ANNUAL REPORT ON GEOTRACES ACTIVITIES IN MEXICO

May 1st, 2024 to April 30th, 2025

New GEOTRACES or GEOTRACES-relevant publications (published or in press)

- Quintanilla Terminel, J. G., Herguera García, J. C., & Sheinbaum Pardo, J. (2024). Oxygenation of the Gulf of Mexico thermocline linked to the detachment of Loop Current eddies. Frontiers in Marine Science, (11), 18. doi: 10.3389/fmars.2024.1479837.

- Venegas, R. M., Rivas Camargo, D. A., & Treml, E. (2024). Global climate-driven sea surface temperature and chlorophyll dynamics. Marine Environmental Research, 204(1), 106856. doi: 10.1016/j.marenvres.2024.106856.

- Peña-Zuñiga, P., Samperio-Ramos, G. A., & Pajares-Moreno, S. (2024). Distribution and potential activity of aerobic denitrifying bacteria isolated from sediments of a coastal lagoon system in northwestern Mexico. *Ciencias marinas*, *50(1A)*. https://doi.org/10.7773/cm.y2024.3459

- Otero X.L., Ramírez-Pérez A.M., Abernathy M., Ying S.C., Queiroz H.M., Ferreira T.O., Huerta-Díaz M.A.* and de Blas E. (2024). Manganese diagenesis in different geochemical environments of the ria de Vigo (Galicia, NW Iberian Peninsula). *Mar. Geol.* 470, 107250. doi: 10.1016/j.margeo.2024.107250. ISSN Electrónico: ISSN: 1872-6151. https://doi.org/10.1016/j.margeo.2024.107250

- Gentil, M., Pallás Sanz, E., Midelton, L., Ruíz Angulo, Á., Meunier, T., Durante Barajas, G., Costa de Almeida Tenreiro, M. J., Estrada Allis, S. N., & Sheinbaum Pardo, J. (2024). Distribution, Mixing, and Transformation of a Loop Current Ring Waters: The Case of Gulf of Mexico. Geophysical Research Letters, 51(23). doi: 10.1029/2024GL110845.

- Koseki, S., Crespo, L. R., Tjiputra, J., Fransner, F., Keelyside, N., & Rivas Camargo, D. A. (2024). Assessing the tropical Atlantic biogeochemical processes in the Norwegian Earth System Model. Biogeosciences, 21, 4149-4168. doi: 10.5194/bg-21-4149-2024.

- Jiménez-Quiroz, MC, FJ Barrón-Barraza, R Cervantes-Duarte et al. (2024). Differences in the impact of intense ENSO+ in Bahia Magdalena (SW of Baja California, Mexico) in the context of climate change. Regional Studies in Marine Science, 80, 103864, https://doi.org/10.1016/j.rsma.2024.103864.

- Rico, M., Santiago-Díaz, P., Samperio-Ramos, G., González-Dávila, M., & Santana-Casiano, J. M. (2024). Variations of polyphenols and carbohydrates of Emiliania huxleyi grown under simulated ocean acidification conditions. *Biogeosciences*, *21*(19), 4381-4394. https://doi.org/10.5194/bg-21-4381-2024

- Martínez–López, A., Hakspiel–Segura, C., Verdugo–Díaz, G. *et al.* (2024). Climate variability effects on autotrophic picophytoplankton in the southern Gulf of

California. *Hydrobiologia* 851, 4353–4370. https://doi.org/10.1007/s10750-024-05588-1

- Molodtsov, S., Anis, A., Amon, R., Meunier, T., Pérez Brunius, P., Sheinbaum Pardo, J., & Candela Pérez, J. (2024). Glider-Based Microstructure Measurements of Enhanced Diapycnal Mixing along the Continental Slope of the Western Gulf of Mexico. Ocean-Land-Atmosphere Research, 3. doi: 10.34133/olar.0064.

