

DAFTAR PUSTAKA

- Abbasi, T., & Abbasi, S. (2012). *Water Quality Indices*, Water Quality Indices., Oxford: Elsevier.
- Adji, T, N., Haryono, E., & Suprojo. S.W. (1999). Kawasan Karst dan Prospek Perkembangannya di Indonesia. *Prosiding Seminar PIT IGI 1999.*, Depok : Universitas Indonesia.
- Adji, T, N. (2006). Peranan Geomorfologi dalam Kajian Kerentanan Air Bawah Tanah Karst. *Gunung Sewu, Indonesia Cave and Karst Journal*, 2(1), 68-74
- Adji, T, N. (2009). Kajian Variasi Spasial-Temporal Hidrogeokimia dan Sifat Aliran Untuk Karakterisasi Perilaku Sistem Karst Dinamis (SKD) Sepanjang Sungai Bawah Tanah (SBT) Bribin, Kabupaten Gunungkidul, DIY. *Disertasi*. Universitas Gadjah Mada.
- Adji, T.N., 2011. Pemisahan aliran dasar bagian hulu Sungai Bribin pada aliran Gua Gilap, di Karst Gunung Sewu, Gunung Kidul, Yogyakarta, Jurnal Geologi Indonesia, Vol. 6 No. 3 September
- Adji, T. N. (2016). Baseflow Separation of the Bribin River Upstream in Gilap Cave Flowage, Sewu Mountain Karst, Gunung Kidul, YOGYAKARTA. *Indonesian Journal on Geoscience*, 6(3), 165-175, doi:10.17014/ijog.6.3.165-175.
- Adji, T.N. (2015). Nilai Ekonomi Air di Daerah Karst. *disampaikan dalam Lokakarya Nasional Ekosistem Karst*, 16 Desember 2015, Jakarta: Direktorat Bina Pengelolaan Ekosistem Essensial Kemeterian Lingkungan Hidup dan Kehutanan Republik Indonesia.
- Adji, T.N.A., & Cahyadi, A. (2016). Pentingnya Monitoring Parameter-Parameter Hidrograf dalam Pengelolaan Airtanah di Daerah Karst. *Seminar Ekohidrolika*, Yogyakarta.
- Adji, T. N., Cahyadi, A., Ramadhan, G. S., Haryono, E., Purnama, S., Tastian, N. F., Acitya, R., & Putra, R. D. (2023). Analisis Dampak Aktivitas Antropogenik Terhadap Kualitas Air Sungai Bawah Tanah Seropan, Kawasan Karst Gunungsewu, Kabupaten Gunungkidul. *Jurnal Geografi, Edukasi Dan Lingkungan (JGEL)*, 7(1), 1–17. <https://doi.org/10.22236/jgel.v7i1.10006>
- Agniyy, R.F., Adji, T.N., Cahyadi, A., Nurkholis, A., & Haryono, E. (2019). Characterizing the Cavities of Anjani Cave in Jonggrangan Karst Area, Purworejo, Central Java, Indonesia. *Earth and Environmental Science*, 256, 1 – 8.
- Agrawal, A., Pandey, R. S., & Sharma, B. (2010). Water Pollution with Special Reference to Pesticide Contamination in India. *Journal of Water Resource and Protection*, 02(05), 432–448. doi:10.4236/jwarp.2010.25050

- Akkoyunlu, A., & Akiner, M. E. (2012). Pollution Evaluation in Streams Using Water Quality Indices: A case study from Turkey's Sapanca Lake Basin. *Ecological Indicators*, 18, 501–511. doi:10.1016/j.ecolind.2011.12.018
- Alver, Alper. (2019). Evaluation of Conventional Drinking Water Treatment Plant Efficiency According to Water Quality Index and Health Risk Assessment. *Environmental Science and Pollution Research*, 26(26), 27225-27238. 10.1007/s11356-019-05801-y.
- BPS, 2023. *Suhu Kabupaten Gunung Kidul 2020-2022*. Kabupaten Gunungkidul: Badan Pusat Statistik
- Badeenezhad, A., Tabatabaee, H., Nikbakht, H., Radfard, M., Abbasnia, A., Baghapour, M., & Alhamd, M. (2020). Estimation of The Groundwater Quality Index and Investigation of The Affecting Factors Their Changes in Shiraz Drinking Groundwater, Iran. *Groundwater for Sustainable Development*. 11, 100435.
- Baker, A. (2003). Land Use and Water Quality. *Hydrol. Process*, 17, 2499–2501.
- Behmanesh, A. (2015). Assessment the water quality of Babolrood river based on the NSF Water Quality Index, Pharmacy, Allied Sciences (IJBPAS). *International Journal of Biology*, 4 (5), 342-352.
- Bonacci, O., 1990. Regionalization in Karst Regions. *Proceedings of the Ljubljana Symposium*, 191.
- Bouderbala, A., & Gharbi, B.Y. (2017). Hydrogeochemical Characterization and Groundwater Quality Assessment in The Intensive Agricultural Zone of The Upper Cheliff Plain, Algeria. *Environ. Earth Sci*, 76 (21), 744.
- Bovee, K.D., Lamb, B.L., Bartholomow, J.M., Stalnaker, C.B., Taylor J., & Henriksen, J. (1998). *Stream Habitat Analysisi using the Instream Flow Incremental Methodology*. USGS, Biological Resources Division Information and Technology Report USGS.
- Boyacioglu, H. (2006). Surface Water Quality Assessment Using Factor Analysis. *Water SA*, 32 (3): 389–393.
- Boyacioglu, H. (2014). Spatial Differentiation of Water Quality Between Reservoirs Under Anthropogenic and Natural Factors Based on Statistical Approach. *Archives of Environmental Protection*, 40(1), 41–50. doi:10.2478/aep-2014-0002
- Brown, R, M., McClelland, N, I., Deininger, R, A., & Ronald, G, T. (1970). “A Water Quality Index—Do We Dare?”. *Water Sewage Works*, 11, 339–343.
- Cahyadi, A., Riyanto, I., Irshabdillah, M. R., & Firizqi, F. (2018). Inventarisasi dan Karakterisasi Sistem Aliran Sungai Alogenik di Kawasan Karst Gunungsewu Kabupaten Gunungkidul. *Laporan Penelitian*, Fakultas Geografi, Universitas Gadjah Mada, Yogyakarta.
- Cahyadi, A., Ayuningtyas, E.A., & Prabawa, B.A. (2013). Urgensi Pengelolaan Sanitasi dalam Upaya Konservasi Sumberdaya Air di Kawasan Karst

