

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN FRANCE
JUNE 2013 – JUNE 2014

New publications

- Annett A., Henley S., van Beek P., Souhaut M., Ganeshram R., Venables H., Meredith M., Geibert W., 2013. Use of radium isotopes to estimate mixing rates and trace sediment inputs to surface waters in northern Marguerite Bay (Antarctic Peninsula), *Antarctic Science* 25(3), 445–456, doi:10.1017/S0954102012000892
- Garcia-Solsona, E., Jeandel, C. Labatut M., Lacan F., Vance D., Chavagnac V. Rare Earth Elements and Nd isotopes tracing water mass mixing and particle-seawater interactions in the SE Atlantic. 2014. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2013.10.009.
- Geibert W., Rodellas V., Annett A., van Beek P., Garcia-Orellana J., Hsieh Y.-T., Masque P., 2013. ^{226}Ra determination via the rate of ^{222}Rn ingrowth with the Radium Delayed Coincidence Counter (RaDeCC), *Limnology and Oceanography : Methods* 11, 2013, 594-603.
- Jeandel C., Delattre M., Grenier M., Pradoux C. and Lacan F. 2013. Rare Earth Concentrations and Nd isotopes reveal exchange processes along the East Pacific Rise, South East Pacific Ocean. *Geochemistry, Geophysics, and Geosystems*. doi:10.1029/2012GC004309
- Grenier M., Jeandel C., Lacan F., Vance D., Venchiarutti C., Cros A., Cravatte S. 2013. From the subtropics to the central equatorial Pacific Ocean: neodymium isotopic composition and rare earth element concentration variations. *Journal of Geophysical Research Oceans.*, doi:10.1029/2012JC008239.
- Heimbürger, LE, C Migon, R Losno, JC Miquel, B Thibodeau, M Stabholz, A Dufour and N Leblond (2014). Vertical export flux of metals in the Mediterranean Sea Deep Sea Research Part I 87: 14-23, doi: 10.1016/j.dsr.2014.02.001
- Hsieh, Y.-T., Geibert, W., van Beek, P., Stahl, H., Aleynik, D., and Henderson, G.M., 2013. Using the radium quartet (^{228}Ra , ^{226}Ra , ^{224}Ra , and ^{223}Ra) to estimate water mixing and radium inputs in Loch Etive, Scotland. *Limnology and Oceanography* 58: 1089-1102.
- Jacq V., Ridame C., L'Helguen S., Kaczmar F., and Saliot A.: Response of the unicellular diazotrophic cyanobacterium *Crocospaera watsonii* to iron limitation, *Plos One*, 9(1): e86749, doi:10.1371/journal.pone.0086749, 2014.
- Quéguiner B., 2013. Iron fertilization and the structure of planktonic communities in high nutrient regions of the Southern Ocean. *Deep Sea Research Part II: Topical Studies in Oceanography*, doi:10.1016/j.dsr2.2012.07.024.
- Quéroüé, F., Townsende, A., van der Merwe, P., Lannuzel, D., Sarthou, G., Bucciarelli, E. and Bowie, A., 2014. Advances in the offline trace metal extraction of Mn, Co, Ni, Cu, Cd, Pb in open ocean seawaters with Sector Field ICP-MS analysis. *Anal. Meth.*, DOI: 10.1039/c3ay41312h.
- Rochelle-Newall, E. Ridame, C. Dimier-Hugueney C., L'Helguen S. Impact of iron limitation on primary production (dissolved and particulate) and secondary production in cultured *Trichodesmium* sp., *AME*, accepted, 10.3354/ame01690, 2014.
- Rousseau T. , Sonke J.E., Chmeleff J., Candaudap F., Lacan F., Boaventura G., Seyler P., Jeandel C. (2013) Rare earth element analysis in natural waters by multiple isotope dilution - sector field ICP-MS. *Journal of Analytical Atomic Spectrometry*, doi:10.1039/C3JA30332B.
- Sanial V., van Beek P., Lansard B., d'Ovidio F. , Kestenare E., Souhaut M., Zhou M., Blain S., 2013. Study of the phytoplankton plume dynamics off the Crozet Islands

(Southern Ocean): A geochemical-physical coupled approach. *Journal of Geophysical Research-Oceans*, 119, doi:10.1002/2013JC009305.

