

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN BRAZIL

April 1st, 2019 to April 30th, 2021

Since the beginning of the COVID-19 pandemic in Brazil in march 2020, all universities and research centers have suspended activities. More than one year later, most research institutions are still closed since the severity of the pandemic has not significantly decreased. A few institutions are working in a reduced hours regime, with rotation of personal. In general, only graduate students approaching the conclusion of their work are allowed to work at university under restricted protocols. All cruises and field works have been postponed and it is yet to be determined when we return to normal activities.

New Scientific Results

- Anthropogenic Gd in coastal waters

Gadolinium-based contrast agents are worldly used for medical magnetic resonance imaging and are an emerging contaminant in natural waters. Based on this synoptic study and the conservative behavior of Gdanth, it was estimated a sewage-based source which accounts for 2200 pmol kg⁻¹ and to an annual discharge of 25 kg of Gd to the ocean, suggesting that Gd is a tracer for water management and forensic purposes. To guide the application of this method to coastal waters impacted by metropolitan areas, it was proposed a conceptual model for Gdanth behavior within salinity gradients.

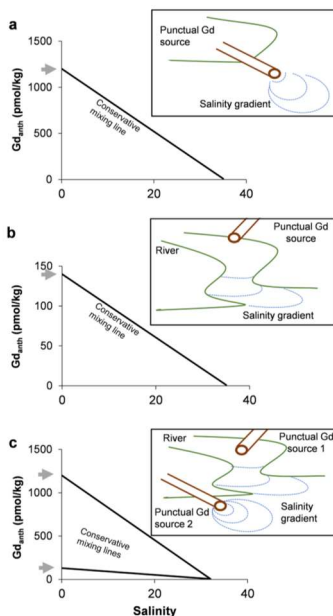


Fig. 1 Conceptual cases illustrating the conservative behavior of anthropogenic Gd during freshwater/seawater mixing: a) highly concentrated Gd_{anth} source scenario; b) diluted Gd_{anth} source scenario and; c) two distinct sources scenarios. Reference: da Costa et al., 2021.

Other GEOTRACES Activities

- V. Hatje, Elizabeth Holland and Manmohan Sarin are the co-chairs of the new GESAMP working group 45 - Climate Change and Greenhouse Gas Related Impacts on Contaminants in the Ocean.
- V. Hatje is a Full Member of SCOR Working Group 145: Modelling Chemical Speciation in Seawater to Meet 21st Century Needs (MARCHEMSPEC).
- V. Hatje is serving as a member of the IAEA Standing Advisory Group on Nuclear Applications (SAGNA).
- V. Hatje is serving as a member of the SCOR Capacity Building Committee.

GEOTRACES-related articles

- DA COSTA, A.R.B.; ROUSSEAU, T.C.C.; MAIA, P.D.; AMORIN, A.M.; SODRÉ, F.F. Anthropogenic gadolinium in estuaries and tropical Atlantic coastal waters from Fortaleza, Northeast Brazil. *APPLIED GEOCHEMISTRY*, 127, 104908, 2021.
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- HATJE, V.; ANDRADE, R.L.B.; OLIVEIRA, C.C.; POLEJACK, A.; GXABA, T. Pollutants in the South Atlantic Ocean: sources, knowledge gaps and perspectives for the Decade of Ocean Science. *FRONTIERS IN MARINE SCIENCE*, v. 8, p. 644569, 2021.
- MIRANDA, D.A.; BENSKIN, J.P.; AWAD, R.; LEPOINT, G.; LEONEL, J.; Hatje, V. Bioaccumulation of Per- and polyfluoroalkyl substances (pfass) in a tropical estuarine food web. *SCIENCE OF THE TOTAL ENVIRONMENT*, v. 754, p. 142146, 2021.
- SCHETTINI, C.A.F.; Hatje, V. The Suspended Sediment and Metals Load from the Mariana's Tailing Dam Failure to the Coastal Sea. *Integrated Environmental Assessment and Management*, v. 16, p. 661-668, 2020.
- BARSANTI, M.; GARCIA-TENORIO, R.; SCHIRONE, A.; ROZMARIC, M.; RUIZ-FERNÁNDEZ, A.C.; SANCHEZ-CABEZA, J.A.; DELBONO, I.; CONTE, F.; DE OLIVEIRA GODOY, J.M.; HEIJNIS, H.; ERIKSSON, M.; HATJE, V.; LAISSAOUI, A.; NGUYEN, H.Q.; OKUKU, E.; AL-ROUSAN, SABER A.; UDDIN, S.; YIL, M.W.; OSVATH, I. Challenges and limitations of the ²¹⁰Pb sediment dating method: Results from an IAEA modelling interlaboratory comparison exercise. *Quaternary Geochronology*, v. 59, p. 101093, 2020.
- UMBRIA-SALINAS, K.; VALERO, A.; MARTINS, S. E.; WALLNER-KERSANACH, M. Copper ecological risk assessment using DGT technique and PNEC: A case study in the Brazilian coast. *JOURNAL OF HAZARDOUS MATERIALS*, v. 403, p. 123918, 2021.
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- POERSCH, L. H.; BAUER, W.; WALLNER-KERSANACH, M.; WASIELESKY, W. Assessment of trace metals, total organic carbon and total nitrogen of a shrimp farm system in southern Brazil. *REGIONAL STUDIES IN MARINE SCIENCE*, v. 1, p. 101452, 2020.

- AZAR, E.; PINANGO, A.; WALLNER-KERSANACH, M.; KERR, R. Source waters contribution to the tropical Atlantic central layer: new insights on the Indo-Atlantic exchanges. DEEP-SEA RESEARCH PART I-OCEANOGRAPHIC RESEARCH PAPERS, v. 1, p. 103450, 2020.
- DOS SANTOS VERGILIO, C.; LACERDA, D.; DA SILVA SOUZA, T.; DE OLIVEIRA, B.C.V.; FIORESI, V. S.; DE SOUZA, V.V.; DA ROCHA RODRIGUES, G.; DE ARAUJO MOREIRA BARBOSA, M. K.; SARTORI, E.; RANGEL, T.P.; DE ALMEIDA, D.Q. R.I; DE ALMEIDA, M.G.; THOMPSON, F.; DE REZENDE, C.E. Immediate and long-term impacts of one of the worst mining tailing dam failure worldwide (Bento Rodrigues, Minas Gerais, Brazil). SCIENCE OF THE TOTAL ENVIRONMENT, v. 756, p. 143697-143709, 2021.

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