- Gunungsewu Kabupaten Gunungkidul. *Indonesian Journal of Conservation*, 2(1), 23 – 32.
- Cahyadi, A., Widyastuti, M., & Sasongko, M. H. D. (2017). Hidrologi dan Hidrogeologi Karst. doi:10.31227/osf.io/8wcm7.
- Cahyadi, A., Haryono, E., Adji, T.N., Widyastuti, M., Riyanto, I.A., Naufal, M. & Ramadhan, F. (2020). Allogenic River in the Hydrogeological System of Gremeng Cave, Gunungsewu Karst Area, Java Island, Indonesia. *Earth and Environmental Science*, 448, 1-7.
- Camara, M., Jamil, N.R., & Bin, Abdullah, A.F. (2019). Impact of Land Uses on Water Quality in Malaysia: A Review. *Ecol. Processes*, 8(10).
- Cardinale, B.J. (2011). Biodiversity Improves Water Quality Through Niche Partitioning. *Nature*, 472, 86–89.
- CCME., (2001). *Canadian Environmental Quality Guidelines for The Protection of Aquatic Life*. CCME water quality index: technical report, 1.0.
- CCME., 2017. *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. Ccme Water Quality Index User's Manual 2017 Update.
- Chang, H. (2008). Spatial analysis of water quality trends in the Han River basin, South Korea, *Water Res*, 42:3285–3304.
- Chen, J., Wang, F., Xia, X. & Zhang, L. (2002). Major Element of the Changjiang (Tangtze River). *Chemical Geology*, 187, 231-255.
- Chen, Z., Aulier, S.A., Bakalowicz, M., Drew, D., Griger, F., Hartmann, J., Jiang, G., Moosdorf, N., Richts, A., & Stevanovic, Z. (2017). The World Karst Aquifer Mapping Project: Concept, Mapping Procedure and Map of Europe. *Hydrogeol. J*, 25, 771–785.
- Cox, P.A., Banack, S.A., Murch, S.J. (2003). Biomagnification of cyanobacterial neurotoxins and neurodegenerative disease among the Chamorro people of Guam. *Proc. Natl. Acad. Sci, U.S.A*, 100, 13380–13383.
- Cude, C. G. (2001). Oregon Water Quality Index A Tool for Evaluating Water Quality Management Effectiveness. *Journal of The American Water Resources Association*, 37 (1), 125-137.
- Dao, V., Urban, W., & Hazra, S. B. (2020). Introducing the modification of Canadian Water Quality Index. *Groundwater for Sustainable Development*, 11. doi:10.1016/j.gsd.2020.100457
- Darvishi, G., Kootenaei, F. G., Ramezani, M., Lotfi, E., & Asgharnia, H. (2016). Comparative Investigation of River Water Quality by OWQI, NSFQI and Wilcox Indexes (Case study: The Talar River - Iran). *Archives of Environmental Protection*, 42(1), 41–48. doi:10.1515/aep-2016-0005
- Effendi, Hefni. 2003. *Telaah Kualitas Air: Bagi Pengelolaan Sumber Daya Alam dan Lingkungan Perairan*. Yogyakarta: Penerbit Kanisius.