- Stieglitz T., van Beek P., Souhaut M., Cook P., 2013. Groundwater discharge Karstic groundwater discharge and seawater recirculation through sediments in shallow coastal Mediterranean lagoons, determined from water, salt and radon budgets, *Marine Chemistry* 156, 73-84
- Subetto D.A., Shevchenko V.P., Ludikova A.V., Kuznetsov D.D., Sapelko T.V., Lisitsyn A.P., Evzerov V.Y., van Beek P., Souhaut M., Subetto G.D., 2013. Chronology of isolation of the Solovetskii archipelago lakes and current rates of lake sedimentation, *Doklady Earth Sciences* DOI: 10.1134/S1028334X12090140.
- van Beek P., Souhaut M., Lansard B., Bourquin M., Reyss J-L., Jean P., von Ballmoos P., 2013. LAFARA : A new underground laboratory in the French Pyrénées for low-background gamma spectrometry, *Journal of Environmental Radioactivity* 116, 152-158.
- Yeghicheyan D., C. Bossy, M. Bouhnik-Le Coz, C. Douchet, G. Granier, A. Heimburger, Lacan F., Lanzanova A. Rousseau T., Seidel JL., Tharaud M., Candaudap F., Chmeleff J., Cloquet C., Delpoux S., Labatut M., Losno R., Pradoux C., Sivry Y. Sonke J. 2013. A compilation of silicon, rare earth element and twenty one other trace element concentrations in the natural river water standard SLRS-5 (NRC-CNRC), *Geostandards and Geoanalytical Research*. doi:10.1111/j.1751-908X.2013.00232.x.

International conferences

2013

- Abadie, C., Lacan, F., Radic, A., Poitrasson, F. Iron concentrations and isotopic compositions in the Southern Ocean along the zero meridian. Ocean Science Meeting, Hawaii, Feb. 2014.
- Abadie C., Lacan F., Radic, A. and Poitrasson F. Dissolved and Particulate Iron Concentrations and Isotopic Compositions in the South Atlantic and Southern Ocean. Goldschmidt Conference. Florence, Italy, August 2013.
- Blain S., B. Quéguiner, KEOPS 2 Team. Spatial and temporal responses of the southern ocean to large scale natural iron fertilization (Kerguelen region). ASLO 2013 Aquatic Sciences Meeting 'Learning for the Future', Special session 51 'Iron, Carbon Cycling, and Ecosystem Dynamics in the Southern Ocean', Nouvelle Orleans, février 2013.
- Blain S, B. Quéguiner, KEOPS2 Team, OISO Team. Response of the southern ocean to large scale natural iron fertilization (Kerguelen region). 2014 Ocean Science Meeting AGU/ASLO/Oceanography Society, Session 072 'The Southern Ocean and Its Role In the Climate System: Observations and Modeling of Physical and Biogeochemical Processes', Hawaii, février 2014.
- Bowie, A.R., Quéroué F., Sarthou G., Chever F., van der Merwe P., Bucciarelli E., Townsend A., Blain S., 2013, Dissolved and particulate trace metals in the vicinity of the Kerguelen Islands, Southern Ocean, during the KEOPS 2 experiment, Aquatic Sciences meeting, New Orleans, USA, 17-22 February.
- Cavagna A., B. Quéguiner, F. Planchon, S. Jacquet, I. Closset, F. Dehairs. Production regime and potential for carbon export in the naturally iron fertilized kerguelen area (Southern Ocean). ASLO 2013 Aquatic Sciences Meeting 'Learning for the Future', Special session 51 'Iron, Carbon Cycling, and Ecosystem Dynamics in the Southern Ocean', Nouvelle Orleans, février 2013.
- Cavagna A.-J., F. Dehairs, S.H.M. jacquet, F. Planchon. Gaining information on C-sequestration efficiency using a production / export / remineralisation toolbox: the S.O. naturally Fe-fertilized areas study-case. 45th International Liège Colloquium on Ocean

Dynamics, Primary Production in the Ocean from the Synoptic to the Global Scale, Liège, mai 2013.