- López-Pérez, A., Granja-Fernández, R., Valencia-Méndez, O., González-Mendoza, T., Ramírez-Chávez, E., Pañola-Madrigal, A., Rodríguez-Zaragoza, F. A. (2024). Updating the understanding of lesser-known coral systems in the southern Mexican Pacific. *Ciencias Marinas*, *50*(1B). https://doi.org/10.7773/cm.y2024.3503

- Linacre, L., Durazo, R., Camacho-Ibar, V., Mirabal-Gómez, U., Velásquez-Aristizábal, J. A., Sánchez-Robles, C., ... & Bazán-Guzmán, C. (2024). Drivers of microbial carbon biomass variability in two oceanic regions of the Gulf of Mexico. *Progress in Oceanography*, *229*, 103348. https://doi.org/10.1016/j.pocean.2024.103348

- Márquez Artavia, A., Pallás Sanz, E., & Costa de Almeida Tenreiro, M. J. (2024). On the Seasonal Cycle of Phytoplankton Bio-Optical Properties Inside a Warm Core Ring in the Gulf of Mexico. Journal of Geophysical Research: Oceans, 129(8), 1-18. https://doi.org/10.1029/2023JC020837.

- Samperio-Ramos, G., Hernández-Sánchez, O., Camacho-Ibar, V. F., Pajares, S., Gutiérrez, A., Sandoval-Gil, J. M., ... & Cervantes, F. J. (2024). Ammonium loss microbiologically mediated by Fe (III) and Mn (IV) reduction along a coastal lagoon system. *Chemosphere*, *349*, 140933. https://doi.org/10.1016/j.chemosphere.2023.140933

- Villagómez-Velez, S. I., L., Carreón-Palau, R., Mejía-Zepeda, R., González-Armas, S., Aguiñiga-García, A., Vázquez-Haikin, F., Galván-Magaña (2024). Fatty acid composition of whale shark (*Rhincodon typus*), and zooplankton in two aggregation sites in the Gulf of California. Regional Studies in Marine Science, 76: 103577. https://doi.org/10.1016/j.rsma.2024.103577

- Gutiérrez-Cárdenas, G. S., E., Morales-Acuña, L., Tenorio-Fernández, J., Gómez-Gutiérrez, R., Cervantes-Duarte, S., Aguiñiga-García (2024). El Niño-Southern Oscillation diversity: Effect on upwelling center intensity and its biological response. Journal of Marine Science and Engineering, 12(7): 1061. https://doi.org/10.3390/jmse12071061

- Reyes-Márquez, A., J. E., Sedeño-Díaz, S., Aguiñiga-García, G. M., Austria-Ortíz, E., López-López (2024). Health risk assessment by consumption of commercial biota contaminated with heavy metals in Tampamachoco coastal lagoon, Gulf of Mexico. Marine Pollution Bulletin, 206: 1167. https://doi.org/10.1016/j.marpolbul.2024.116757

- Sánchez, A., J. D., Carriquiry (2024). Thermocline-level connectivity between the tropical equatorial Pacific and tropical northeast Pacific during deglaciation. Quaternary International, 705: 86–93. https://doi.org/10.1016/j.quaint.2024.03.010

- Domínguez-Samalea, Y., N., Rey-Villers, A., Sánchez (2024). Deoxygenation of the Eastern Tropical North Pacific over the last 1200 years. Quaternary International, 711: 68-82. https://doi.org/10.1016/j.quaint.2024.08.003

- Camacho-Cruz, K. A., M. C., Ortíz-Hernández, L., Carrillo, A., Sánchez (2024). Dissolved inorganic nutrients in a reef lagoon influenced by submarine groundwater discharge in the Mexican Caribbean. Regional Studies in Marine Science, 79: 103814. https://doi.org/10.1016/j.rsma.2024.103814

- Tortolero-Langarica, J.J.A., García-Malo, C., Calderon-Aguilera, L.E. *et al.* (2024). Calcification and growth of the reef coral *Porites panamensis* in a shallow hydrothermal field in the Gulf of California, Mexico. *Reg Environ Change* **24**, 156. https://doi.org/10.1007/s10113-024-02311-7

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- Martínez-Trejo, J.A., Cardoso-Mohedano, J.G., Sanchez-Cabeza, JA. *et al.* (2024). Variability of dissolved inorganic carbon in the most extensive karst estuarine-lagoon system of the southern Gulf of Mexico. *Estuaries and Coasts* **47**, 2573–2588. https://doi.org/10.1007/s12237-024-01384-1

- Sampedro-Avila, J. E., Lu, K., Xue, J., Liu, Z., & Maske, H. (2024). The chemical characteristics and mixing behaviors of particulate organic matter from small subtropical rivers in coastal Gulf of Mexico. *Estuarine, Coastal and Shelf Science*, *299*, 108664. https://doi.org/10.1016/j.ecss.2024.108664