- Eletta, O.A.A. (2012). Water Quality Monitoring and Assessment in A Developing Country. In: Voudouris, D. (Ed.). *Water Quality Monitoring and Assessment*, InTech, Croatia, 481–494.
- El-Iskandarani, M., Nasr, S., Okbah, M., & Jensen, A. (2004). Principal Components Analysis for Quality Assessment of The Mediterranean Coastal Water of Egypt. *Model. Measur*, 65, 69–83
- Ewaid, S,H., Abed, S,A. (2017). Water quality index for Al-Gharraf River, southern Iraq. *Egypt J Aquat Res*, 43(2):117–122.doi.org/10.1016/j.ejar.2017.03.001
- Faizaturrohmah, N. (2023). Analisis Konsentrasi Sedimen Melayang dan Bakteri Coliform di Sungai Bawah Tanah Seropan dan Sungai Sumurup, Kabupaten Gunungkidul, Yogyakarta. *Tesis*. Universitas Gadjah Mada.
- Fardiaz, S. (1992). *Polusi Air dan Udara*, Yogyakarta: Kanisius.
- Fernández, N., Ramírez, A., & Solano, F. (2014). Physico-Chemical Water Quality Indices-A Comparative Review.
- Ford, D., & Williams, P. (2007). *Karst Hydrogeology and Geomorphology*, John Wiley & Sons: Hoboken, NJ, USA.
- Ford, D,C., & Williams, P,W. (2011). Geomorphology Underground: The Study of Karst and Karst Processes. In : Gregory, K.J. and Goudie, A.S (eds). 2011. *The SAGE Handbook of Geomorphology*. London: SAGE Publications Ltd.
- Gillieson, D. (1996). Processes of Cave Development, dalam: *Caves, Processes, Development and Management*. Oxford: Blackwell Publishers.
- Godghate, A., Sawant, R. & Jadhav, S. (2013). An evaluation of physico-chemical parameters to assess borewell water quality from Madyal and Vadgaon villages of Kagal Tahsil, MS, India, *International Research Journal of Environment Sciences*, 2(5), pp. 95–97.
- Goldscheider, N. (2005). Karst Groundwater Vulnerability Mapping: Application of a New Method in the Swabian Alb, Germany. *Hydrogeology Journal*, 13(4), 555-564.
- Goldscheider, N., & Drew, D. (2007). *Methods in Karst Hydrogeology*, London: Taylor & Francis.
- Goldscheider, N., Chen, Z., Auler, A.S., Bakalowicz, M., Broda, S., Drew, D., Hartmann, J., Jiang, G., Moosdorf, N., Stevanovic, Z., & Veni, G. (2020). Global distribution of carbonate rocks and karst water resources. *Hydrogeol J*, 28, 1661–1677, <https://doi.org/10.1007/s10040-020-02139-5>
- Gupta, N. (2015). Water Pollution, An Environmental Issue Of Global Concern: A Focus On River Ramganga. In: Yadav, S., & Singh, R (Eds)., *Environmental issues for socio ecological development*, Excel India Publishers., New Delhi.

- Gupta, N., Yadav, K. K., Kumar, V., & Singh, D. (2013). Assessment of Physicochemical Properties of Yamuna River in Agra City. *International Journal of ChemTech Research*, 5(1).
- Hartmann, A., Goldscheider, N., Wagener, T., Lange, J., & Weiler, M. (2014). Karst Water Resources in A Changing World: Review of Hydrological Modeling Approaches. *Rev. Geophys*, 52, 218–242.
- Haryono. E. (2001). Nilai Hidrologi Bukit Karst. *Seminar Nasional Eko-Hidrolik. Teknik Sipil Universitas Gadjah Mada, Yogyakarta*
- Haryono, E., & Adji, T.N. (2004). *Bahan Ajar Geomorfologi Dan Hidrologi Karst, Yogyakarta : Universitas Gadjah Mada*
- Haryono, E., Day, M. 2004. Landform Differentiation within The Gunungkidul Kegelkarst, Java, Indonesia. *Journal of Cave and Karst Studies*. 66 (2). 62-69.
- Ho, J. Y., Afan, H. A., El-Shafie, A. H., Koting, S. B., Mohd, N. S., Jaafar, W. Z. B., Lai, S., Abdul, M. M., Najah, A., Wan, M. H., Elshorbagy, A., El-Shafie, A. (2019). Towards A Time and Cost Effective Approach to Water Quality Index Class Prediction. *Journal of Hydrology*, 575, 148–165. doi:10.1016/j.jhydrol.2019.05.016
- Hoaghia, M.A., Moldovan, A., Kovacs, E., Mirea, I.C., Kenesz, M., Brad, T., Cadar, O., Micle, V., Levei, E.A., Moldovan, O.T., 2021., Water Quality and Hydrogeochemical Characteristics of Some Karst Water Sources in Apuseni Mountains, Romania., *Water.*, 13 (857).
- Hobbs, W. H. (1912). *Earth Features and Their Meaning: An Introduction to Geology for the Student and the General Reader*. Macmillan, 182-189.
- Ichwana, I., Syahrul, S., & Nelly, W. (2016). *Water Quality Index by Using National Sanitation Foundation-Water Quality Index (NSF-WQI) Method at Krueng Tamiang Aceh*. 110-117. 10.21063/ICTIS.2016.1019.
- Igwe,P.U., Chukwudi, C.C., Ifenatuorah, F.C., Fagbeja, I.F., Okeoke, C.A. (2017). AReview of Environmental Affects of Surface Water Pollution. *International Journal of Advanced Engineering Research and Science (IJAERS)*, 4(1), 128-137.
- Irawan, E. D., & Puradimaja, D. J. (2015). *Hidrogeologi Umum*. Yogyakarta: Penerbit Ombak
- Jafarabadi, A. (2012). Investigation on causes of pollution in Zayanderood river and its qualitative estimation by NSFQI, paper presented at *the 5th National Conference and Exhibition of Environmental Engineering*, Tehran University, Iran 2012.
- Jiang, Y., Wu, Y., Groves, C., Yuan, D. & Kambesis, P. (2009) Natural and Anthropogenic Factors Affecting Groundwater Quality in The Nandong Karst Underground River System in Yunan, China. *Journal of Contaminant Hydrology*, 109, 49-61. doi:10.1016/j.jconhyd.2009.08.001