- Dehairs F., T.W. Trull, C. Fernandez, D. Davies, A.J. Cavagna, A.E. Piniella. Nitrate isotopic composition in the Kerguelen area (Southern Ocean) during KEOPS 2. ASLO 2013 Aquatic Sciences Meeting 'Learning for the Future', Special session 51 'Iron, Carbon Cycling, and Ecosystem Dynamics in the Southern Ocean', Nouvelle Orleans, février 2013.
- Dehairs F., T. Trull, A.J. Cavagna, F. Planchon, F. Fripiat. Nitrate isotopic composition in the Kerguelen area (Southern Ocean). 2014 Ocean Science Meeting AGU/ASLO/Oceanography Society, Session 125 'The Many Faces of the Marine N Cycle', Hawaii, février 2014.
- Dulaquais, G., Boye, M., Middag, R., Planquette, H., Puigcorbe, V. (2014). Comparative atmospheric contributions to dissolved cobalt in the mixed layer: case of the Western North Atlantic and Mediterranean Sea (GEOTRACES sections A02 and A04N). Ocean Sciences Meeting, Février 2014 - Honolulu, U.S.A
- Grenier, M., E. Garcia Solsona, N. Lemaître, V. Bouvier, T. Trull, and C. Jeandel, Rare Earth Element Concentrations and Nd isotopic compositions of seawater around the Kerguelen plateau: Tracing land-to-ocean sources and ocean circulation Ocean Sciences Meeting, Hawaii, USA, February 2014
- Heimbürger LE, JE Sonke, D Cossa, B Galfond, L Laffont, D Point, J Masbou, C Lagane, B Thomas, R Teisserenc, OS Pokrovsky and MR van der Loeff, Gateway to the Arctic workshop, IPEV, Brest, France, Invited speaker: Mercury in the Arctic Ocean, 10/2013
- Heimbürger, LE, JE Sonke, D Point, L Laffont, C Lagane, F Candaudap, D Cossa, B Thomas, E Stathopoulou and T Tanhua, CIESM 2013, Marseille, France, Methylmercury distributions in contrasted basins - results of the 2011 Mediterranean GOSHIP cruise
- Heimbürger L-E, Sonke J. E., Point D., Labatut M., Pradoux C., Lagane C., Lacan F., Jeandel C., Ganachaud A., Eldin G. Methylmercury production and marine boundary exchange – results of the 2012 GEOTRACES West Pacific PANDORA cruise. 11th International Conference on Mercury as a Global Pollutant. Edinburgh, UK, July 2013.
- Heimbürger L-E, Sonke J. E., Point D., Lagane C., Labatut M., Pradoux C., Lacan F., Jeandel C., Ganachaud A., Eldin G. Marine methylmercury production and marine boundary exchange – results of the 2012 GEOTRACES West Pacific PANDORA cruise. 29th International Conference on environmental Geochemistry and Health 29th International Conference on environmental Geochemistry and Health. Toulouse, Fr., July 2013.
- Jacquet S.H., F. Dehairs, A.J. Cavagna, F. Planchon, I. Closset, D. Cardinal. Seasonal variability of mesopelagic organic carbon remineralization in the naturally iron-fertilized Kerguelen area (Southern Ocean) . ASLO 2013 Aquatic Sciences Meeting 'Learning for the Future', Special session 51 'Iron, Carbon Cycling, and Ecosystem Dynamics in the Southern Ocean', Nouvelle Orleans, février 2013.
- Jeandel C. and Oelkers E. Revisiting land to ocean fluxes, Int. Goldschmidt Conf., Florence, Aug. 2013 (Key note speaker)
- Jeandel C. and Oelkers E. Influence of riverine transported particulate material on the global cycle of Si. Ocean Sciences Meeting, Hawaii, USA, February 2014
- Jouandet M., L. Guidi, F. Carlotti, L. Stemann, M. Picheral, M. Zhou, T. Trull, S. Blain. Particle size distributions in response to natural iron fertilisation in the Southern Ocean (Kerguelen island)-implication for carbon export. . ASLO 2013 Aquatic Sciences Meeting 'Learning for the Future', Special session 51 'Iron, Carbon Cycling, and Ecosystem Dynamics in the Southern Ocean', Nouvelle Orleans, février 2013.

