

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN SPAIN

April 1st, 2020 to April 30st, 2021

Geotraces related articles

- González-Santana, D., González-Dávila, M., Lohan, M.C., Artigue, L., Planquette, H., Sarthou, G., Tagliabue, A., Santana-Casiano, J.M. 2021. Variability in iron (II) oxidation kinetics across diverse hydrothermal sites on the northern Mid Atlantic Ridge. *Geochimica et Cosmochimica Acta*, 297, 143-157. <https://doi.org/10.1016/j.gca.2021.01.013>
- Puigcorbé, V., Ruiz-González, C., Masqué, P. and Gasol, J.M. (2020). Sampling device-dependence of prokaryotic community structure on marine particles: higher diversity recovered by in situ pumps than by oceanographic bottles. *Frontiers in Microbiology*, 11:1645. <https://doi.org/10.3389/fmicb.2020.01645>.
- Puigcorbé, V., Masqué, P. and Le Moigne, F.A.C. (2020). Global database of oceanic particulate organic carbon to ²³⁴Th ratios: Improving estimates of the biological carbon pump. *Earth System Science Data*, 12, 1267-1285. <https://doi.org/10.5194/essd-12-1267-2020>.
- Tesán-Onrubia, J.A., Petrova, M.V., Puigcorbé, V., Black, E.E., Valk, O., Dufour, A., Hamelin, B., Buesseler, K.O., Masqué, P., Le Moigne, F.A.C., Sonke, J.E., Rutgers van der Loeff, M., Heimbürger-Boavida, L.-E. (2020). Mercury export flux in the Arctic Ocean estimated from ²³⁴Th:²³⁸U disequilibria. *ACS Earth and Space Chemistry*, 4, 5, 795-801. <https://dx.doi.org/10.1021/acsearthspacechem.0c00055>.
- Kenyon, J., Buesseler, K., Casacuberta, N., Castrillejo, M., Otosaka, S., Masqué, P., Drysdale, J., Pike, S. and Sanial, V. (2020). Evolution of concentrations of ¹³⁷Cs, ⁹⁰Sr, and ¹²⁹I in surface ocean waters derived from the Fukushima Dai-ichi nuclear accident. *Environmental Science and Technology*, 54, 23, 15066-15075. <https://doi.org/10.1021/acs.est.0c05321>.
- Álvarez-Vázquez, M.A., Álvarez-Iglesias, P., de Uña-Álvarez, E., Quintana, B., Caetano, M., Prego, R., 2020. Industrial dynamics of trace elements, historical record in estuarine sediments of the Anthropocene (Ria of Ferrol, NW Iberian Peninsula). *Marine Chemistry*, 223: 103825.
- Martínez-Ruiz, F., Paytan, A., González-Muñoz, M.T., Jroundi, F., Abad, M.M., Lam, P.J., Horner, T.J., Kastner, M. Barite Precipitation on Suspended Organic Matter in the Mesopelagic Zone (2020) *Frontiers in Earth Science*, 8, art. no. 567714.
- Charette, M. A., Kipp, L. E., Jensen, L. T., Dabrowski, J. S., Whitmore, L. M., Fitzsimmons, J. N., ... & Zhang, R. (2020). The Transpolar Drift as a Source of Riverine and Shelf-Derived Trace Elements to the Central Arctic Ocean. *Journal of Geophysical Research: Oceans*, 125(5), e2019JC015920.
- Whitby, H., Planquette, H., Cassar, N., Bucciarelli, E., Osburn, C. L., Janssen, D. J., ... & Sarthou, G. (2020). A call for refining the role of humic-like substances in the oceanic iron cycle. *Scientific reports*, 10(1), 1-12.
- Albuquerque R, Bode A, González-Gordillo JI, Duarte CM, Queiroga H (2021) Trophic structure of neuston across tropical and subtropical oceanic provinces assessed with stable isotopes. *Frontiers in Marine Science* 7, 606088 <https://doi.org/10.3389/fmars.2020.606088>

- Álvarez M, Fajar NM, Carter BR, Guallart EF, Pérez FF, Woosley RJ, Murata A (2020a) Global Ocean Spectrophotometric pH Assessment: Consistent Inconsistencies. *Environmental Science & Technology* 54:10977-10988 <https://doi.org/10.1021/acs.est.9b06932>
- Belgacem M, Chiggiato J, Borghini M, Pavoni B, Cerrati G, Acri F, Cozzi S, Ribotti A, Álvarez M, Lauvset SK, Schroeder K (2020) Dissolved inorganic nutrients in the western Mediterranean Sea (2004-2017). *Earth System Science Data* 12:1985-2011, <https://doi.org/10.5194/essd-12-1985-2020>
- Bode A, Álvarez M, García García LM, Louro MA, Nieto-Cid M, Ruíz-Villarreal M, Varela MM (2020a) Climate and local hydrography underlie recent regime shifts in plankton communities off Galicia (NW Spain). *Oceans* 1:181-197. <https://doi.org/10.3390/oceans1040014>
- Bode A, Lamas AF, Mompeán C (2020) Effects of upwelling intensity on nitrogen and carbon fluxes through the planktonic food web off A Coruña (Galicia, NW Spain) assessed with stable isotopes. *Diversity* 12, <https://doi.org/10.3390/d12040121>
- Espinosa-Leal L, Bode A, Escribano R (2020) Zonal and depth patterns in the trophic and community structure of hyperiid amphipods in the Southeast Pacific. *Deep Sea Research*, <https://doi.org/10.1016/j.dsr.2020.103402>
- Hainbucher D, Álvarez M, Astray Uceda B, Bachi G, Cardin V, Celentano P, Chaikakis S, Chavez Montero MM, Civitarese G, Fajar NM, Fripiat F, Gerke L, Gogou A, Fernández Guallart E, Gülk B, Hassoun AER, Lange N, Rochner A, Santinelli C, Steinhoff T, Tanhua T, Urbini L, Velaoras D, Wolf F, Welsch A (2020) Variability and trends in physical and biogeochemical parameters of the mediterranean sea during a cruise with RV Maria S. Merian in March 2018, *Earth System Science Data Discussions*, <https://doi.org/10.5194/essd-2020-82>
- Hernández-León S, Koppelman R, Fraile-Nuez E, Bode A, Mompeán C, Irigoien X, Olivar P, Echevarría F, Fernández de Puelles ML, González-Gordillo I, Cózar A, Acuña JL, Agustí S, Duarte CM (2020) Large deep-sea zooplankton biomass mirrors primary production in the global ocean. *Nature Communications*, 11: 6048 <https://doi.org/10.1038/s41467-020-19875-7>
- Olsen A, Lange N, Key RM, Tanhua T, Bittig HC, Kozyr A, Álvarez M, Azetsu-Scott K, Becker S, Brown PJ, Carter BR, Cotrim da Cunha L, Feely RA, van Heuven S, Hoppema M, Ishii M, Jeansson E, Jutterström S, Landa CS, Lauvset SK, Michaelis P, Murata A, Pérez FF, Pfeil R, Schirnick C, Steinfeldt R, Suzuki T, Tilbrook B, Velo A, Wanninkhof R, Woosley RJ (2020) An updated version of the global interior ocean biogeochemical data product, GLODAPv2.2020, *Earth Syst. Sci. Data*, 12, 3653–3678, <https://doi.org/10.5194/essd-12-3653-2020>
- Torres R, Artioli Y, Kitidis V, Ciavatta S, Ruiz-Villarreal M, Shutler J, Polimene L, Martinez V, Widdicombe C, Woodward EMS, Smyth T, Fishwick J, Tilstone GH (2020) Sensitivity of modeled CO₂ air–sea flux in a coastal environment to surface temperature gradients, surfactants, and satellite data assimilation. *Remote Sensing*, 12: 2038. <https://doi.org/10.3390/rs12122038>
- Varela MM, Rodríguez-Ramos T, Guerrero-Feijoo E, Nieto-Cid M (2020) Changes in activity and community composition shape bacterial responses to size-fractionated marine DOM. *Frontiers in Microbiology* 11:586148. <https://doi.org/10.3389/fmicb.2020.586148>

- Ceballos Romero, Elena, Buesseler, Ken, Villa Alfageme, M., 2021. Revisiting 50 years of 234Th data: a comprehensive global oceanic compilation. PANGAEA. <https://doi.org/10.1594/PANGAEA.918125>
- Laglera L.M., Tovar-Sánchez A., Sukekava C.F., Naik H., Naqvi S.W.A., Wolf-Gladrow D.A. Iron organic speciation during the LOHAFEX experiment: Iron ligands release under biomass control by copepod grazing. *Journal of Marine Systems*, 207. 103151, 2020. <https://doi.org/10.1016/j.jmarsys.2019.02.002>

Meetings

- Martínez-Ruiz, F., Paytan, A., Gonzalez-Muñoz, M.T., Jroundi, F., Abad M.M., Lam, P., Horner, T., Kastner, M. Role of Exopolymers in Pelagic Barite Precipitation in the Ocean. GOLDSCHMIDT 2020, Virtual, June 21-26, 2020 (<https://goldschmidt.info/2020/>).
- Álvarez M, Kozyr A, Velo A, Lange N, Tanhua T, Acerbi R, Guallart EF et al. (2020b) Towards a public and internally consistent data product containing CARbon, transient tracers and ancillary data In the Mediterranean Sea, CARIMED. 8-10 September, GOA-ON Ocean Acidification week, on line event, MedSea Hub. Oral presentation.
- García-Ibáñez MI, Guallart EF, Fajar NM, Barbero L, Cai WJ, Wanninkhof R, Takeshita Y, Pierrot D, Pérez FF, Álvarez M (2020) Gaining insights into ocean CO₂ system inconsistencies from discrete fCO₂ measurements. 8-10 September, GOA-ON Ocean Acidification week, on line event, North East Atlantic Hub. Oral presentation.
- Guallart EF, García-Ibáñez MI, Santiago-Domenech R, Hassoun AER, Fajar NM, Pérez FF, Easley R, Álvarez M (2020) Spectrophotometric measurement of [CO₃²⁻] in seawater: dealing with inconsistencies. 8-10 September, GOA-ON Ocean Acidification week, on line event, North East Atlantic Hub. Oral presentation.
- Jerusalén-Lleó E, Nieto-Cid M, Álvarez-Salgado XA (2020) Solid phase extraction of ocean DOM with PPL cartridges: efficiency and selectivity. SIQUIMAR: XX Seminario Ibérico de Química Marina, Vigo 1-3 July. Oral presentation.

GEOTRACES related projects

- Effects of ocean acidification, temperature and organic matter on Fe(II) persistence in the Atlantic Ocean. Ministerio de Economía y Competitividad. CTM2017-83476-P (2018-2021) IP: J. Magdalena Santana Casiano, Melchor González Dávila
- Marine productivity oscillations in the Mediterranean: new perspectives on climate change impacts and role of deoxygenation and eolian dust input. PID2019-104624RB-I00 (01/06/2020-31/05/2023) PI: Francisca Martínez-Ruiz. Budget: 157.300€
- Interrelationships among marine primary production and climate variability: new perspectives and insights from Barium biogeochemistry and the global carbon cycle. Junta de Andalucía P18-RT-3804 (01/01/2020-31/12/2022) PI: Francisca Martínez-Ruiz. Budget: 108.292€
- H2020 - MSCA-IF. Global Fellowship (University of Sevilla-WHOI). "IMaging Ocean Sinkers for evaluating carbon export fluxes (IMOS). From: 01/09/2022 to: 31/08/25. 245 732 €.

Outreach activities conducted (EPB authors in bold)

- Olsen A, Lange N, Key RM, Tanhua T, Bittig H, Kozyr A, **Álvarez M**, Azetsu-Scott K, Becker S, Brown PJ, Carter BR, Cotrim da Cunha L, Feely RA, van Heuven S, Hoppema M, Ishii M, Jeansson E, Jutterström S, Landa CS, Lauvset SK, Michaelis P, Murata A, Pérez FF, Pfeil R, Schirnack C, Steinfeldt R, Suzuki T, Tilbrook B, Velo A, Wanninkhof R, Woosley RJ (2020) GLODAPv2.2020: A data product of internally consistent ocean biogeochemical observations. Poster.
https://www.nodc.noaa.gov/ocads/oceans/GLODAPv2_2020/

PhD Thesis

- Nieves Torres Crespo. The barium biogeochemical cycle in the Mediterranean: bacterial barite precipitation and implication for paleoproductivity reconstructions. University of Granada. April 2021

Cruises

- IFADO cruise (B/O Sarmiento de Gamboa). 10-23 July 2020. NE Atlantic (Cape Finisterre section). Chief Scientist: M. Ruíz-Villarreal.

Other activities

- Bode A, Olivar MP, Hernández-León S (2021) Natural abundance of stable isotopes in micronekton fish species from the BATHYPELAGIC cruise (North Atlantic, June 2018): carbon and nitrogen values in bulk tissues and nitrogen values in amino acids. PANGAEA <https://doi.org/10.1594/PANGAEA.930111>
- Bode A, **Álvarez M**, García L, Louro MÁ, Nieto-Cid M, Ruiz-Villarreal M, Varela MM (2020) Time series of hydrographic, biogeochemical and plankton variables for a shelf station off A Coruña (NW Spain): 1990-2018. PANGAEA, <https://doi.pangaea.de/10.1594/PANGAEA.919087>
- Bode A, Lamas AF, Mompeán C (2020) Monthly data of stable carbon and nitrogen isotopes in seston, sedimented particles, and plankton size-fractions for a shelf station off A Coruña (NW Spain): 2010-2011. PANGAEA, <https://doi.pangaea.de/10.1594/PANGAEA.911575>
- Bode A, Mompeán C (2020) Stable isotope data of mesozooplankton for depth layers along the Malaspina-2010 expedition. PANGAEA <https://doi.pangaea.de/10.1594/PANGAEA.919314>

Contributors to the report

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