- Jiang, Y., Gui, H., Yu, H., Wang, M., Fang, H., Wang, C. et al. (2020). Hydrochemical Characteristics and Water Quality Evaluation of Rivers in Different Regions of Cities: A Case Study of Suzhou City in Northern Anhui Province, China. *Water*, 12, Article No. 950. <https://doi.org/10.3390/w12040950>.
- Kachroud, M., Trolard, F., Kefi, M., Jebari, S., & Bourri , G. (2019). Water Quality Indices: Challenges and Application Limits in the Literature. *Water*, 11(2), 361. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/w11020361>.
- Kang, J. H., Lee, S. W., Cho, K. H., Ki, S. J., Cha, S. M., & Kim, J. H. (2010). Linking land-use type and stream water quality using spatial data of fecal indicator bacteria and heavy metals in the Yeongsan river basin. *Water Research*, 44(14), 4143–4157. doi:10.1016/j.watres.2010.05.009.
- Kazi, T.G., Arain, M.B., Jamali, M.K., Jalbani, N., Afridi, H.I., Sarfraz, R.A., Baig, J.A., & Shah, Abdul, Q. (2009). Assessment of water quality of polluted lake using multivariate statistical techniques: A case study. *Ecotoxicology and Environmental Safety*, 72(2), 301-309, <https://doi.org/10.1016/j.ecoenv.2008.02.024>.
- Keputusan Menteri Lingkungan Hidup Nomor 115 Tahun 2003. *Tentang Pedoman Penentuan Status Mutu Air*, Jakarta: Kementrian Lingkungan Hidup.
- Khan, A.A., Paterson, R., Khan, H. (2004). Modification and application of the Canadian Council of Ministers of the Environment Water Quality Index (CCME WQI) for the communication of drinking water quality in Newfoundland and Labrador. *Water Quality Research Journal of Canada*, 39 (3).
- Khusnuryani, A. 2008. Mikroba sebagai Agen Penurunan Fosfat pada Pengolahan Limbah Cair Rumah Sakit. *Prosiding Seminar Nasional Aplikasi Sains & Teknologi*, 144-151.
- Kurniawan, I. A., Adji, T. N., Nurkholis, A., Haryono, E., Fatoni, H., Waskito, W. A., & Agniy, R, F. (2019). Karst aquifer response by time series analysis applications in Jonggrangan Karst, Java Island, Indonesia. *Environmental Earth Sciences*, 78(13), 1-14.
- Kusumayudha, S. B. 2004. *Hidrogeologi Karst dan Geometri Fraktal di Daerah Gunungsewu*. Yogyakarta: Adicita Karya Nusa.
- Kwon, D., Park, W., & Won, J. -. (2016). Classification of intertidal sediment using a two-step principal component analysis (PCA) of optical reflectance: A case study in ganghwa tidal flats. *Journal of Marine Science and Technology (Taiwan)*, 24(6), 1136-1145. doi:10.6119/JMST-016-1026-2.
- Li, J., Qi, Y., Zhong, Y., Yang, L., Xu, Y., Lin, P., Wang, S., & He, J. (2016). Karst aquifer characterization using storm event analysis for Black Dragon springshed, Beijing. China. *Catena*, 145, 30-38, 10.1016/j.catena.2016.05.019.

- Lintern, A., Webb, J. A., Ryu, D., Liu, S., Bende-Michl, U., Waters, D., Leahy, P., Wilson, P., & Western, A. W. (2018). Key factors influencing differences in stream water quality across space. *WIREs Water*, 5(1), e1260. <https://doi.org/10.1002/wat2.1260>;
- Lobato, T.C., Hauser-Davis, R.A., Oliveira, T.F., Silveira, A.M., Silva, H.A.N., Tavares, M.R.M., & Saraiva, A.C.F. (2015). Construction of a novel water quality index and quality indicator for reservoir water quality evaluation: A case study in the Amazon region. *Journal of Hydrology*, 522, 674-683.
- Lumb, A., Halliwell, D., & Sharma, T. (2006). Application of CCME Water Quality Index to Monitor Water Quality: A Case of the Mackenzie River Basin, Canada. *Environmental Monitoring and Assessment*, 113, 411-429.
- Mainali, J., Chang, H. (2018). Landscape and anthropogenic factors affecting spatial patterns of water quality trends in a large river basin, South Korea. *J. Hydrol*, 564, 26–40, <https://doi.org/10.1016/j.jhydrol.2018.06.074>.
- Malá, J., Hrich, K., Vaculíková, K., & Lejska, S. (2022). Multicriterial approach to the determination of buffer zones for the Moravian Karst protected landscape area in the Czech Republic. *Environmental Monitoring and Assessment*, 194(2). doi:10.1007/s10661-022-09759-2
- Malik, M.S., & Shukla, J.P. (2019). Assessment of groundwater vulnerability risk in shallow aquifers of Kandaihimmat Watershed, Hoshangabad, Madhya Pradesh. *J Geol Soc India*, 93(2), 199–206.
- Manampiring, A. E. (2009). Studi Kandungan Nitrat (NO₃) Pada Sumber Air Minum Masyarakat Kelurahan Rurukan Kecamatan Tomohon Timur Kota Tomohon. *Karya Ilmiah*. Fakultas Kedokteran Universitas Sam Rratulangi Manado.
- Mandaric, L., Mor, J., Sabater, S., Petrovic, M. (2018). Impact of urban chemical pollution on water quality in small, rural and effluent-dominated Mediterranean streams and rivers. *Sci. Total Environ*, 613–614, 763–772, <https://doi.org/10.1016/j.scitotenv.2017.09.128>.
- Marinoni, O., Higgins, A., Coad, V., Garcia, N, J. (2013). Directing urban development to the right places: Assessing the impact of urban development on water quality in an estuarine environment. *Landscape and Urban Planning*, 113, 62-77, <https://doi.org/10.1016/j.landurbplan.2013.01.010>.
- Marselina, M., Wibowo, F., & Mushfiroh, A. (2022). Water quality index assessment methods for surface water: A case study of the Citarum River in Indonesia. *Heliyon*, 8(7). doi:10.1016/j.heliyon.2022.e09848
- Maurya, Pradip K, Malik, D. S., & Pradip Maurya, C. K. (2016). International Journal of Fisheries and Aquatic Studies 2016. 4(2), 208-215. *IJFAS*, 4(2), 208–215.
- Maurya, P., Malik, D., Yadav, K., Kumar, A., Kumar, S., Kamyab, H. (2019). Bioaccumulation and potential sources of heavy metal

