

## DAFTAR PUSTAKA

- Abdirozaq, M., Y. Rochwulaningsih, & A. Alamsyah. 2024. The development of Klidang Lor Port Batang, 1975-2014. *Indonesian Historical Studies*, 7(1): 107-114.
- Abidin, A. F., A. Amron, & M. I. Marzuki. 2020. Relationship between chlorophyll-a and sea surface temperature to tuna catch in the southern water of java. *Jurnal Penelitian Sains*, 22(2): 55.
- Alhadid, B. & A. B. Nugroho. 2024. The study of *triple-dip La Niña* phenomenon (2020-2023) and its impact on atmospheric dynamics and rainfall in the Indonesian region. In *Proceeding International Conference on Religion, Science and Education*, 3: 707-716.
- Alizadeh, O. 2022. A review of the *El Niño*-southern oscillation in future. *Earth-Science Reviews*. 235: 1.
- Arianto, B.Y., S. Sawitri, & Hani'ah. 2014. Analisa hubungan produktivitas ikan Lemuru dengan suhu permukaan laut dan klorofil-a menggunakan citra satelit Aqua MODIS. *Jurnal Geodesi Undip* 2: 4.
- Asriyana & Yuliana. 2012. *Produktivitas Perairan*. Bumi Aksara. Jakarta.
- Bahiyah, A., Y. Masumoto, A. Wirasatriya, W. Mardiansyah, & I. Iskandar. 2025. Freshwater variability in the southern part of the Indonesian Maritime Continent during Indo-Pacific climate anomalies, revealed by high-resolution OGCM. *Journal of Geophysical Research: Oceans*, 130(5), e2024JC021654.
- Baktiar, A.H., A.P. Wijaya, & A. Sukmono. 2016. Analisis kesuburan dan pencemaran air berdasarkan kandungan klorofil-a dan konsentrasi *total suspended solid* secara multitemporal di Muara Banjir Kanal Timur. *Jurnal Geodesi UNDIP* 5(4): 263–276.
- Bakun, A., B. A. Black, S. J. Bograd, M. García-Reyes, A. J. Miller, R. R. Rykaczewski, & W. J. Sydeman. 2015. Anticipated effects of climate change on coastal *Upwelling* ecosystems. *Current Climate Change Reports*, 1(2): 85-93.
- Behrenfeld M. J., E. Boss, D. A. Siegel, & D. M. Shea. 2005. Carbon-based ocean productivity and phytoplankton physiology from space. *Global Biogeochemical Cycles*. Vol 19.
- Bell, G. D., M. S. Halpert, R. C. Schnell, R. W. Higgins, J. Lawrimore, V. E. Kousky, R. Tinker, W. Thiaw, M. Chelliah, & A. Artusa. 2000. Climate assessment for 1999. *Bulletin of the American Meteorological Society*, 81(6): S1–S50.
- Bertrand, A., M. Lengaigne, K. Takahashi, A. Avadí, F. Poulain, & C. Harrod. 2020. *El Niño* Southern Oscillation (ENSO) effects on fisheries and aquaculture. *FAO Fisheries and Aquaculture Technical Paper*. Food & Agriculture Org, Rome.
- Bograd S. J., M. G. Jacox, E. L. Hazen, E. Lovecchio, I. Montes, B. M. Pozo, L. J. Shannon, W. J. Sydeman, R. R. Rykaczewski. 2023. Climate change impacts on eastern boundary *upwelling* systems. *Ann Rev Mar Sci*. 15(1): 303-328.
- BPS. 2015. *Statistik Indonesia 2015*. Jakarta: Badan Pusat Statistik.
- Brewin, R. J. W., G. Dall'Olmo, J. A. Gittings, X. Sun, P. K. Lange, D. E. Raitsos, A. B. Heather, H. Ibrahim, A. Jim. & S. Sathyendranath. 2022. A conceptual approach

to partitioning a vertical profile of phytoplankton biomass into contributions from two communities. *Journal of Geophysical Research: Oceans*, 127(4).

- Carundyatama, D. I., B. Arzhida, P. W. Novitarini. & I. R. Nugraheni. 2024. Identifikasi variabilitas suhu permukaan laut dan klorofil-a Lombok Strait pada triple-dip La Niña 2020-2022. *Jurnal Ilmu dan Teknologi Kelautan Tropis*, 16(3): 317-329.