- Avendaño, K. A., Ponce-Jahen, S. J., Valenzuela, E. I., Pajares, S., Samperio-Ramos, G., Camacho-Ibar, V. F., & Cervantes, F. J. (2024). Nitrogen loss in coastal sediments driven by anaerobic ammonium oxidation coupled to microbial reduction of Mn (IV)-oxide. *Science of the Total Environment*, *923*, 171368. https://doi.org/10.1016/j.scitotenv.2024.171368

- Ruben, Z., Murgulet, D., Lopez, C. V., Marino-Tapia, I., Valle-Levinson, A., & Matthews, K. E. (2024). Influence of submarine groundwater discharge on the nutrient dynamics of a fringing-reef lagoon. *Journal of Hydrology: Regional Studies*, *56*, 101956. https://doi.org/10.1016/j.ejrh.2024.101956

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- Uribe-Martínez, A., Espinoza-Tenorio, A., Cruz-Pech, J.B. *et al.* (2024). An affordable operational oil spill monitoring system in action: A diachronic multiplatform analysis

of recent incidents in the southern Gulf of Mexico. *Environ Monit Assess* **196**, 1069. https://doi.org/10.1007/s10661-024-13161-5

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- Osorio-Pando, L. S., Hernández-Guzmán, M., Sidón-Ceseña, K., Ortega-Saad, Y., Camacho-Ibar, V. F., Chong-Robles, J., & Lago-Lestón, A. (2025). The meso-and bathypelagic archaeal and bacterial communities of the Southern Gulf of Mexico are dominated by nitrifiers and hydrocarbon degraders. *Microorganisms*, *13*(5), 1106. https://doi.org/10.3390/microorganisms13051106

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- Sánchez, A., M., Juarez (2025). Chlorins and sea surface temperature in the transitional zone of the northeastern Pacific Ocean during the last 1350 years. Palaeogeography, Palaeoclimatology, Palaeoecology, 661: 112704. https://doi.org/10.1016/j.palaeo.2024.112704

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- Guerrero-Murcia, LA, J Helenes, MA Huerta, K Mejía, VR Martínez-Pérez, M Elizarrarás-Botello (2025) Record of marine and terrestrial palynomorphs as a tool for paleoenvironmental reconstruction during the Early Holocene in the Alfonso Basin, southern Gulf of California, Mexico. Available at SSRN: https://ssrn.com/abstract=5227956

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***Completed PhD, Master or Bs theses** (the URL link to the pdf file of the thesis is included)*

- López-Pacheco, V. 2024. Evaluation of the functional role of microfungi isolated from deep-sea hydrothermal vents (Gulf of California) in the sulfur cycle. Evaluación del papel funcional de micromicetos aislados de ventilas hidrotermales de mar profundo (Golfo de California) en el ciclo del azufre. Master's thesis. Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California. 48 pp. (Spanish). http://cicese.repositorioinstitucional.mx/jspui/handle/1007/4123

- Smith-Saiza, J. L. (2024). Controls on the distribution of dissolved inorganic nutrients in the Perdido and Coatzacoalcos areas, Gulf of Mexico. Controles de la distribución de los nutrientes inorgánicos disueltos en las zonas de Perdido y Coatzacoalcos, Golfo de México. Master's thesis. Universidad Autonoma de Baja California. 70 pp. (Spanish). https://hdl.handle.net/20.500.12930/12232

- Sampedro-Avila, J.E. 2024. Flocculation of riverine organic matter when mixed with seawater: Methodology and ecological implications. Doctoral thesis. Centro de

Investigación Científica y de Educación Superior de Ensenada, Baja California. 69 pp. http://cicese.repositorioinstitucional.mx/jspui/handle/1007/4115

- Gutiérrez-Cárdenas, G. S. (2024). Influence of ENSO diversity estimation on the intensity of upwelling centers on the west coast of Baja California peninsula and their biological response. Master's thesis. CICIMAR-IPN. 96p. https://delfin.cicimar.ipn.mx/Biblioteca/Busqueda/Tesis/1313?Origen=coleccion_tesis

- Sidón-Ceseña, K. (2024). Structure, distribution and function of protists in the euphotic zone of the oceanic waters of the Gulf of Mexico. Estructura, distribución y función de los protistas de la zona eufótica de las aguas oceánicas del golfo de México. Doctoral thesis. Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California. 99 pp. https://cicese.repositorioinstitucional.mx/jspui/handle/1007/4240