- contamination in fish species in River Ganga basin: Possible human health risks evaluation. *Toxicology Reports*, 6, 10.1016/j.toxrep.2019.05.012.
- Maurya, Pradip Kumar, Ali, S. A., Alharbi, R. S., Yadav, K. K., Alfaisal, F. M., Ahmad, A., ... Jeon, B. H. (2021). Impacts of land use change on water quality index in the upper ganges river near haridwar, uttarakhand: A gis-based analysis. *Water (Switzerland)*, 13(24). doi:10.3390/w13243572
- Mihaiescu, T., Mihaiescu, R., Vârban, D., Vârban, R., Mihnea, M. (2013). Water Quality Assessment of The Nadas River (Romania) in Terms of NSF Water Quality Index. *Analele Universității din Oradea, Fascicula Protecția Mediului*, XXI, 649-654.
- Mokodompit, M. S. P., Umboh, J. M. L. and Pinontoan, O. R. (2020) „Uji Kualitas Air Danau Berdasarkan Kandungan Escherichia Coli dan Total Coliform di Danau Mooat Kabupaten Bolaang Mongondow Timur Tahun 2019“, *Jurnal Kesmas*, 9(2), pp. 27–32.
- Molekoa, M. D., Avtar, R., Kumar, P., Minh, H. V. T., & Kurniawan, T. A. (2019). Hydrogeochemical assessment of groundwater quality of Mokopane area, Limpopo, South Africa using statistical approach. *Water (Switzerland)*, 11(9). doi:10.3390/w11091891
- Muhammad, S., & Ullah, I. (2022). Spatial and seasonal variation of water quality indices in Gomal Zam Dam and its tributaries of south Waziristan District, Pakistan. *Environ. Sci. Pollut. Res*, 29, 29141–29151.
- Nautiyal, C.S. (2009). Scientific validation of incorruptible self-purificatory characteristic of Ganga water. *Asian Agri-History*, 13, 53–56.
- Nong, X., Shao, D., Zhong, H., & Liang, J. (2020). Evaluation of water quality in the South-toNorth Water Diversion Project of China using the water quality index (WQI) method. *Water Res*, 178.
- Noori, R., Kerachian, R., Khodadadi, A., Shakibayinia, A. (2007). Assessment of importance of water quality monitoring stations using principal component and factor analyses: a case study of the Karoon Iranian. *J Publ Health*, 38(1), 74-84.
- Nugraha, I. (2022). Pengaruh Variabilitas Curah Hujan Terhadap Kualitas Air di Sungai Sumurup, Kabupaten Gunungkidul. *Skripsi*. Universitas Gadjah Mada.
- Nugroho, B., & Pulung A, P. (2012). Klasifikasi geoteknik goa sungai bawah tanah daerah seropan Wonosari – Gunungkidul, daerah istimewa yogyakarta. *Prosiding Simposium dan Seminar Nasional Geomekanika ke-1: Menganggas Masa Depan Rekayasa Batuan dan Terowongan di Indonesia*. Yogyakarta: Fakultas Teknologi Mineral. pp. 1– 11.
- Nugroho, A. S., Tanjung, S. D., & Hendarto, B. 2014. Distribusi serta Kandungan Nitrat dan Fosfat di Perairan Danau Rawa Pening. *Bioma*. 3 (1): 27-41.

- Nugroho, B., Pulung, Utomo, E. P. 2016. Kualitas Batugamping berdasarkan Analisis Klasifikasi Geo Mekanik di Goa Seropan Gunungkidul Yogyakarta. *Bulletin of Scientific Contribution*, Vol 14: 63-74.
- Nurkholis, A., Adji, T.N., Haryono, E., Cahyadi, A., & Suprayogi, S. (2019). Time Series Application for Karst Aquifer Characterisation in Pindul Cave Karst System, Indonesia. *Acta Carsologica*, 48(1), 69 – 84.
- Ockenden, M., Hollaway, M., Beven, K., Collins, A., Evans, R., Falloon, P., Forber, K., Hiscock, K., Kahana, R., Macleod, C., Tych, W., Villamizar, M., Wearing, C., Withers, P., Zhou, J., Barker, P., Burke, S., Freer, J., Johnes, P., & Haygarth, P. (2017). Major agricultural changes required to mitigate phosphorus losses under climate change. *Nature Communications*, 8. 10.1038/s41467-017-00232-0.
- Ott, W.R. (1978). *Environmental Indices: Theory and Practice.*, Ann Arbor Science Publishers Inc., Ann Arbor.
- PERGUB Prov. DIY No 20 Tahun 2008. *Tentang Baku Mutu Air di Provinsi Daerah Istimewa Yogyakarta*. Yogyakarta: Gubernur Daerah Istimewa Yogyakarta.
- Petersen, W., Bertino, L., Callies, U., & Zorita, E. (2001). Process identification by principal component analysis of river water-quality data. *Ecol. Model*, 138 (1– 3): 193–213.
- Parparove A., Hambright, K.D., Hakanson, L., & Ostapania, A. (2006). Water Quality Quantification: Basic and Implementation. *Hydrobiologia*, 560, 227-237.
- PP RI No 22 tahun 2021. *Tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup*. Jakarta: Pemerintah Pusat.
- Rana, R., & Ganguly, R. (2020). Water quality indices: challenges and applications- an overview. doi:10.1007/s12517-020-06135-7/Published
- Ratnaningsih, D., Lestari, R, P., Nazir, E., Fauzi, R., dan Kurniawan, B. (2020). Penggunaan IKA-INA dalam Penilaian Kualitas Air dengan Dua Skenario Kurva Sub-Indeks. *Ecolab*, 14(2), 125-135, doi:10.20886/jklh.2020.14.2.125-135.
- Ratnaningsih, D., & Hadi, A. (2016). Determination of parameter and sub-index curves. *Jurnal Ecolab*, 10(2), 47–102.
- Ramadhan, F., Widyastuti, M., Adji, T.N., Cahyadi, A., Naufal, M. & Riyanto, I.A. (2020). Characterizing flow release from the aquifer of Guntur Spring in Gunungsewu Karst Area, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 451(1).
- Ramadhan, G, S. (2023). Kajian Karakteristik Zat Pencemar dan Hubungannya dengan Hidrodinamika Aliran di Sungai Bawah Tanah Seropan Kabupaten Gunungkidul. *Tesis*. Universitas Gadjah Mada