- Lacan, F., Labatut, M., Murray, J. Iron isotopes in the Papua New Guinea area and in the Equatorial Pacific. Ocean Science Meeting, Hawaii, Feb. 2014.
- Lacan F., Tachikawa K., Tachikawa, K., Arsouze T., Bayon G., Bory A., Colin C., Dutay J-C., Frank N., Gherardi J., Gurlan A. T., Grousset F., Hillaire-Marcel C., Jeandel C., Meynadier L., Montagna P., Pucéat E., Roy-Barman M., Waelbroeck C. A new database for Nd isotopes in marine environments. Goldschmidt Conference. Florence, Italy, August 2013.
- Laurenceau E.C., Trull, T.W., Davies, D.M., De La Rocha, S., Blain. Aggregation processes and phyto-plankton morphology in the control of export fluxes from naturally iron fertilized waters near the Kerguelen plateau. ASLO 2014 Ocean Science Meeting AGU/ASLO/Oceanography Society, Session 026 'Biological and Physical Controls of Particle Dynamics and Fluxes In the Mesopelagic Layer of the Ocean: Current Understanding and Future Directions', Hawaii, février 2014.
- Lemaître, N., Bayon, G., Ondréas, H., Freslon, N., Bollinger, C., Rouget, M.L., De Prunelé, A., Ruffine, L., Olu, K., Sarthou, G., Trace element behaviour and the export of organically-bound dissolved iron at cold seeps, 2014, Goldschmidt meeting, Sacramento, 8-13 June.
- Lemaître, N., Planquette, H., Bowie, A., Trull, T., Dehairs, F. (2014). Biogenic silica (BSi) and trace elements (TE), Fe, Zn, Cu, Cd, Mn, Co, P, surface export fluxes near the Kerguelen Island, Southern Ocean (KEOPS2). Ocean Sciences Meeting, Février 2014, Honolulu, U.S.A.
- Planchon F., D. Ballas, A.J. Cavagna, T. Trull, F. Dehairs. Fe fertilization and carbon export production: the natural laboratory of the Kerguelen island, Southern Ocean. 2014 Ocean Science Meeting AGU/ASLO/Oceanography Society, Session 026 'Biological and Physical Controls of Particle Dynamics and Fluxes In the Mesopelagic Layer of the Ocean: Current Understanding and Future Directions', Hawaii, février 2014.
- Planquette, H., Sherrell, R.M., Lagerström, M., Forsch, K., Stammerjohn, S.E. (2014). Particulate trace elements (Zn, Cu, Cd, Co, Ni and P) in One of the Most Productive Antarctic Polynyas: the Amundsen Sea. Ocean Sciences Meeting, Février 2014, Honolulu, U.S.A.
- Point D., Lorrain A., Heimbürger L-E, Lagane C., Menkes C., Masboul J., Allain V., Sonke J. E., Labatut M., Lacan F., Pradoux C., Jeandel C., Eldin G. Methylmercury origin, accumulation and distribution in tuna and swordfish from the southwestern Pacific Ocean. 11th International Conference on Mercury as a Global Pollutant. Edinburgh, UK, July 2013.
- Quéroùé, F., A.T. Townsend, D. Lannuzel, P. van der Merwe, G. Sarthou, E. Bucciarelli, A.R. Bowie, 2013, Trace metal (Fe, Mn, Co, Cu, Pb, Cd, Ni, Al) analysis in open ocean samples using Sector Field ICP-MS, Collaborative on Oceanographic Chemical Analysis Meeting, Hawaii, March 26-29, 2013.
- Sanial V., van Beek P., Lansard B., Souhaut M., Kestenare E., d'Ovidio F., Zhou M. and Park Y-H. Tracing iron input off Kerguelen Islands using Radium isotopes, KEOPS 2 Workshop. Brest (France), May 2013.
- Sanial V., van Beek P., Lansard B., Souhaut M., Kestenare E. and Zhou M. Utilisation des isotopes du radium pour tracer les échanges côte-large - L'exemple des Iles Kerguelen. Journées Scientifiques du Laboratoire, Toulouse (France), March 2013.
- Sanial V., van Beek P., Lansard B., Souhaut M., Kestenare E. and Zhou M. Use of the radium quartet to study the natural iron fertilization off Kerguelen Islands. ASLO' 2013 Aquatic Sciences Meeting, New Orleans (Louisiana, USA), February 2013.
- Sanial V., van Beek P., Lansard B., Souhaut M., Zhou M., d'Ovidio F., Kestenare E. and Blain S. Study of the natural fertilization off Kerguelen Islands (Southern Ocean) using