- Chen H. 2017. Simplified, rapid, and inexpensive estimation of water primary productivity based on chlorophyll fluorescence parameter Fo. *Journal of Plant Physiology*, 211: 128–135.
- DiNezio, P. & Deser, C. 2014. Nonlinear controls on the persistence of la niña\*. *Journal of Climate*, 27(19), 7335-7355.
- Dong, X., R. Zhang, J. Hu, C. Gao. & M. Chen. 2025. Thermodynamic processes prolong triple la niña events in a hybrid coupled ocean-atmosphere model. *Climate Dynamics*, 63(2).
- Efendi, Y. 2008. *Biologi Laut Jilid 1*. Bung Hatta University Press, Padang.
- Fadika, U., A. Rifai, & B. Rochaddi. 2014. Arah dan kecepatan angin musiman serta kaitannya dengan sebaran suhu permukaan laut di selatan Pangandaran Jawa Barat. *Journal of Oceanography*, 3(3): 429-437.
- Fauzi, A. I., A. D. Sakti, B. F. Robbani, M. Ristiyani, R. T. Agustin, E. Yati, & K. Wikantika. 2021. Assessing potential climatic and human pressures in Indonesian coastal ecosystems using a spatial data-driven approach. *ISPRS International Journal of Geo-Information*, 10(11), 778.
- Fekranie, N. A., A. Setiawan, & M. R. Putri. 2024. Variability of Indonesian throughflow transport in the Indonesian seas during *triple-dip La Niña*. *IOP Conference Series: Earth and Environmental Science*, 1350(1), 012007.
- Feng, M., J. A. Benthuisen, N. Zhang, & D. Slawinski. 2015. Freshening anomalies in the Indonesian throughflow and impacts on the Leeuwin current during 2010-2011. *Geophysical Research Letters*, 42(20): 8555-8562.
- Ffield, A. & A. L. Gordon. 1996. Tidal mixing signatures in the Indonesian seas. *Journal of Physical Oceanography*, 26(9), 1924-1937.
- Geng, T., F. Jia, W. Cai, L. Wu, B. Gan, Z. Jing, & M. J. McPhaden. 2023. Increased occurrences of consecutive la Niña events under global warming. *Nature*, 619(7971): 774-781.
- Gordon, A. L., & R. A. Fine. 1996. Pathways of water between the Pacific and Indian oceans in the Indonesian seas. *Nature*, 379(6561): 146–149.
- Hanifa, R. & J. Wiratmo. 2024. ENSO and IOD influence on extreme rainfall in Indonesia: historical and future analysis. *Agromet*. 38(2): 78-87.
- Haryati, A. & M. Akbar. 2023. *La Niña triple dip: penyebab, dampak, dan mitigasinya*. Mega Press Nusantara.
- Hasan, N., Y. Chikamoto, & M. McPhaden. 2022. The influence of tropical basin interactions on the 2020–2022 double-dip La Niña. *Frontiers in Climate*, 4.

- He, W., Y. Yang, & X. S. Liang. 2024. Time-dependent role of multiyear La Niña in impacting the pacific tropical instability waves. *Journal of Geophysical Research: Oceans*, 129(1).
- Hu, X., H. Xue, & L. Liang. 2022. Impact of ENSO on the entrance of the Indonesian throughflow: the oceanic wave propagation. *Journal of Geophysical Research: Oceans*, 127(12).
- Iskandar, I., Q. W. Sari, D. Setiabudidaya, I. Yustian, & B. C. Monger. 2017. The distribution and variability of chlorophyll-a bloom in the southeastern tropical indian ocean using empirical orthogonal function analysis. *Biodiversitas Journal of Biological Diversity*, 18(4): 1546-1555.
- Iwakiri, T. & M. Watanabe. 2020. Mechanisms linking multi-year La Niña with preceding extreme el niño. *Sci. Rep.* 11(1).
- Jatisworo, D., A. Murdimanto, & K. Wikantika. 2012. Peranan teknologi penginderaan jauh bagi penangkapan ikan di Indonesia (studi kasus Kabupaten Indramayu). *Bunga Rampai Penginderaan Jauh Indonesia*. Pusat Penginderaan Jauh. ITB.