- Ren, K., Pan, X., & Zeng, J. (2019). Contaminant sources and processes affecting spring water quality in a typical karst basin (Hongjiadu Basin, SW China): insights provided by hydrochemical and isotopic data. *Environ Sci Pollut Res*, 26: 31354–31367.
- Ren, K., Pan, X., Zeng, J., Jiao, Y. (2017). Distribution and source identification of dissolved sulfate by dual isotopes in waters of the Babu subterranean river basin, SW China. *J Radioanal Nucl Chem*, 312(2), 317-328, doi: 10.1007/s10967-017-5217-y.
- Renouf, M. A., Serrao-Neumann, S., Kenway, S. J., Morgan, E. A., & Low Choy, D. (2017). Urban water metabolism indicators derived from a water mass balance: Bridging the gap between visions and performance assessment of urban water resource management. *Water Research*, 122, 669-677.
- Riyanto, I.A., Cahyadi, A., Adji, T.N., Haryono, E., Widyastuti, M., Agniy, R.F., Fathoni, W.A., Rahmawati, N., & Baskoro, H. (2018). Analisis Konektivitas dan Karakterisasi Pelorongan dengan Uji Peruntutan pada Mataair Epikarst Sub-sistem Panggang, Kawasan Karst Gunungsewu. Jakarta.
- Rosarina, D., & Laksanawati, E. K. (2018). Studi Kualitas Air Sungai Cisadane Kota Tangerang Ditinjau dari Parameter Fisika. *Jurnal Redoks*, 3(2), 38-43.
- Salerno, F., Gaetano, V., & Tartari, G. (2018). Urbanization and climate change impacts on surface water quality: Enhancing the resilience by reducing impervious surfaces. *Water Research*, 144.
- Samadi, M. T. et al. (2015) ‘Survey of water quality in Moradbeik river basis on WQI index by GIS’. *Environ Health Eng Manag J*, 1(2): 7–11.
- Sánchez, E., Colmenarejo, M. F., Vicente, J., Rubio, A., García, M. G., Travieso, L., & Borja, R. (2007). Use of the water quality index and dissolved oxygen deficit as simple indicators of watersheds pollution. *Ecological Indicators*, 7(2), 315–328. doi:10.1016/j.ecolind.2006.02.005
- Santy, D. A., Adytama, S., & Huda, N. 2017. Analisis Kandungan Bakteri Fecal Coliform pada Sungai Kuin Kota Banjarmasin. *Majalah Geografi Indonesia*. 31(2): 51-60.
- Saraswati, S. P., Sunyoto, S., Bambang, A. K., & Suwarno, H. (2014). Kajian Bentuk Dan Sensitivitas Rumus Indeks Pi, Storet, Ccme Untuk Penentuan Status Mutu Perairan Sungai Tropis Di Indonesia. *Journal of People and Environment*, 2(21).
- Selle, B., Schwientek, M., Lischeid, G. (2013). Understanding processes governing water quality in catchments using principal component scores. *J. Hydrol*, 486: 31–38.
- Selvakumar, S. & Chandrasekar, N. & G., Kumar. (2017). Hydrogeochemical characteristics and groundwater contamination in the rapid urban