radium isotopes. Gordon Research Conference - Chemical of the Sea, Biddeford (Main, USA), August 2013.

- van Beek P., Souhaut M., Moore W., De Oliveira J., Jeandel C., Seyler P. The radium quartet (^{223}Ra , ^{224}Ra , ^{226}Ra , ^{228}Ra) in the plume of the Amazon river, Ocean Sciences Meeting, Hawaii, USA, February 2014.
- van Beek P., Sanial V., Lansard B., Souhaut M., Kestenare E., d'Ovidio F., Zhou M., Blain S. Study of the natural iron fertilization off Crozet and Kerguelen Islands (Southern Ocean) using radium isotopes as tracers, Goldschmidt conference, INVITED TALK, Florence (Italy), august 2013.
- van der merwe P., A.R. bowie, F. Qu  rou  , T. Trull. Lateral transport of particle-laden shallow coastal waters is fundamental to iron fertilisation around the Kerguelen plateau within the Southern Ocean. 2014 Ocean Science Meeting AGU/ASLO/Oceanography Society, Session 080 'Biogeochemistry of Trace Elements and their Isotopes', Hawaii, f  vrier 2014.

Book chapters

- Jeandel C., van Beek P., Lacan F. 2014. Les   l  ments chimiques et isotopes, traceurs des   changes Terre-Mer. Collection Mer & Oc  an, vol.1 : 181-208, ISTE Editions, London.

Cruises

- GEOVIDE (15 May-30 June): <http://geovide.tumblr.com/>, <http://www.geovide.obs-vlfr.fr/>
- MED-Black: participation to the intercalibration exercices for:
 - Trace element concentrations in suspended particles
 - Iron isotopes in the dissolved and particulate phases
 - US-GEOTRACES PACIFIC (Collaboration WHOI)
- GEOTRACES GA04 (*R/V Pelagia*, May-July 2013, without embarking): determination of particulate trace metals.
- GEOVIDE (*R/V Pourquoi Pas ?* scheduled for May-June 2014, embarking): determination of particulate trace metals in different size fractions.

New funding

- GEOVIDE project: ANR/INSU/IFREMER

Other activities (e.g., acquisition of new sampling systems)

- A first in-situ pump was modified and will be tested during the GEOVIDE cruise.
- GEOVIDE precruise meeting. 6-7 February 2014, in Brest, France.

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