Environmental Science Work:

References to peer reviewed publications and presentations arising from datasets and samples collected on the UK Seabed Resources-sponsored environmental survey cruises in the Pacific Ocean Clarion-Clipperton Zone. The cruises took place under Exploration Contracts awarded to UK Seabed Resources by the International Seabed Authority.

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Rabone, M., Wiethase, J.H., Simon-Lledó, E., Emery, A.M., Jones, D.O., Dahlgren, T.G., Bribiesca Contreras, G., Wiklund, H., Horton, T. and Glover, A.G. (2023a). How many metazoan species live in the world's largest mineral exploration region? Current Biology, 33(12), pp.2383-2396.Doi: https://doi.org/10.1016/j.cub.2023.04.052

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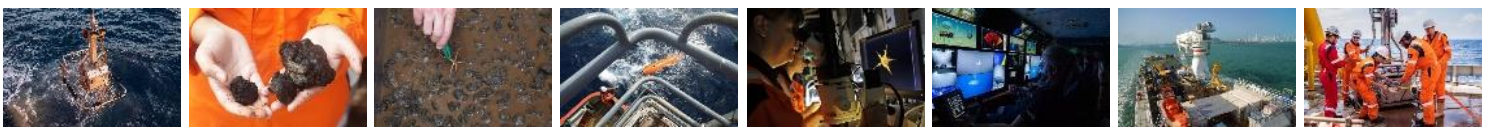
Dahlgren, T.G. "Effective deep sea management: experiences from the Clarion- Clipperton Zone". Talk at Energy Transition Norway, March 2023, Stavanger, Norway.

Dahlgren, T. G. "What happens in the deep waters? Managing a sustainable deep-sea 'blue economy' requires knowledge of what actually lives there". Online talk at International Training Program, Regional Marine Spatial Planning Workshop, April 2023, Mozambique.

Dahlgren TG. "Waters between our nations". Online talk, ITP Regional Workshop, April 2023, Mozambique.



Bribiesca-Contreras, G. “Diversity of polymetallic nodule-associated corals in the Clarion-Clipperton Zone, Pacific Ocean”. Talk at the 8th International Symposium on Deep-Sea Corals, 2 June 2023, Edinburgh, UK. NHM-UNI UKSR 2023 September Interim Report: Megafaunal and Macrofaunal Genetics-5-

Glover AG. “Secrets of the abyss: deep-sea biodiversity, deep-sea mining and deep-sea biodiscovery in the worlds largest exploration frontier”. Invited Talk, June 2023, University of Aberdeen, UK

Glover AG and Rabone, M. “Background briefing on deep-sea mining: history of seabed mining and environmental research in the Clarion-Clipperton Zone”. Invited Talk, June 2023, The White House Office of Science and Technology, USA

Bribiesca-Contreras, G. “Racing against biodiversity loss in the marine realm”. Talk at the Royal Society’s ‘Recovering nature: building on Georgina Mace's work to ensure a biodiverse and liveable future’ meeting, 12 June, London, UK.

Dahlgren T.G., “Managing a sustainable deep-sea ‘blue economy’ requires knowledge of what actually lives there-Baseline studies in the CCZ and Norwegian Sea”. TRIDENT kick-off meeting Porto, Portugal.

Rabone M. “Building biodiversity knowledge for the world’s largest mineral exploration region: the checklist of the Clarion-Clipperton Zone (CCZ) in WoRDSS” Online Talk at 6th World Conference on Marine Biodiversity, July 2023.

Rabone M. “How many metazoan species live in the world’s largest mineral exploration region?” Talk at side event at 28th Session of the International Seabed Authority Assembly and Council (Part 2), July 2023, Kingston Jamaica.

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Dahlgren TG. “Conservation of deep-sea biodiversity and the new global ocean treaty”. Sea & Society, October 2023. University of Gothenburg, Sweden.