- development areas of Coimbatore, India. *Water Resources and Industry*, 17, 26-33, 10.1016/j.wri.2017.02.002.
- Septianingrum, R. S. (2020). Analisis Karakteristik Aliran Sungai Alogenik Serpeng & Sumurup dengan Bantuan Perangkat Lunak Sistem Informasi Geografis di Ledok Wonosari, Gunungkidul. *Skripsi*. Program Sarjana Universitas Gadjah Mada.
- Singh, K.P., Malik, A., Mohan, D., & Sinha, S. (2004). Multivariate statistical techniques for the evaluation of spatial and temporal variations in water quality of Gomti River (India) – a case study. *Water Res*, 38 (18), 3980–3992.
- Smart, P.L. and Hobbes, S.L., 1986. Characteristics of Carbonate Aquifers: A Conceptual Basis. In Proceedings, Environmental Problem in Karst Terrains and Their Solution. Bowling Green, KY: *National Well Water Association*, 1-4
- Smith, D. G. (1990). A Better Water Quality Indexing System For Rivers And Streams. *Wat. Res* . 24, 10, 1237-1244,
- Stevanovic, Z. (2019). Karst waters in potable water supply: a global scale overview. *Environ Earth Sci*, 78(23), 662.
- Suharsimi, A. (2006). *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta
- Sullivan, P.L., Macpherson, G.L., Martin, J.B. & Price, R.M. (2020). Evolution of Carbonate and Karst Critical Zones. *Chemical Geology*, 527.
- Suprayogi, D., Sulistya, N., dan Abdul, H. 2019. Analisis Kualitas Air Sungai Bawah Tanah Gua Ngerong, Tuban. Al-Ard: *Jurnal Teknik Lingkungan*. 5(1): 45-53.
- Suryono, T. (2006). Pengelolaan Sumber Air Bawah Tanah Sungai Bribin. *Gunungsewu Indonesian Cave and Karst Journal*, 2(1), 37-52.
- Sutadian, A.D., Muttill, N., Yilmaz, A.G., & Perera, B.J.C. (2016). Development of river water quality indices—a review. *Environ. Monit. Assess*, 188(58).
- Tahiru, A.A., Doke, D.A., & Baatuuwie, B.N. (2020). Effect of Land Use and Land Cover Changes on Water Quality in the Nawuni Catchment of the White Volta Basin, Northern Region, Ghana. *Appl. Water Sci*, 10(198).
- Tian, Y., Jiang, Y., Liu, Q., Dong, M., Xu, D., Liu, Y., & Xu, X. (2019). ‘Using A Water Quality Index To Assess The Water Quality of The Upper and Middle Streams of The Luanhe River, Northern China’, *Science of the Total Environment*, 667,142–151. doi: 10.1016/j.scitotenv.2019.02.356.
- Tirkey P., Bhattacharya T., & Chakraborty S. (2015). Water Quality Indices-Important Tools for Water Quality Assessment: A Review. *IJAC*, 1, 15-29.
- Tjasyono, B. (2004). *Klimatologi*. Bandung : Institut Teknologi Bandung.

- Todd, A.S., Manning, A.H., Verplanck, P.L., Crouch, C., McKnight, D.M., & Dunham, R. (2012). Climate-change-driven deterioration of water quality in a mineralized watershed. *Environ Sci Technol*, 46, 9324–9332.
- Toledo, L.G., & Nicolella, G. (2002). Índice de qualidade de água em microbacia sob uso agrícola e urbano. *Sci. Agric*, 59 (1), 181–186.
- Turner, R. E., Rabalais, N. N. (2003). Linking landscape and water quality in the Mississippi River basin for 20 years. *BioScience*, 53. 563-572.
- Tyagi S., Sharma B., Singh P., & Dobhal R. (2013). Water Quality Assessment in Terms of Water Quality Index. *American Journal of Water Resources*, 1 (3), 34-38.
- Tyson, J. M., & House, M. A. (1989). The application of a water quality index to river management. *Water Science and Technology*, 21(10-11) 1149-1159.
- Uddin, M.G., Nash, S., & Olbert, A.I. (2021). A review of water quality index models and their use for assessing surface water quality. *Ecol. Indic*, 122.
- Universitas Gadjah Mada. (2020). *Modul Hidrometeorologi Dasar-Dasar, Analisis Dan Aplikasi*. Yogyakarta: Fakultas Kehutanan Universitas Gadjah Mada.
- Ustaoglu, F., Tepe, Y., & Tas, B. (2020). Assessment of Stream Quality and Health Risk in A Subtropical Turkey River System: A Combined Approach Using Statistical Analysis and Water Quality Index. *Ecol. Indic*, 113, 105815.
- Verawati. (2016). Analisis Kualitas Air Laut di Teluk Lampung. *Thesis*. Program Sarjana Magister Teknik Sipil, Fakultas Teknik, Universitas Lampung., Bandar Lampung: 167.
- Vesper, D., White, W. B. (2004). Spring and conduit sediments as storage reservoirs for heavy metals in karst aquifers. *Environmental Geology*, 45, 481-493, 10.1007/s00254-003-0899-6.
- Vias, J.M., Andreo, B., Perles, M.J., Carrasco, F. Vadillo, I., & Jimnes, P. (2006). Proposed Method for Groundwater Vulnerability Mapping in Carbonate (Karstic) Aquifer: The COP Method (Application in Two Pilot Sites in Southern Spain). *Hydrogeologist Journa*, 14 (6), 912- 925.
- Vialle, C. et al. (2011). Monitoring Of Water Quality from Roof Runoff: Interpretation Using Multivariate Analysis. *Water Res*, 45 (12), 3765–3775.
- Vonberg, D., Vanderborght, J., Cremer, N., Pütz, T., Herbst, M., & Vereecken, H. (2014). 20 Years of Long-Term Atrazine Monitoring in A Shallow Aquifer in Western Germany. *Water Res*, 50, 294–306.
- Vorosmarty, C.J., & Sahagian, D. (2000). Anthropogenic Disturbance of The Terrestrial Water Cycle. *Bioscience*, 50 (9), 753–765.
- Wang, J., Da, L., Song, K., & Li, B.L. (2008). Temporal Variations of Surface Water Quality in Urban, Suburban and Rural Areas During Rapid Urbanization in Shanghai. *China. Environ Pollut*, 152, 387–393.