- Jia, Y., Z. Wang, X. Song, W. Li, M. Zhao, & Y. Fu. 2025. Seasonal and interannual variability of particulate organic carbon in the Banda sea. *Journal of Geophysical Research: Oceans*, 130(5).
- Joesidawati, M. I. & S. Suwarsih. 2018. *Teknologi Penginderaan Jauh untuk Perikanan dan Kelautan*.
- Kemili, P. & W. R. Putri. 2012. Influences of *upwelling* duration and intensity based on sea surface temperature anomaly toward primary productivity variability in Indonesian waters. *Jurnal Ilmu Dan Teknologi Kelautan Tropis*, 4(1).
- KKP. 2017. *Laut Masa Depan Bangsa; Kedaulatan, Keberlanjutan, Kesejahteraan*. Edisi Pert, Kementerian Kelautan dan Perikanan. Edisi Pert. Jakarta.
- Kunarso, A., Supangat, & Wiweka. 2008. Studi keunggulan aplikasi teknologi peramalan *fishing ground* dengan data *Upwelling* dan *real time satellite* untuk berburu ikan tuna pada variasi iklim global. Laporan Penelitian. Kementerian Negara Riset dan Teknologi Lembaga Penelitian Universitas Diponegoro, Semarang. 158.
- Kunarso, K., S. Hadi, N.S. Ningsih, dan M. Baskoro. 2011. Variabilitas suhu dan klorofil-a di daerah *Upwelling* pada variasi kejadian ENSO dan IOD di Perairan Selatan Jawa sampai Timor. *Ilmu Kelautan: Indonesian Journal of Marine Sciences*. 16(3): 171-180.
- Kuswardani, R. T. D., and F. Qiao. 2014. "Influence of the Indonesian Throughflow on the Upwelling off the East Coast of South Java." *Chinese Science Bulletin*. 59 (33): 4516–4523.
- Laevastu, T. & M. L. Hayes. 1981. *Fisheries oceanography and ecology*. Fishing News Books Ltd, England.
- Lalli, C.M. & T.R. Parson. 1994. *Biological oceanography: an introduction*. Pergamon, BPC Wheatons Ltd, British.
- Lee, Z.P., J. Marra, M. J. Perry, & M. Kahru. 2014. Estimating oceanic primary productivity from ocean color remote sensing: a strategic assesment. *Journal of Marine Systems* 149: 50-59.

- Li, X., Z. Hu, M. J. McPhaden, C. Zhu, & Y. Liu. 2023. Triple-dip La Niña in 1998–2001 and 2020–2023: impact of mean state changes. *Journal of Geophysical Research: Atmospheres*, 128(17).
- Li, M., Z. Cao, A. L. Gordon, F. Zheng, & D. Wang. 2023. Roles of the indo-pacific subsurface kelvin waves and volume transport in prolonging the triple-dip 2020–2023 La Niña. *Environmental Research Letters*, 18(10), 104043.
- Littler M. M., & S.N. Murray. 1974. The Primary Productivity of Marine Macrophytes from a Rocky Intertidal Community. *Marine Biology*, 27: 31-135.
- Liu, W., S. P. Xie, X. T. Zheng, & J. Zhu. 2020. *ENSO modulation of Upwelling variability along the western boundary of the Pacific*. *Journal of Climate*, 33(11), 4575–4590.
- Ma, S., Z. Tao, X. Yang, Y. Yu, X. Zhou, W. Ma, & Z. Li. 2014. Estimation of Marine Primary Productivity from Sattelite-Derived Phytoplankton Absorption Data. *IEEE J Select Topics Apl Earth Observ Remote Sens*, 7(7): 3084-3092.
- Mamayev, O.I. 1975. *Temperature-salinity analysis of world ocean waters*. Elseviver Scientific Publ. C.: 374 hal.
- Mustikasari, E., L.C. Dewi, A. Heriati, dan W.S. Pranowo. 2015. Pemodelan pola arus barotropik musiman 3 dimensi untuk mensimulasikan fenomena *Upwelling* di Perairan Indonesia. *Jurnal Segara* 11(1): 25–30.
