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DAFTAR PUSTAKA

Andreastuti, S. D., Paripurno, E. T., Subandriyo, Syahbana, D. K., Meilano, I., & Budi-Santoso, A. (2023). Volcano disaster risk management during crisis: Implementation of risk communication in Indonesia. *Journal of Applied Volcanology, 12*(1), Article 3. https://doi.org/10.1186/s13617-023-00129-2

Bani, P., Nauret, F., Oppenheimer, C., Aiuppa, A., Saing, B. U., Haerani, N., ... & Tsanev, V. (2021). Heterogeneity of volatile sources along the Halmahera arc, Indonesia. *Journal of Volcanology and Geothermal Research*, *418*, 107342. https://doi.org/10.1016/j.jvolgeores.2021.107342

Belousov, A. B. (2006). Distribution and eruptive mechanism of maars in the Kamchatka Peninsula. In Doklady Earth Sciences. https://doi.org/10.1134/S1028334X06010077

Bohm M, Haberland C, Asch G (2013) Imaging fluid-related subduction processes beneath Central Java (Indonesia) using seismic attenuation tomography. Tectonophysics 590:175-188. https:// doi.org/10.1016/j.tecto.2013.01.021

Bronto, S., Hadisantono, R. D., & Lockwood, J. P. (1982). Geologic Map of Gamalama Volcano, Ternate, North Maluku, Scale 1: 25,000. *Bandung: Volcanological Survey of Indonesia*.

Bustos, L., Cepeda, H., & Márquez, F. (2023). Volcanic evolution through geomorphological mapping: A case study of Cerro Bravo volcano (Colombia). Journal of Volcanology and Geothermal Research, 435, 107659. https://doi.org/10.1016/j.jsames.2023.104472

Badan Pusat Statistik Kota Ternate. (2025). *Kota Ternate Dalam Angka 2025*. Ternate: BPS Kota Ternate. https://ternatekota.bps.go.id/id/publication/2025/02/28/547a02830ed6220514c23a25/kota-ternate-dalam-angka-2025

UNIVERSITAS
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Charlton, T. R. (2000). Tertiary evolution of the eastern Indonesia collision complex. Journal of Asian Earth Sciences, 18(5), 603-631.

Davidson, J. P., & De Silva, S. L. (2000). Composite vo lcanoes. Dalam H. Sigurdsson (Ed.), Encyclopedia of Volcanoes (pp. 663-681). Academic Press.

De Belizal, E., Lavigne, F., Hadmoko, D. S., Degeai, J. P., Dipayana, G. A., Mutaqin, B. W., Marfai, M. A., Coquet, M., Mauff, B. L., Robin, A. K., Vidal, C., Cholik, N., & Aisyah, N. (2013). Rain-triggered lahars following the 2010 eruption of Merapi volcano, Indonesia: A major risk. Journal of Volcanology and Geothermal Research, 261, 330-347. https://doi.org/10.1016/j.jvolgeores.2013.01.010

De Silva, S., & Lindsay, J. M. (2015). Primary volcanic landforms. In The encyclopedia of volcanoes (pp. 273-297). Academic Press. http://dx.doi.org/10.1016/B978-0-12-385938-9.00015-8

Di Traglia, F., Pistolesi, M., Bonadonna, C., & Rosi, M. (2024). The last 1100 years of activity of La Fossa caldera, Vulcano Island (Italy): new insights into stratigraphy, chronology, and landscape evolution. *Bulletin of Volcanology*, *86*(5), 47. https://doi.org/10.1007/s00445-024-01738-4

Dramis, F., Guida, D., & Cestari, A. (2011). Nature and aims of geomorphological mapping. In M. J. Smith, P. Paron, & J. S. Griffiths (Eds.), *Geomorphological mapping: Methods and applications* (Developments in Earth Surface Processes, Vol. 15, pp. 39-73). Elsevier. https://doi.org/10.1016/B978-0-444-53446-0.00003-3

Dramis, F., & Bisci, C. (1998). Cartografia geomorfologica. Dalam M. J. Smith, P. Paron, & J. S. Griffiths (Eds.), *Geomorphological mapping: Methods and applications* (Developments in Earth Surface Processes, Vol. 15, pp. 39-73). Elsevier. https://doi.org/10.1016/B978-0-444-53446-0.00003-

UNIVERSITAS
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Eghbal, M. K., Hamzehpour, N., & Farpoor, M. H. (2018). *Geology and Geomorphology* (pp. 35-56). Springer, Cham. https://doi.org/10.1007/978-3-319-69048-3_4

Faral, A., Lavigne, F., Mutaqin, B. W., Mokadem, F., Achmad, R., Ningrum, R. W., ... & Mei, E. T. W. (2022). A 22,000-year tephrostratigraphy record of unidentified volcanic eruptions from Ternate and Tidore islands (North Maluku, Indonesia). *Journal of Volcanology and Geothermal Research*, *423*, 107474. https://doi.org/10.1016/j.jvolgeores.2022.107474

Firmansyah, F. (2010). Identifikasi tingkat risiko bencana letusan gunungapi Gamalama di Kota Ternate. Jurnal Lingkungan dan Bencana Geologi, 2(3), 203-219.

