTION USING THE LIMIT EQUILIBRIUM METHOD.” n.d. Accessed June 7, 2022. https://aseestant.ceon.rs/index.php/jaes/article/view/28853/17761.

Wahyono, U., and N. M. Wiwik Astuti. 2021. “What We Can Learn from 2018 Liquefaction in Central Sulawesi: Stories from the Survivors.” *Journal of Physics: Conference Series* 2126 (1): 012023. https://doi.org/10.1088/1742-6596/2126/1/012023.

Waloejo, Christrijogo Sumartono, Teddy Heri Wardhana, Lucky Andrianto, Theophilus Ezra Nugroho Pandin, and Moses Glorino Rumambo Pandin. 2021. “Analyzing Earthquake, Tsunami, and Liquefaction Disaster Mitigation Preparedness in Central Sulawesi, Indonesia.” *Review of International Geographical Education Online* 11 (4): 1581–89.

Wang, Yongzhe, Wanpeng Feng, Kun Chen, and Sergey Samsonov. 2019. “Source Characteristics of the 28 September 2018 Mw 7.4 Palu, Indonesia, Earthquake Derived from the Advanced Land Observation Satellite 2 Data.” *Remote Sensing* 11 (17): 1999. https://doi.org/10.3390/rs11171999.

Watkinson, Ian M., and Robert Hall. 2019. “Impact of Communal Irrigation on the 2018 Palu Earthquake-Triggered Landslides.” *Nature Geoscience* 12 (11): 940–45. https://doi.org/10.1038/s41561-019-0448-x.

Wekke, Ismail Suardi, Rajindra Rajindra, Dinil Pushpalal, Muhammad Ahsan Samad, Ahmad Yani, and Rofiqul Umam. 2019. “Educational Institution on Responding Disasters in Palu of Indonesia.” INA-Rxiv. https://doi.org/10.31227/osf.io/drc8q.

Wekke, Ismail Suardi, Zakir Sabara, Muhammad Ahsan Samad, Ahmad Yani, Tarmizi Abbas, and Rofiqul Umam. 2019. “EARTHQUAKE, TSUNAMI, AND SOCIETY COOPERATION: EARLY FINDINGS IN PALU OF INDONESIA POST DISASTER.” INA-Rxiv. https://doi.org/10.31227/osf.io/xmcyn.

Widiyanto, Wahyu, Purwanto B. Santoso, Shih-Chun Hsiao, and Rudy T. Imananta. 2019. “Post-Event Field Survey of 28 September 2018 Sulawesi Earthquake and Tsunami.” *Natural Hazards and Earth System Sciences* 19 (12): 2781–94. https://doi.org/10.5194/nhess-19-2781-2019.

Widyatmoko, A, D Legono, and H C Hardiyatmo. 2021. “Potential Study of Liquefaction in the Downstream Area of Jono Oge-Paneki River, Central Sulawesi.” *IOP Conference Series: Earth and Environmental Science* 930 (1): 012084. https://doi.org/10.1088/1755-1315/930/1/012084.

Williams, James H., Ryan Paulik, Thomas M. Wilson, Liam Wotherspoon, Andi Rusdin, and Gumbert Maylda Pratama. 2020. “Tsunami Fragility Functions for Road and Utility Pole Assets Using Field Survey and Remotely Sensed Data from the 2018 Sulawesi Tsunami, Palu, Indonesia.” *Pure and Applied Geophysics* 177 (8): 3545–62. https://doi.org/10.1007/s00024-020-02545-6.

Williamson, Amy L., Diego Melgar, Xiaohua Xu, and Christopher Milliner. 2020. “The 2018 Palu Tsunami: Coeval Landslide and Coseismic Sources.” *Seismological Research Letters* 91 (6): 3148–60. https://doi.org/10.1785/0220200009.

Williamson, Amy, Diego Melgar, Xiaohua Xu, and Christopher Milliner. 2019. “Coseismic or Landslide? The Source of the 2018 Palu Tsunami,” September. https://eartharxiv.org/repository/view/676/.

Wu, Dengyun, Zhikun Ren, Jinrui Liu, Jie Chen, Peng Guo, Gongming Yin, Hongliu Ran, Chuanyou Li, and Xiaodong Yang. 2020. “Coseismic Surface Rupture during the 2018 Mw 7.5 Palu Earthquake, Sulawesi Island, Indonesia.” *GSA Bulletin* 133 (5–6): 1157–66. https://doi.org/10.1130/B35597.1.

Yew, YingYing, Pedro Arcos González, and Rafael Castro Delgado. 2020. “Real-Time Impact Analysis and Response Using a New Disaster Metrics: 2018 Sulawesi (Indonesia) Earthquake and Tsunami.” *Prehospital and Disaster Medicine* 35 (1): 76–82. https://doi.org/10.1017/S1049023X19005247.

Yulianto, Edy, Dita A. Yusanta, Prahastiwi Utari, and Ignatius Agung Satyawan. 2021. “Community Adaptation and Action during the Emergency Response Phase: Case Study of Natural Disasters in Palu, Indonesia.” *International Journal of Disaster Risk Reduction* 65 (November): 102557. https://doi.org/10.1016/j.ijdrr.2021.102557.

Zaytsev, A. I., E. N. Pelinovsky, A. Yalciiner, H. Susmoro, G. Prasetya, R. Hidayat, G. I. Dolgikh, et al. 2019. “Generation of the 2018 Tsunami on Sulawesi Island: Possible Sources.” *Doklady Earth Sciences* 486 (1): 588–92. https://doi.org/10.1134/S1028334X19050295.

Zeffitni, M Basir-Cyio, M Napitupulu, and S Worosuprojo. 2020. “Spatial Analysis of the Liquefaction Vulnerability Zone Based on the Phreatic Level at the Palu Groundwater Basin, Central Sulawesi Province.” *Journal of Physics: Conference Series* 1434 (1): 012019. https://doi.org/10.1088/1742-6596/1434/1/012019.

Zhao, Bo. 2021. “Landslides Triggered by the 2018 Mw 7.5 Palu Supershear Earthquake in Indonesia.” *Engineering Geology* 294 (December): 106406. https://doi.org/10.1016/j.enggeo.2021.106406.