Glover AG. “Deep-Sea Mining: Environmental Impacts”. Invited Talk, December 2023, Jefferies Bank Workshop, London

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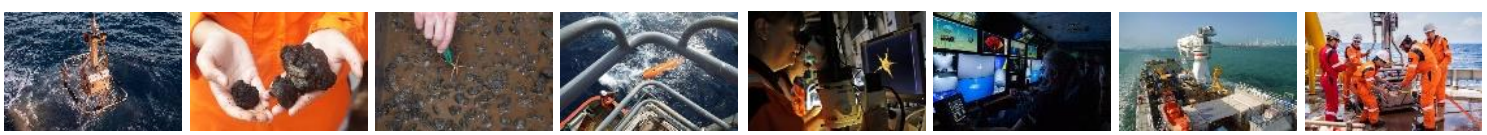

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Dahlgren TG. "Managing a sustainable deep-sea 'blue economy' requires knowledge of what actually lives there - Experience from environmental baseline studies in the Pacific and what to learn from these". UTC Marine Minerals conference in Bergen, Norway.

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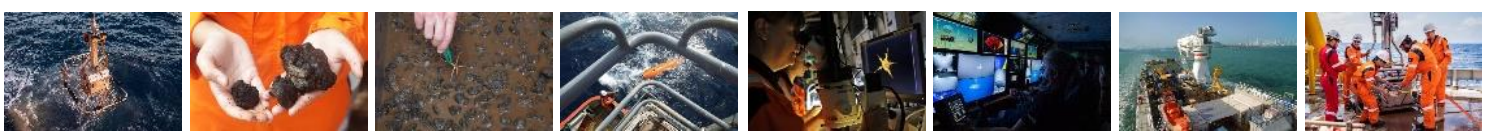

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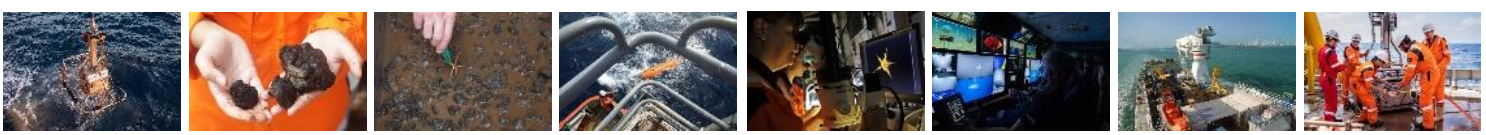

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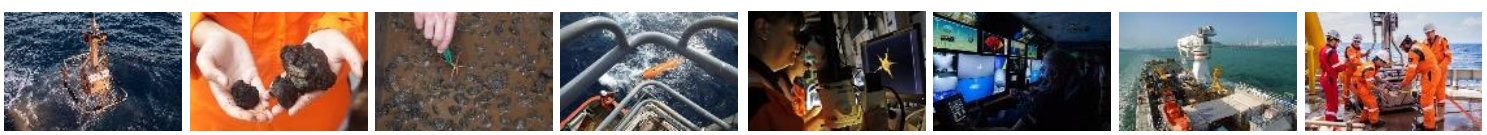

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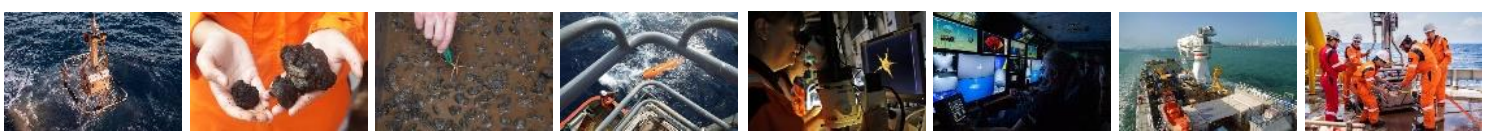

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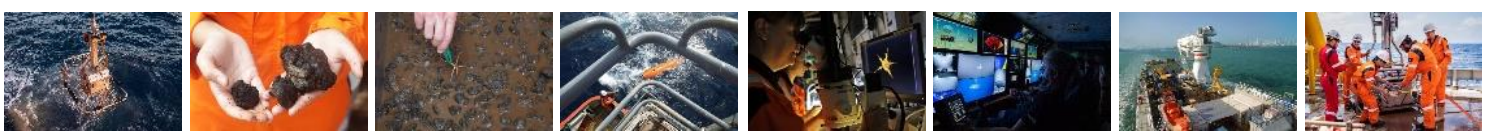