- Cepero Pedroso, F. A. (2024). Trace element geochemistry in surface sediments in the El Chisguete watershed in Baja California Sur, Mexico. Geoquímica de elementos traza en sedimentos superficiales en la cuenca hidrográfica El Chisguete en Baja California Sur, México. Master's thesis. Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California. 99 pp. CICIMAR-IPN. https://delfin.cicimar.ipn.mx/Biblioteca/Busqueda/Tesis/1286?Origen=coleccion_tesis

- Cano-Suzan, A. 2024. Dynamics in the production and consumption of vitamin B12 between prototrophic and auxotrophic bacterial groups. Dinámica en la producción y consumo de vitamina B12 entre grupos bacterianos protótrofos y auxótrofos. Master's thesis. Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California. 61 pp. http://cicese.repositorioinstitucional.mx/jspui/handle/1007/4075

- Ruiz-Villegas, J. M. (2025). Dinámica de nutrientes en la zona de mínimo oxígeno en el Pacífico Tropical Mexicano. Nutrient dynamics in the oxygen minimum zone of the Mexican Tropical Pacific. Bachelor's thesis. Universidad del Mar (Spanish) http://coralito.umar.mx:8383/jspui/handle/123456789/1825

- Vasquez- Lara, E. (2025). Isotopic variability of the biocenosis and thanatocenosis of benthic foraminifera from the deep sea of the Gulf of Mexico. Master's thesis. Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California. 38 pp. (Spanish) https://cicese.repositorioinstitucional.mx/jspui/handle/1007/4260

- Padilla-Villa, M.A. (2025). Study of iron and nitrate limitation in the Gulf of California during summer conditions. Estudio de limitación por hierro y nitrato en el Golfo de California durante condiciones de verano. Bachelor's thesis. Facultad de Ciencias Marinas. Universidad Autonoma de Baja california. 70 pp. (Spanish)

- Contreras-Pacheco, Y.V. (2025). Organic carbon concentrations, fluxes and accumulation rates in the Gulf of Mexico. Doctoral thesis. Centro de Investigación

Científica y de Educación Superior de Ensenada, Baja California. 92 pp. https://cicese.repositorioinstitucional.mx/jspui/handle/1007/4272

- González-Colorado, I. A. (2025). Caracterización física y biogeoquímica de los filamentos en el golfo de México. Physical and biogeochemical characterization of filaments in the Gulf of Mexico. Master's thesis. Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California. 76 pp. http://cicese.repositorioinstitucional.mx/jspui/handle/1007/4302

New projects and/or funding

- Exported production and vertical biogeochemical fluxes in a scenario of increased sea temperature and acidification. La producción exportada y los flujos biogeoquímicos verticales en un escenario de incremento en la temperatura y acidificación del mar. CONACYT Ciencia Básica y de Frontera (CF-2019 – 6364). CICIMAR – Instituto Politécnico Nacional.
- Climate change indicators and the health status of marine ecosystems in Northwestern Mexico. Indicadores del cambio climático y estado de salud de ecosistemas marinos del Noroeste de México. (SIP-2248). CICIMAR – Instituto Politécnico Nacional.
- Global warming: Ecophysiological responses of diatoms to ocean acidification. Calentamiento global: Respuestas ecofisiológicas de diatomeas frente a la acidificación oceánica. (BF2023-2024-216). CONACYT Ciencia Básica y de Frontera. Centro de Investigación Científica y de Educación Superior de Ensenada.
- Effect of sea surface temperature on the solubility of trace metals associated with continental dust particles: Understanding the impact of global warming on the southern California Current System. Efecto de la temperatura superficial del mar sobre la solubilidad de metales traza asociados a partículas de polvo de origen continental: Entendiendo el impacto del calentamiento global en el sur del Sistema de la Corriente de California. (CF-2023-G-935). CONACYT Ciencia Básica y de Frontera. Universidad Autónoma de Baja California.
- Influence of Santa Ana winds and wildfires in the coastal zone of northwestern Mexico in a context of global change: transport and deposition of dust, ash, and metals, and their impact on the air quality and the marine environment. Influencia de eventos Santa Ana e incendios forestales en la zona costera del noroeste de México en un contexto de cambio global: transporte y deposición de polvos, cenizas y metales, así como su impacto en la calidad del aire y el ambiente marino. (CF-2023-G-913). CONACYT Ciencia Básica y de Frontera. Universidad Autónoma de Baja California.

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