- Wang, F., Chen, H., Lian, J, Fu, Z., Nie, Y. (2020). Hydrological response of karst stream to precipitation variation recognized through the quantitative separation of runoff components. *Science of The Total Environment*, 748,142483, <https://doi.org/10.1016/j.scitotenv.2020.142483>.
- Wang, Z., Torres, M., Paudel, P., Hu, L., Yang, G., & Chu, X. (2020). Assessing The Karst Groundwater Quality and Hydrogeochemical Characteristics of A Prominent Dolomite Aquifer in Guizhou. China. *Water*, 12, 2584.
- Wardani, D,W,T. (2018). Pengaruh pemasangan check dam dengan variasi jarak pada belokan sungai menggunakan uji model laboraorium. *Proyek akhir*, Universitas Negeri Yogyakarta.
- Wardhana, W, A. (2004). *Dampak Pencemaran Lingkungan*. Andi: Yogyakarta.
- Wenning, Richard J. & Gerald A. Erickson, 1994, *Interpretation and analysis of complex environmental data using chemometric methods*, TrAC Trends in Analytical Chemistry, 13(10), Pages 446-457, [https://doi.org/10.1016/0165-9936\(94\)85026-7](https://doi.org/10.1016/0165-9936(94)85026-7).
- White, W. B. 1988. *Geomorphology and Hydrology of Karst Terrains*. New York: Oxford University Press.
- Widyastuti, M., S.udarmadji, S., Sutikno, S., & Hendrayana, H. (2012). Kerentanan Airtanah Terhadap Pencemaran Daerah Imbuhan Ponor di Karst Gunung Sewu (Studi di Daerah Aliran Sungai Bawah Tanah Bribin) (Ground Water Vulnerability to Contamination of Swallow Holes Recharge Area at Gunung Sewu Karst (Study in Bribin). *Journal of People and Environment*, 19(2), 128-142.
- Widyastuti, M., & Marfai, MA. (2004). Kajian Daya Tampung Sungai Gajahwong Terhadap Beban Pencemaran. *Majalah Geografi Indonesia*, 18 (2), 81-97.
- Widyastuti, M., Cahyadi, A., Adji, T. N., Purnama, S., Firizqi, F., Naufal, M., & Irshabdillah, M. R. (2019). Kualitas Air Sungai-sungai Alogenik di Kawasan Karst Gunungsewu, Kabupaten Gunungkidul pada Musim Kemarau. In *Proceeding of The Thrid National Seminar on Geography*, Yogyakarta: 62.
- Wiyani, D. (2009). Pengendalian Pencemaran Sungai Berbasis Masyarakat (Studi Kasus Sungai Tegoan di Kota Wonosari Kabupaten Gunungkidul). *Skripsi*. Universitas Gadjah Mada
- Wilson, A. M., Moore, W. S., Joye, S. B., Anderson, J. L., & Schutte, C. A. (2011). Storm-Driven Groundwater Flow in A Salt Marsh. *Water Resour. Res*, 47, W02535, doi:10.1029/2010WR009496.
- Xu,G., Fan, H., Oliver, D., Dai, Y., Li, H., Shi, Y., Long, H., Xiong, K., & Zhao, Z. (2022). Decoding River Pollution Trends and Their Landscape Determinants in An Ecologically Fragile Karst Basin Using A Machine Learning Model. *Environmental Research*, (214).Pt 4:113843.

- Yadav, K. K., Gupta, N., Kumar, V., Arya, S., & Singh, D. (2012). Physico-Chemical Analysis of Selected Ground Water Samples of Agra City, India. *Recent Research in Science and Technology*, 4(11), 51–54. Retrieved from <http://recent-science.com/>
- Yadav, K. K., Kumar, V., Gupta, N., Kumar, S., Rezanian, S., & Singh, N. (2019). Human Health Risk Assessment: Study of A Population Exposed to Fluoride Through Groundwater of Agra City, India. *Regulatory Toxicology and Pharmacology*, 106, 68–80. doi:10.1016/j.yrtph.2019.04.013
- Yan, W., Chen, H., & Wang, Y. (2021). The Effect of Landscape Complexity on Water Quality in Mountainous Urbanized Watersheds: A Case Study in Chongqing, China. *Landscape Ecol Eng*, 17, 165–193.
- Yan, J., Chen, J., & Zhang, W. (2022). Impact of Land Use and Cover on Shallow Groundwater Quality in Songyuan City, China: A Multivariate Statistical Analysis. *Environmental Pollution*, 307. doi:10.1016/j.envpol.2022.119532
- Yang, P.H., Ming, X.X., Chris, G., Ting, S. (2019). Impact of hotel septic effluent on the Jinfoshan Larst aquifer, SW China. *Hydrogeol. J*, 27, 321–334. <https://doi.org/10.1007/s10040-018-1890-3>
- Yisa, J. & Jimoh, T. (2010). Analytical Studies on Water Quality Index of River Landzu. *American Journal of Applied Sciences*, 7(4), 453–458. <https://doi.org/10.3844/ajassp.2010.453.458>.
- Zaman, A., Zaman, P., & Maitra, S. (2017). Water resource development and management for agricultural sustainability. *Journal of Applied and Advanced Research*, 2, 73, 10.21839/jaar.2017.v2i2.61.
- Zuo, Y., 2010., *Environtology Higher Education Press*.
- Zhang, B., Zhao, D., Zhou, P., Qu, S., Liao, F., & Wang, G. (2020). Hydrochemical Characteristics of Groundwater and Dominant Water–Rock Interactions in The Delingha Area, Qaidam Basin, Northwest China. *Water*, 12, 836.
- Zhou, C., Zou, S., Zhu, D., Xie, H., Chen, H., & Wang, Jia. (2018). Pollution pattern of underground river in karst area of the Southwest China. *Journal of Groundwater Science and Engineering*, 6(2), 71–83.
- Zotou, I., Tsihrintzis, V., Gikas, G. (2019). Performance of Seven Water Quality Indices (WQIs) in a Mediterranean River. *Environmental Monitoring and Assessment*. 191. 10.1007/s10661-019-7652-4.