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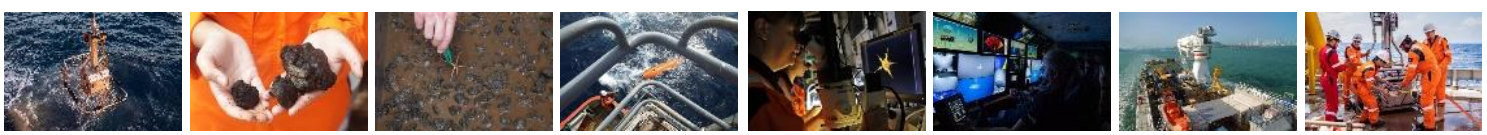
Amon, D.J., Ziegler, A.F., Dahlgren, T.G., Glover, A.G., Goineau, A., Gooday, A.J., Wiklund, H., and Smith, C.R.; (2016). Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports, 6:30492. DOI: 10.1038/srep30492

Amon, D.J., Hilario, A., Martinez Arbizu P., and Smith, C.R.; (2016). Observations of organic falls in the abyssal Clarion-Clipperton Zone, tropical eastern Pacific Ocean. Marine Biodiversity. doi: 10.1007/s12526-016-0572-44. http://rd.springer.com/article/10.1007/s12526-016-0572-4

Dahlgren, T.G., Wiklund, H., Rabone, M., Amon, D.J., Ikebe, C., Watling, L. Smith, C.R., and Glover, A.G.; (2016). Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Cnidaria, Biodiversity Data Journal 4: e9277 (30 June 2016). doi: 10.3897/BDJ.4.e9277

Glover, A.G., Wiklund, H., Dahlgren, T.G., Rabone M., Amon, D.J., Smith C.R., and O'Hara, T.; (2016). Abyssal fauna of the UK-1 polymetallic nodule exploration claim, Clarion-Clipperton Zone, central Pacific Ocean: Echinodermata, Biodiversity Data Journal 4: e7251, doi: 10.3897/BDJ.4.e7251



Glover, A. G., Dahlgren, T. G., Wiklund, H., Mohrbeck, I., & Smith, C. R. (2016). An End-to-End DNA Taxonomy Methodology for Benthic Biodiversity Survey in the Clarion-Clipperton Zone, Central Pacific Abyss. Journal of Marine Science and Engineering, 4(1), 2. https://doi.org/10.3390/jmse4010002

Glover, A.G., Dahlgren, T.G., Taboada, S., Paterson, G.L., Wiklund, H., Waeschenbach, A., Cobley, A., Martinez Arbizu, P., Kaiser, S., Schnurr, S., Khodami, S., Raschka, U., Kersken, D., Stuckas, H., Menot, L., Bonifacio, P., Vanreusel, A., Macheriotou, L., Cunha, M., Hilário, A., Rodrigues, C., Colaço, A., Ribeiro, P., Błażewicz, M., Gooday, A.G., Jones, D. O.B., Billett, D. S.M., Goineau, A., Amon, D.J., Smith, C.R., Patel, T., McQuaid, K., Spickermann, R., and Brager, S. ; (2016). The London Workshop on the Biogeography and Connectivity of the Clarion-Clipperton Zone. Research Ideas and Outcomes 2: e10528 (16 Sep 2016). doi: 10.3897/rio.2.e10528

Markhaseva, E.L., Mohrbeck, I., and Renz, J.; (2016). Description of Pseudeuchaeta vulgaris n.sp.(Copepoda: Calanoida), a new aetideid species from the deep Pacific Ocean with notes on the biogeography of benthopelagic aetideid calanoids, Marine Biodiversity (Special issue: Biodiversity of the CCZ) http://rd.springer.com/article/10.1007/s12526-016-0527-9

Paterson, G.L., Neal, L., Altamira, I., Soto, E. H., Smith, C. R., Menot, L., Billett, D.S.M., Cunha, M. R., Marchais-Laguionie, C., and Glover, A.G.; (2016). New Prionospio and Aurospio Species from the Deep Sea (Annelida: Polychaeta). Zootaxa, 4092 (1): 001-032. https://doi.org/10.11646/zootaxa.4092.1.1 (Includes species descriptions of macrofaunal polychaetes collected by the ABYSSLINE project.)