- Nurman, A. 2010. Pemanfaatan data modis untuk mendeteksi daerah tangkapanikanpantai timur dan barat Sumatera Utara. *Jurnal Geografi*. 12:17-30.
- Nuzapril, M., B. S. Setyo, & J. P. Panjaitan. 2017. Estimasi produktivitas primer perairan berdasarkan konsentrasi klorofil-a yang diekstrak dari citra satelit Landsat-8 di perairan Kepulauan Karimun Jawa. *Jurnal Penginderaan Jauh Vol. 14 No. 1 Juni 2017*: 25-36.
- Nuzapril, M, B. S. Setyo, P. P. James. 2017. Hubungan antara konsentrasi klorofil-a dengan tingkat produktivitas primer menggunakan citra satelit Landsat-8. *Jurnal Teknologi Perikanan dan Kelautan*, 8 (1): 105-114.
- Nybakken, J. W. 1992. *Biologi Laut suatu pendekatan ekologis*. PT. Gramedia. Jakarta.
- O’carroll, A. G., E. M. Armstrong, H. M. Beggs, M. Bouali, K. S. Casey, G. K. Corlett, & W. Wimmer. 2019. Observational needs of sea surface temperature. *Frontiers in Marine Science*, 6: 420.
- Okumura, Y., P. DiNezio, & C. Deser. 2017. Evolving impacts of multiyear la niña events on atmospheric circulation and u.s. drought. *Geophysical Research Letters*, 44(22).
- Puspita, E. S., & L. Yulianti. 2016. Perancangan sistem peramalan cuaca berbasis logika fuzzy. *Jurnal Media Infotama*: 12(1).
- Qu, T., Y. Du, J. Strachan, G. Meyers, & J. Slingo. 2005. Sea surface temperature and its variability in the Indonesian region. *Oceanography* 18(4):50-61.
- Rahayu N. L., W. Lestari & E. R. Ardly. 2017. Bioprospektif Perairan Berdasarkan Produktivitas: Studi Kasus Estuari Sungai Serayu Cilacap, Indonesia. *Biosfera*, 34 (1): 15-21. DOI: 10.20884/1.mib.2017.34.1.405.

- Ratnawati, H. I., R. Hidayat, A. Bey, & T. June. 2016. *Upwelling* di Laut Banda dan pesisir selatan Jawa serta hubungannya dengan ENSO dan IOD. *Omni-Akuatika* 12:119-130.
- Salawane, H., & C. Salawane, C. 2020. Pemanfaatan Data Angin Untuk Sumber Energi Listrik di Nabire. *Pascasarjana Universitas Negeri Semarang*.
- Santoso, A., M. J. McPhaden, & W. Cai. 2017. The defining characteristics of ENSO extremes and the strong 2015/2016 El Niño. *Reviews of Geophysics*, 55(4), 1079-1129.
- Siadari, E.D.M., D.M.P. Rosita, & D.G.A. Putra. 2017. Pengaruh suhu permukaan laut dan angin terhadap distribusi klorofil-a di Perairan Papua tahun 2002-2016. *Prosiding Seminar Nasional Sains Atmosfer. Pusat Penelitian dan Pengembangan BMKG*.
- Silva, T. S. F., P. F. C. Maycira, & M. M. John. 2009. Annual Net Primary Production of Macrophytes in The Eastern Amazon Floodplain. *Wetlands*, 29 (2): 747–758.
- Sprintall, J., A. L. Gordon, S. Wijffels, M. Feng, S. Hu, A. Koch-Larrouy, & A. Setiawan. 2019. Detecting change in the Indonesian seas. *Frontiers in Marine Science*, 6.
- Sudjana, M. M. 1992. *Metode Statistika*. Tarsito, Bandung.
- Susanto, R.D., & J. Marra. 2005. Effect of the 1997/98 El Niño on chlorophyll a variability along the southern coasts of Java and Sumatra. *Oceanography*, 18(4):124–127.
- Swara, I. G. M. A., I. W. G. A. Karang, & G. S. Indrawan. 2021. Analisis pola sebaran area *Upwelling* di selatan Indonesia menggunakan citra modis level 2. *Journal of Marine Research and Technology*, 4(1), 56.