Gabrielli S, Spagnolo M, De Siena L (2020) Geomorphology and surface geology of Mount St. Helens volcano. J Maps 16:2. https://doi.org/10.1080/17445647.2020.1790048

Global Volcanism Program. (2013). Gamalama volcano information. Smithsonian Institution. https://volcano.si.edu/volcano.cfm?vn=268030

Griffiths, J. S., Warburton, J., & Stokes, M. (2011). Mapping geomorphology in practice. Progress in Physical Geography, 35(3), 275-297. https://doi.org/10.1177/0309133310397412

Gunda, G. K. T., Chauhan, M., Chauhan, P., Tripathi, S., Anumalla, S., Goud, R. S., ... & Balaji, S. (2025). Morphometric Analysis of Barren Island Volcano Using Remote Sensing and Field Studies: Insights into Volcanic Processes and Caldera Formation. Journal of the Indian Society of Remote Sensing, 53(5), 1359-1372. https://doi.org/10.1007/s12524-024-02040-8

Harris, A. J., Rowland, S. K., Villeneuve, N., & Thordarson, T. (2017). Pāhoehoe,‘a ‘ā, and block lava: an illustrated history of the nomenclature. *Bulletin of Volcanology*, *79*(1), 7. 10.1007/s00445-016-1075-7

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Karátson, D., Telbisz, T., & Singer, B. S. (2010). Late-stage volcano geomorphic evolution of the Pleistocene San Francisco Mountain, Arizona (USA), based on high-resolution DEM analysis and 40 Ar/39 Ar chronology. Bulletin of Volcanology, 72, 833-846. 10.1007/s00445-010-0365-8

Kereszturi, G., & Németh, K. (2012). Monogenetic basaltic volcanoes: genetic classification, growth, geomorphology and degradation. Updates in volcanology-new advances in understanding volcanic systems, 3-88. http://dx.doi.org/10.5772/51387

Kilburn, C. R. (2004). Fracturing as a quantitative indicator of lava flow dynamics. Journal of Volcanology and Geothermal Research, 132(2-3), 209-224. https://doi.org/10.1016/S0377-0273(03)00346-9

Kósik, S., et al. (2022). Integrating LiDAR to unravel the volcanic architecture of Mayor Island. Journal of Volcanology and Geothermal Research, 426, 107567.

Kunrat, S., Bani, P., Haerani, N., Saing, U. B., Aiuppa, A., & Syahbana, D. K. (2020). First gas and thermal measurements at the frequently erupting Gamalama volcano (Indonesia) reveal a hydrothermally dominated magmatic system. *Journal of Volcanology and Geothermal Research*, *407*, 107096. https://doi.org/10.1016/j.jvolgeores.2020.107096

Lee, E. M. (2001). Geomorphological mapping. In J. S. Griffiths (Ed.), Land surface evaluation for engineering practice (Vol. 18, pp. 53-56). Geological Society of London. https://doi.org/10.1144/GSL.ENG.2001.018.01.05

Lewin, J., & Woodward, J. C. (2009). Karst geomorphology and environmental change. The physical geography of the mediterranean, 8, 287.

Loye, A., Pedrazzini, A., Theule, J. I., Jaboyedoff, M., Liébault, F., & Metzger, R. (2012). Influence of bedrock structures on the spatial pattern of erosional landforms in small alpine catchments. Earth Surface Processes and Landforms, 37(13), 1407-1423. https://doi.org/10.1002/ESP.3285

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Macpherson, C. G., Forrde, E. J., Hall, R., & Thirlwall, M. F. (2003). Geochemical evolution of magmatism in an arc-arc collision: the Halmahera and Sangihe arcs, eastern Indonesia. Geological Society, London, Special Publications, 219(1), 207-220. https://doi.org/10.1144/GSL.SP.2003.219.01.10