Shulse, C., Maillot B., Smith C.R., and Church M.J.; (2016). Polymetallic nodules, sediments, and deep waters in the equatorial North Pacific exhibit highly diverse and distinct bacterial, archaeal, and microeukaryotic communities. Microbiology Open. https://onlinelibrary.wiley.com/doi/10.1002/mbo3.428

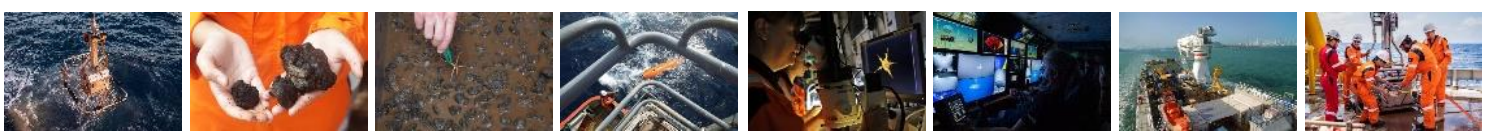
Zinssmeister, C., Wilke, T., Hoppenrath, M., and von Ossietzky, C.; (2016). Species diversity of dinophysoid dinoflagellates of the Clarion Clipperton Fracture Zone, eastern Pacific. Marine Biodiversity. https://doi.org/10.1007/s12526-016-0607-x.

2016 Conference Presentations Arising from UK1 AB01 (2013) and AB02 (2015) Environmental Datasets

Goineau, A.; (2016). "Monothalomophobia" or the tragedy of the monothalomous benthic foraminifera: can we ignore them? TMS Foraminifera and Nanofossil Spring Meeting, 19-24 June 2016, Angers, France

Goineau A., and Gooday A. J.; (2016). High abundance and diversity of novel benthic foraminifera in the abyssal equatorial Pacific (Clarion–Clipperton Zone). MeioScool, Brest, France, June 2016.

Gooday, A.J., and Goineau, A.; (2016). Recent research on benthic foraminifera (Protista) in the abyssal equatorial Pacific (Clarion-Clipperton Zone). Talk given at Challenger Society - UK Deep-Sea Ecosystems Special Interest Group, University of Liverpool, 9th September 2016.



Mohrbeck, I., Neira, C., and Martinez Arbizu P.; (2016). Abyssal Meiofauna Communities in the UK-1 Exploration Area in the Clarion-Clipperton Zone (Northeast Pacific), International Meiofauna Conference (ISIMCO 03. -08.07.2016), Heraclion, Greece.

2015 Publications Arising from UK1 AB01 (2013) Environmental Datasets

Cairns, S.; (2015). New abyssal Primnoidae (Anthozoa: Octocorallia) from the Clarion-Clipperton Fracture Zone, equatorial northeastern Pacific. Marine Biodiversity, 1-10, https://doi.org/10.1007/s12526-015-0340-x (Includes species descriptions of cnidarians collected by the ABYSSLINE project.)

Goineau A., Gooday A. J.; (2015). Radiolarian tests as microhabitats for novel benthic foraminifera: Observations from the abyssal eastern equatorial Pacific (Clarion–Clipperton Fracture Zone). Deep-Sea Research I 103, 73–85. https://doi.org/10.1016/j.dsr.2015.04.011

Gooday A. J., Goineau A., Voltski I.; (2015). Abyssal foraminifera attached to polymetallic nodules from the eastern Clarion Clipperton Fracture Zone: a preliminary description and comparison with North Atlantic dropstone assemblages. Marine Biodiversity, https://doi.org/10.1007/s12526-014-0301-9

Kersten, O.; (2015). Abyssal Near-Bottom Zooplankton in the Eastern Tropical North Pacific. Master's Thesis, Hawai'i Pacific University.

2015 Conference Presentations Arising from UK1 AB01 (2013) Datasets

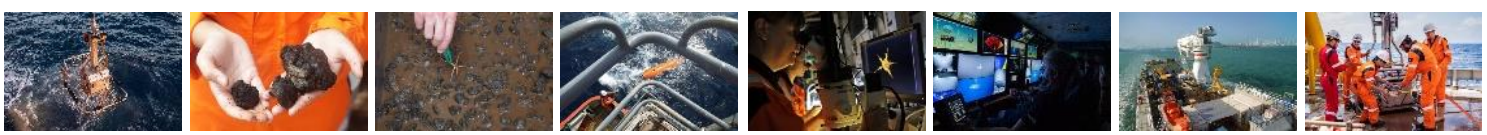
Amon, D.J., Smith, C.R., Ziegler, A.F.; (2015). Megafaunal community structure and biodiversity in the UK-1 claim area of the Clarion-Clipperton Zone. Oral presentation. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015