- Syah, A. F. 2010. Penginderaan jauh dan aplikasinya di wilayah pesisir dan lautan. *Jurnal Kelautan: Indonesian Journal of Marine Science and Technology*. 3(1): 18-28.
- Syamsuddin, M. L., A. B. Harto, & A. Wahyudi. 2019. Spatial and temporal characteristics of chlorophyll-a in the Banda Sea using satellite imagery. *IOP Conference Series: Earth and Environmental Science*, 246(1), 012042.
- Syamsuddin, M. L., A. R. Puspita, F. Syamsudin, Y. N. Ihsan, S. Sunarto, & M. Zainuddin. 2023. Variation in eastern little tuna (*euthynnus affinis*) catches related to El Niño southern oscillation (ENSO) events in the Makassar Strait. *IOP Conference Series: Earth and Environmental Science*, 1289(1), 012007.
- Tamire G., & S. Mengistou. 2014. Biomass and net aboveground primary productivity of macrophytes in relation to physico-chemical factors in the littoral zone of Lake Zway, Ethiopia. *Tropical Ecology*, 55(3): 313- 326.
- Tang, W., B. B. Ward, M. Beman, L. A. Bristow, D. R. Clark, S. E. Fawcett, & Y. Zhang. 2023. Database of nitrification and nitrifiers in the global ocean. *Earth System Science Data*, 15(11), 5039-5077.
- Wirasatriya, A., R. D. Susanto, K. Kunarso, A. R. Jalil, F. Ramdani, & A. D. Puryajati. 2021. Northwest monsoon *upwelling* within the Indonesian seas. *International Journal of Remote Sensing*, 42(14), 5433-5454.
- Xiao, X., Y. Wang, H. Zhang, & X. Yu. 2015. Effects of primary productivity and ecosystem size on food-chain length in Raohe River, China. *Acta Ecologica Sinica*, 35: 29–34.

- Yan, Y., Z. Ling, & C. Chen. 2015. Winter coastal *upwelling* off northwest Borneo in the south China sea. *Acta Oceanologica Sinica*, 34(1), 3-10.
- Yoga, P. S. 2021. Pengaruh angin terhadap kelancaran pelayaran di perairan Pulau Jawa dari badan meteorologi dan geofisika Semarang. Karya Tulis.
- Yulianto, A. 2018. Analisis Citra MODIS dan Spatial Data *Mining Vessel Monitoring System* (VMS) untuk Penentuan Konsentrasi Ikan dan Dugaan *Illegal Fishing* (Studi di Wilayah Pengelolaan Perikanan (WPP)-712). Tesis. Fakultas Geografi Universitas Gadjah Mada. Yogyakarta.
- Zhang, Y., L. Zhang, & W. J. Mitscha. 2014. Predicting river aquatic productivity and dissolved oxygen before and after dam removal. *Ecological Engineering*, 72: 125–137.
- Zhang, C., J. Luo, & S. Li. 2019. Impacts of tropical Indian and Atlantic ocean warming on the occurrence of the 2017/2018 La Niña. *Geophysical Research Letters*, 46(6): 3435-3445.
- Zhang, H., Y. Yu, Z. Gao, Y. Zhang, W. Ma, D. Yang, & Y. Wang. 2023. Seasonal and interannual variability of fronts and their impact on chlorophyll-a in the Indonesian seas. *Journal of Physical Oceanography*, 53(12), 2847-2859.
- Zhang, L., C. Wang, & X. Liu. 2019. La Niña-induced freshwater cap suppression of vertical mixing in the western Pacific warm pool. *Nature Communications*, 10: 1305.
- Zhang, T., A. Hoell, J. Perlwitz, J. Eischeid, D. Murray, M. Hoerling, & T. M. Hamill. 2019. Towards probabilistic multivariate ENSO monitoring. *Geophysical Research Letters*, 46(17-18): 10532-10540.
- Zhou, L., Y. Tan, L. Huang, Z. Hu, & Z. Ke. 2015. Seasonal and size-dependent variations in the phytoplankton growth and microzooplankton grazing in the southern south China sea under the influence of the east Asian monsoon. *Biogeosciences*, 12(22): 6809-6822.