Masruroh, H., Sahrina, A., Rohman, F., & Trihatmoko, E. (2024). Geomorphology mapping and landslide susceptibility for disaster risk reduction and sustainability environment in the Sub DAS Maspo, Mt. Welirang, East Java, Indonesia. https://doi.org/10.1088/1755-1315/1314/1/012117

Martí, J., Groppelli, G., & da Silveira, A. B. (2018). Volcanic stratigraphy: A review. *Journal of Volcanology and Geothermal Research*, *357*, 68-91. https://doi.org/10.1016/j.jvolgeores.2018.04.006

Mawardi, R., Zaennudin, A., Kusdinar, E., & Yohana, T. (1991). Penyelidikan Petrokimia dan potensial diri G. *Gamalama, Ternate, Maluku, Directororat Vukanologi*.

Mulyaningsih S, Shaban G (2023) Geochemistry of basaltic Merb abu volcanic rocks, Central Java. Indonesia Indonesian J Geosci 7(2):161-178. https://doi.org/10.17014/ijog.7.2.161-178

Newhall, C. G., & Self, S. (1982). The volcanic explosivity index (VEI): An estimate of explosive magnitude for historical volcanism. Journal of Geophysical Research: Oceans and Atmospheres, 87, 1231-1238. https://doi.org/10.1029/JC087iC02p01231

Pellegrini, L., & Vercesi, P. L. (2017). *Landscapes and Landforms Driven by Geological Structures in the Northwestern Apennines* (pp. 203-213). Springer, Cham. https://doi.org/10.1007/978-3-319-26194-2_17

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Pike, R. J. (1978). Volcanoes on the inner planets: Some preliminary comparisons of gross topography. In *Proceedings of the 9th Lunar and Planetary Science Conference* (pp. 3239-3273).

Pike, R. J., Evans, I. S., & Hengl, T. (2009). Geomorphometry: A brief guide. In T. Hengl & H. I. Reuter (Eds.), *Geomorphometry: Concepts, software, applications* (Vol. 33, pp. 3-30). Elsevier. https://doi.org/10.1016/S0166-2481(08)00001-9

Quesada-Román, A., et al. (2023). Geomorphological regional mapping for environmental planning in developing countries. Geomorphology, 435, 108028. https://doi.org/10.1016/j.envdev.2023.100935

Radovic, D., Fetahović, I., & Dolićanin, E. Ć. (2022). The Process of Making, Organizing and Using Thematic Layers in GIS. Scientific Publications of the State University of Novi Pazar, 14(2), 89. https://doi.org/10.46793/spsunp2202.089r

Rahanjani, Y. E., Setianto, A., & Srijono, S. (2012, June). Pemanfaatan Citra Digital Elevation Model (DEM) Untuk Studi Evolusi Geomorfologi gunungapi Merapi Sebelum dan Setelah Erupsi gunungapi Merapi 2010. In Seminar Nasional Informatika 2012. " Veteran" University of National Development Yogyakarta.

Samodra, G., Chen, G., Sartohadi, J., Hadmoko, D. S., & Kasama, K. (2014). Automated landform classification in a rockfall-prone area, Gunung Kelir, Java. *Earth Surface Dynamics*, 2, 339-348. https://doi.org/10.5194/esurf-2-339-2014

Sepulveda, J. P., Cioni, R., & Aravena, A. (2023). Morphology-based characterization of intermediate to silicic lava flows: Application to the Central Andean Volcanic Zone. Earth-Science Reviews, 241, 104433. https://doi.org/10.1016/j.earscirev.2023.104433

UNIVERSITAS
GADJAH MADA
**Analisis Karakteristik Geomorfologi dan Klasifikasi Bentuklahan Vulkanik Gunung Gamalama, Ternate,
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Siebert, L., Simkin, T., & Kimberly, P. (2011). Volcanoes of the world (3rd ed.). University of California Press. https://doi.org/10.1525/9780520947931

Sigurdsson, H. (2009). The environmental and geomorphological context of the volcano. The world of Pompeii, 85-104.

Simkin, T., & Siebert, L. (2000). Earth's volcanoes and eruptions: An overview. In H. Sigurdsson (Ed.), Encyclopedia of volcanoes (pp. 249-261). Academic Press.

Stasiun Meteorologi Kelas I Sultan Babullah Ternate. (2023). *Data klimatologi tahun 2023*. Badan Meteorologi, Klimatologi, dan Geofisika.