Dahlgren T.G., Wiklund H., and Glover A.G.; (2015). Biogeography and connectivity of the Clarion-Clipperton Zone abyssal fauna: insights from recent cruises to the UK-1 claim area, Oral presentation. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015

Glover A.G., Dahlgren T.G. and Wiklund H.; (2015). Environmental stewardship of the central Pacific Clarion-Clipperton Zone Mining frontier requires a vastly improved knowledge of species taxonomy and natural history, Oral presentation. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.

Goineau A., Gooday A. J.; (2015). Evaluation of benthic foraminiferal assemblage characteristic in the abyssal eastern equatorial Pacific, an area of likely future polymetallic nodule mining. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.

Goineau A., Gooday A. J.; (2015). Radiolarian tests as snug microhabitats for novel 'squatter' benthic foraminifera: observations from the abyssal eastern equatorial Pacific (Clarion–Clipperton Fracture Zone). 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.



Gooday, A.J., Goineau, A., Weber, A.A.T., Holzmann, M., Pawlowski, J.; (2015). The biodiversity of xenophyophores (Rhizaria, Foraminifera) from the eastern Clarion Clipperton Zone (Equatorial Pacific). 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.

Kersten, O., Smith C.R., Vetter, E.W.; (2015). Abyssal benthopelagic zooplankton in the Clarion Clipperton Zone. Poster presentation. 14th Deep-Sea Biology Symposium, Aveiro, Portugal.

Leitner, A.B, Drazen, J.C., Nunnally, C.C.; (2015). Analysis of scavenging megafauna of the Clarion-Clipperton Zone using a baited camera. 14th Deep-Sea Biology Symposium, Aveiro, Portugal.

Mohrbeck, I., Neira, C., Singh, R., and Martinez Arbizu, P.; (2015). UKSR Environmental Baseline Programme: Meiofaunal Community Structure and Diversity in the UK1 License Area. Workshop of the International Seabed Authority (14.-17.12.2015), Ghent, Belgium

Mohrbeck I., Janssen A., Brenke N., Kaiser S., Menzel L., and Martinez Arbizu P.; (2015). Molecular genetics of Crustacea as a tool to investigate the post-mining recovery potential of deep-sea ecosystems. MIDAS meeting (16-20.11.2015), Sintra, Portugal.

Mohrbeck I., Janssen A., Kaiser S., Brenke N., Borges V.A., Albers L., Raschka U., and Martinez Arbizu P.; (2015). Isopod distribution patterns in polymetallic nodule fields: German vs. UK license area. Presentation at the 14th Deep Sea Biology Symposium (31.08.-04.09.2015), Aveiro, Portugal.

Sweetman, A.K, Smith, C.R, Maillot, B., Schulse, C., Church, M.J., Gooday, A.J., and Moodley, L.; (2015). Bacteria, not macrofauna, are key players in the short-term degradation of phytodetritus in oligotrophic abyssal sediments. Oral presentation. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.

Shulse, C., Maillot B., Nielsen T.N., Delong E.F., Smith C.R., and Church M.J.; (2015). Microbial diversity and metabolic potential of a polymetallic nodule field. Oral presentation. 14th Deep-Sea Biology Symposium, Aveiro, Portugal.

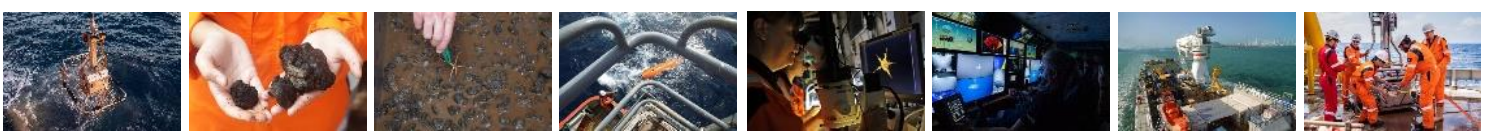
Smith C.R., Amon D.J., Drazen J., Church M., Vetter E., Glover A.G., Dalhgren T.G., