

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN SPAIN
MAY 2014 – JUNE 2015

National committee (under SCOR-Spain)

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- Results from the GEOTRACES section GA04-S (Mediterranean Sea) on board the R/V Ángeles Alvariño between May 2nd and June 1st 2013 are now available and being to be published.
- Participation at a meeting held at ETH-Zurich in December 2014 to discuss U-236 data in the frame of GEOTRACES section GA04-S (Mediterranean Sea).
- Participation in the Ocean Research Meeting on November 2014 presenting the Intermediate Data Product
- Participation in the French GEOVIDE cruise on May 2014 to undertake an integrated oceanographic transect in the North Atlantic Ocean and Labrador Sea (GEOTRACES GA01 section), collecting samples for artificial (i.e. 236U, Pu isotopes, 137Cs, 90Sr, 129I) and natural (i.e. 7Be, 210Po and 210Pb) radionuclides. Samples are in process.
- Participation in the planning activities of two expeditions lead by Germany in the Arctic Ocean onboard Polarstern in 2015 and 2016.
- Participation at the Mediterranean GEOTRACES workshop that was hold in Barcelona in July 10th 2014 and in Texel in March 30th-31th 2015, that lead to share data from different labs and determine the contributions from each lab involved in the cruise.

GEOTRACES-related projects/grants

- PROJECT TITLE: Metal Transport in the Environment (MetTrans).
IP: Don Porcelli (U. Oxford).
Funded by EU FP7-People-2011-ITN, 290336.
- PROJECT TITLE: NUevos REtos en la investigación de cañones submarinos: Indicadores del Estado ambiental y Variabilidad espacio- temporal – El papel de los temporales (NUREIEV).
IP: Miquel Canals (U. of Barcelona).
Funded by Ministerio de Economía y Competitividad, CTM2013-44598-R.
- PROJECT TITLE: MEzcla y DISpersión en el TRAnspORTE de Energia y Solutos (MeDistraes).
IP: Jesus Carrera y Maaten W Saaltink.

Funded by Ministerio de Economía y Competitividad. CGL2013-48869-C2-2-R, 2014-2016.

- PROJECT TITLE: Effect of the ocean acidification and warming in the biogeochemical cycle of Fe in the North Atlantic.
IP: J. Magdalena Santana-Casiano, M. González-Dávila (ULPGC).
Funded by Ministerio de Economía y Competitividad. CTM2014-53342-P.

GEOTRACES-related articles

- Rodellas V, Garcia-Orellana J, Tovar-Sánchez A, Basterretxea G, López-García JM, Sánchez-Quiles D, Garcia-Solsona E, Masqué P. 2014. Submarine groundwater discharge as a source of nutrients and trace metals in a Mediterranean Bay (Palma Beach, Balearic Islands). *Marine Chemistry* 160, 56 – 66.
- Cobelo-García A, Santos-Echeandía J, Lopez-Sanchez DE, Almecija C, Omanovic D. 2014. Improving the Voltammetric Quantification of Ill-Defined Peaks Using Second Derivative Signal Transformation: Example of the Determination of Platinum in Water and Sediments. *Analytical Chemistry* 86, 2308 – 2313.
- Prego R, Caetano M, Ospina-Alvarez N, Raimundo J, Vale C. 2014. Basin-scale contributions of Cr, Ni and Co from Ortegual Complex to the surrounding coastal environment (SW Europe). *Science of the Total Environment* 468-469, 495-504.
- Ospina-Alvarez, N., Caetano, M., Vale, C., Santos-Echeandía, J., Prego, R. 2014. Prevalence of tide-induced transport over other metal sources in a temperate estuarine zone (NW Iberian Peninsula). *Journal of Geochemical Exploration*, 140: 46-55.
- Garcia-Solsona E, Jeandel J, Labatut M, Lacan L, Vance D, Chavagnac V, Pradoux C. 2014. Rare earth elements and Nd isotopes tracing water mass mixing and particle-seawater interactions in the SE Atlantic. *Geochimica et Cosmochimica Acta*, Volume 125, 351-372.
- J. M. Santana-Casiano, M. González-Dávila, A. G. González, M. Rico, A. López, A. Martel. Characterization of phenolic exudates from *Phaeodactylum tricornutum* and their effects on the chemistry of Fe(II)–Fe(III). *Mar. Chem.* 158, 10-16, 2014
- Garcia-Orellana J, Cochran JK, Bokuniewicz H, Daniel JWR, Rodellas V, Heilburn C. Evaluation of ²²⁴Ra as a SGD tracer in Long Island Sound (NY). Accepted in *Geochimica et Cosmochimica Acta* 141, 314-330, 2014
- Rodellas V, Garcia-Orellana J, Masqué P, Feldman M, Weinstein Y Submarine Groundwater Discharge: a major source of nutrients to the Mediterranean Sea. *Proceedings of the National Academy of Sciences of the United States of America* 112 (13), 3926-3930
- Bokuniewicz, H., Cochran, J.K., Garcia-Orellana, J., Rodellas, V., Daniel, J.W.R., Heilbrun, C. Intertidal percolation through beach sands as a source of ^{224,223}Ra to Long Island Sound, New York and Connecticut, U.S.A. *Journal of Marine Research*. In press.
- Rodellas, V., Garcia-Orellana, J., Masqué, P., Font-Muñoz, J.S., 2015. The influence of sediment sources on radium-derived estimates of Submarine Groundwater Discharge. *Marine Chemistry* 171, 107-117.
- Tovar-Sanchez, A., Basterretxea, G., Rodellas, V., Sánchez-Quiles, D., Garcia-Orellana, J., Masqué, P., Jordi, A., López, J.M., Garcia Solsona, E., 2014. Contribution of groundwater discharge to the coastal dissolved nutrients and trace metal concentrations in Majorca Island: karstic vs detrital systems. *Environmental Science and Technology* 48, 11819–11827.

- The GEOTRACES Group. The GEOTRACES Intermediate Data Product 2014. Marine Chemistry, in press.
- Dulaquais, G., Boye, M., Middag, R., Owens, S., Puigcorbe, V., Buesseler, K.O., Masqué, P., de Baar, H. and Carton, X. (2014). Contrasting biogeochemical cycles of cobalt in the surface Western Atlantic Ocean. *Global Biogeochemical Cycles*, 138 (12), 1387-1412.
- Casacuberta, N., Christl, M., Lachner, J., Rutgers van der Loeff, M., Masque, P. and Synal, H.-A. (2014). A first transect of ^{236}U in the North Atlantic. *Geochimica et Cosmochimica Acta*, 133, 34-46.
- Pižeta I., S.G. Sander, R.J.M. Hudson, D. Omanoviæ, O. Baars, K.A. Barbeau, K.N. Buck, R.M. Bundy, G. Carrasco, P.L. Croot, C. Garnier, L.J.A. Gerringa, M. Gledhill, K. Hirose, Y. Kondoo, L.M. Laglera, J. Nuester, M.J.A. Rijkenberg, S. Takeda, B.S. Twining, M. Wells. 2015. Interpretation of complexometric titration data: An intercomparison of methods for estimating models of trace metal complexation by natural organic ligands, *Mar. Chem.*, 173(0), 3-24.
- Laglera, L. M., and M. Filella (2015), The relevance of ligand exchange kinetics in the measurement of iron speciation by CLEAdCSV in seawater, *Mar. Chem.*, 173(0), 100-113.
- Santana-Casiano J. M., M. González-Dávila, A. G. González, M. Rico, A. López and A. Martel (2014) Characterization of phenolic exudates from *Phaeodactylum tricornutum* and their effects on the chemistry of Fe(II)-Fe(III). *Marine Chemistry*, 158, 10-16.
- González A.G., J.M. Santana-Casiano, M., González-Dávila, N., Pérez-Almeida, M., Suárez De Tangil. (2014) Effect of *Dunaliella tertiolecta* organic exudates on the Fe(II) oxidation kinetics in seawater. *Environmental Science & Technology*, 48(14), 7933-7941.

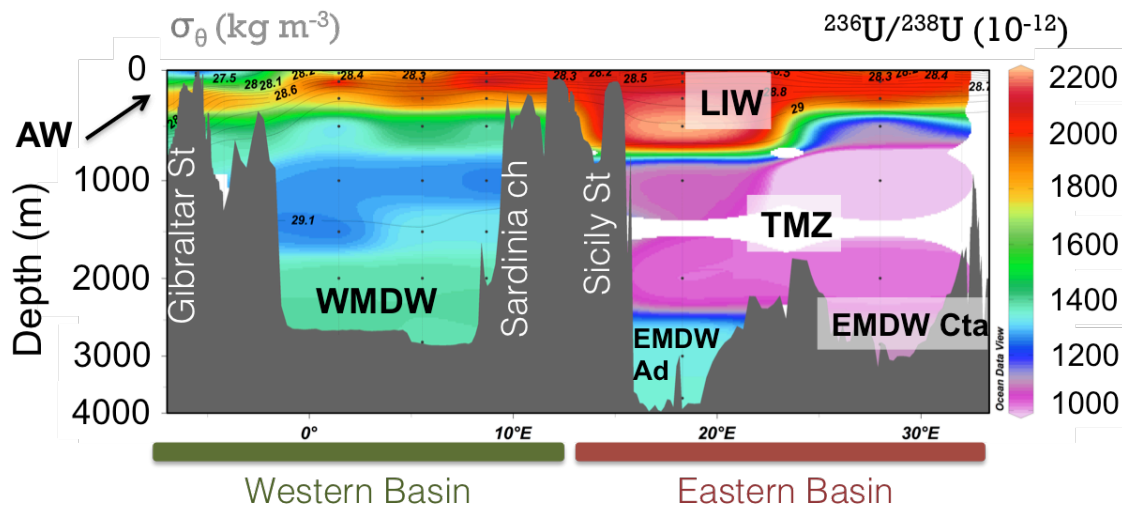


Figure 1: Distribution of $^{236}\text{U}/^{238}\text{U}$ in the Mediterranean Sea. $^{236}\text{U}/^{238}\text{U}$ ratios are in correspondence to the different water masses in the region. In preparation.

Contributions to conferences:

- Garcia-Orellana J., Mawji E., Schlitzer R., Masferrer E. et al. GEOTRACES Intermediate Data Product 2014. 2nd International Ocean Research Conference. Barcelona, November 2014.
- Kenna, T. and Masqué, P. (2014). Anthropogenic radionuclides in the Atlantic Ocean. ICRER 2014 - Third International Conference on Radioecology and Environmental Radioactivity. Barcelona (Spain). 7-12 September 2014.

- Buessler, K.O., Black, E., Pike, S., T. Kenna and Masqué, P. (2014). Plutonium isotopes in the ocean off Japan after Fukushima. ICRER 2014 - Third International Conference on Radioecology and Environmental Radioactivity. Barcelona (Spain). 7-12 September 2014.
- Casacuberta, N., Christl, M., Lachner, J., Rutgers van der Loeff, M., Masqué, P., Vockenhuber, C., Walther, C. and Synal, H.-A. (2014). ²³⁶U, ¹²⁹I and Pu-isotopes as oceanographic tracers in the Arctic and Atlantic Oceans. AMS-13, Aix-en-Provence (France), 24-29 August 2014.
- Castrillejo, M., Casacuberta, N., Masqué, P., Breier, C., Pike, S. and Buessler, K.O. (2014). Reassessment of ⁹⁰Sr in the Pacific Ocean and the coast off Japan derived from the Fukushima Dai-ichi nuclear accident. ICRER 2014 - Third International Conference on Radioecology and Environmental Radioactivity. Barcelona (Spain). 7-12 September 2014.
- Neira del Rio, P. Antonio Cobel-García; Juan Santos-Echeandía; Victoria Besada. Evidence of Increased Anthropogenic Emissions of Platinum in Coastal Systems from Time-Series Analysis of Mussels Samples (1991-2011). IMMR | International Meeting on Marine Research 2014. Peniche, Portugal. 10-11/07/2014.
- Laglera L.; Juan Santos-Echeandía; Christine Klaas; Dieter Wolf-Gladrow. Iron partition in surface waters of a large-scale summer bloom south of the Antarctic Polar Front. IV Congreso de Ciencias del Mar. Las Palmas de Gran Canaria, Canary Islands, Spain. 11-13/06/2014.
- Santos-Echeandía J.; Patricia Bernárdez; Miguel Caetano; Ricardo Prego. Natural enrichment of coastal waters: the influence of the geological basement on trace metal. IV Congreso de Ciencias del Mar. Las Palmas de Gran Canaria, Canary Islands, Spain. 11-13/06/2014.
- Almécija C.; Antonio Cobelo-García; Juan Santos-Echeandía; Miguel Caetano. Platinum in Salt Marsh sediments: behaviour and biological uptake. IV Congreso de Ciencias del Mar. Las Palmas de Gran Canaria, Canary Islands, Spain. 11-13/06/2014.
- Almécija-Pereda C.; Mukul Sharma; Antonio Cobelo-García; Juan Santos-Echeandía; Miguel Caetano. Salt Marsh Sediment as Source of Osmium to the Oceans. Goldschmidt 2014. California, United States of America. 08-13/06/2014.
- Trimborn S.; Clara J.M. Hoppe; Louiza Norman; Juan Santos-Echeandía; Luis M. Laglera; Christel Hassler. The availability and the source of iron modulate ocean acidification effects in antarctic phytoplankton. DUST 2014: International Conference on Atmospheric Dust. Castellana Marina, Italy. 01-06/06/2014.
- Cerdà-Domènech M., Jordi Garcia-Orellana, Albert Folch, Valentí Rodellas. Characterization of the Ra isotope end-members in the Submarine Groundwater Discharge (SGD). ASLO Meeting. Granada, 22-27 February 2015.
- Trezzi G., Garcia-Orellana J., Rodellas V., Masqué P., Garcia-Solsona E., Andersson P. Continental inputs of Sr to the Mediterranean Sea: SGD and Ebro riverine flux along the Iberian Peninsula Eastern Coast. ASLO Meeting. Granada, 22-27 February 2015.
- Castrillejo, M., N. Casacuberta, M. Christl, C. Vockenhuber, H.-A. Synal, P. Masqué and J. Garcia-Orellana. First comprehensive mapping of ²³⁶U and ¹²⁹I in the Mediterranean Sea. Granada, 22-27 February 2015.
- Rodellas V., J. Garcia-Orellana, G. Trezzi, P. Masqué, E. Berdalet, H. Bokuniewicz, J.K. Cochran. Seasonal cycles in Radium fluxes to a Mediterranean Bay: SGD vs porewater advection. Granada, 22-27 February 2015.
- Laglera L.M. New applications of cathodic polarography for the study of metal-natural organic ligands interactions in seawater. XI Simposio Latinoamericano de Química Analítica Ambiental y Sanitaria. Riobamba (Ecuador), 2015.

- Filella M. and Laglera L.M. Chemical speciation and kinetics of ligand substitution reactions: are we using the right approach? The BNASS (Biennial National Atomic Spectroscopy Symposium) / TraceSpec Tandem Conference. Aberdeen (UK), 2014.
- Monticelli D., L. M. Laglera, S. Caprara. Ultratrace element analysis and speciation with twenty-fold sample size reduction. The BNASS (Biennial National Atomic Spectroscopy Symposium) / TraceSpec Tandem Conference. Aberdeen (UK), 2014.
- Casacuberta, N.; Rutgers van der Loeff, M.; Masqué, P.; Herrmann, J.; Lachner, J.; Henderson, G.; Walther, C.; Vockenhuber, C.; Synal, H. A.; Christl, M.; 236U as a new oceanographic tracer: first data in the North Sea, the Arctic Ocean and the Western North Atlantic Ocean. ASLO Meeting. Granada, 22-27 February 2015.
- Timothy Kenna, María Villa Alfageme, Núria Casacuberta Arola and Pere Masque. The Influence of Hydrothermal Plumes on the Distribution of Anthropogenic Radionuclides Between the Particulate and Dissolved Phases: Results from U.S. Geotraces Equatorial Pacific Zonal Transect GP16. AGU Fall Meeting. San Francisco, 15-19 December 2014.
- Fraile-Nuez E., J. M. Santana-Casiano, M. González-Dávila. The submarine volcano eruption at the island of El Hierro: physical-chemical perturbation and biological response. EGU, Vienna, Austria, 27 April- 2 May, 2014.
- Santana-Casiano J.M., M. González-Dávila, E. Fraile-Nuez The natural ocean acidification and fertilization event caused by the submarine eruption of El Hierro. EGU, Vienna, Austria, 27 April- 2 May, 2014.
- López A., Milagros Rico, J. Magdalena Santana-Casiano, Melchor González-Dávila, and Aridane G. González. Phenolic profile in *Dunaliella tertiolecta* growing under copper stress. EGU, Vienna, Austria, 27 April- 2 May, 2014

PhD defenses

- Valentí Rodellas Vila. Evaluating submarine groundwater discharge to the Mediterranean Sea by using Ra isotopes. Advisors: Jordi Garcia-Orellana and Pere Masqué. Universitat Autònoma de Barcelona. 28/11/2014.
- Clara Almécija-Pereda. Geochemical behaviour and sources of platinumium group elements in anthropogenically-impacted sediments. Advisors: Antonio Cobelo Garcia and Juan Santos Echeandía. Universidade de Vigo 29/5/2015.

Equipment acquisition project

- Luis M Laglera (UIB). Project: Adquisición de material de muestreo para el estudio de la concentración de metales traza en aguas del litoral balear (compra 4 botellas GoFlo con línea kevlar y polea teflón). Budget: 15020€. (submitted)

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