Suhendro, I., Mohammad, T. F., Lesmana, R. A. D., Indrayani, K. I., Nuraini, K., Ahmad, W. A., ... & Mashum, A. S. (2025). Preliminary study on stratigraphy, petrology-geochemistry, eruption styles, and geomorphology of Merbabu volcano, Central Java, Indonesia: Implication for the volcanological hazards of an infrequently active volcano. Environmental Earth Sciences, 84(5), 1-25. https://doi.org/10.1007/s12665-025-12146-y

Suhendro, I., Yuliawan, E., Zen, R. F., Rahmawati, Z. Y., Priyana, P. E., Diwijaya, S., ... & El Zamzamy Latief, G. A. (2024). Petrology, geochemistry, and crystal size distribution of the basaltic andesite-dacite association at Mt. Sumbing, Central Java, Indonesia: Insights to magma reservoir dynamics and petrogenesis. Acta Geochimica, 43(5), 838-855. https://doi.org/10.1007/s11631-024-00673-7

Thornbury, W. D. (1969). Principles of Geomorphology (2nd ed.). Wiley.

Thouret, J. C. (1999). Volcanic geomorphology—an overview. Earth-Science Reviews, 47(1-2), 95-131. https://doi.org/10.1016/S0012-8252(99)00014-8.

Thouret, J. C., Antoine, S., Magill, C., & Ollier, C. (2020). Lahars and debris flows: Characteristics and impacts. Earth-Science Reviews, 201, 103003. https://doi.org/10.1016/j.earscirev.2019.103003

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Thouret, J. C., Ettinger, S., Guitton, M., Santoni, O., Magill, C., Martelli, K., Zuccaro, G., Revilla, V., Charca, J. A., & Arguedas, A. (2014). Assessing physical vulnerability in large cities exposed to flash floods and debris flows: the case of Arequipa (Peru). Natural Hazards, 73(3), 1771-1815. https://doi.org/10.1007/s11069-014-1172-x

Tripodo, A., et al. (2012). Geomorphological map of the Lipari volcanic island (Aeolian Archipelago - Italy). Journal of Maps, 8(1), 1-12.

Valentine, G. A., Shufelt, N. L., & Hintz, A. R. (2011). Models of maar volcanoes, Lunar Crater (Nevada, USA). *Bulletin of Volcanology*, *73*(6), 753-765. https://doi.org/10.1007/S00445-011-0451-6

Van Zuidam, R. A. (1983). Guide to geomorphologic aerial photographic interpretation and mapping. Enschede, The Netherlands: ITC.

Ventura G, Vilardo G, Bronzino G, Gabriele G, Nappi R, Terranova C (2005) Geomorphological map of the Somma-Vesuvius volcanic complex (Italy). J Maps 1(1):30-37. https:// doi. org/ 10. 4113/ jom. 2005.8

Verstappen, H. T., & Van Zuidam, R. A. (1968). ITC textbook of Photo-Interpretation, VII: 2-ITC system of geomorphological survey. ITC, Delft, The Netherlands, 52.

Verstappen, H. T., & Van Zuidam, R. A. (with Meijerink, A. M. J., & Nossin, J. J.). (1991). The ITC system of geomorphic survey: A basis for the evaluation of natural resources and hazards (Rev. ed.). International Institute for Aerospace Survey and Earth Sciences (ITC).

Verstappen, H. T. (2011). Old and new trends in geomorphological and landform mapping. Developments in earth surface processes, 15, 13-38. https://doi.org/10.1016/B978-0-444-53446-0.00002-1

Voight, B., & Elsworth, D. (1997). Failure of volcano slopes. Geotechnique, 47(1), 1-31. http://dx.doi.org/10.1680/geot.1997.47.1.1

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Walker, G. P. (1971). Grain-size characteristics of pyroclastic deposits. The Journal of Geology, 79(6), 696-714.

White, J. D., & Ross, P. S. (2011). Maar-diatreme volcanoes: a review. Journal of Volcanology and Geothermal Research, 201(1-4), 1-29. https://doi.org/10.1016/j.jvolgeores.2011.01.010

Yanny, Y., Maulana, A., Mawaleda, M., & Irfan, U. R. (2026). Geochemistry of Lava Gamalama Volcano, Indonesia: Implications for Magma Genesis, Tectonic Setting, and Potential Hazard. *The Iraqi Geological Journal*, 54-70. https://doi.org/10.46717/igj.2026.59.1A.5

Zinck, J. A. (2023). The geomorphic landscape: Criteria for classifying geoforms. In *Geopedology: An integration of geomorphology and pedology for soil and landscape studies* (pp. 85-106). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-19159-1_6

Zuidam, R. V. (1985). Aerial photo-interpretation in terrain analysis and geomorphologic mapping. *ITC, Smits Publ., Enschede, The Hague*.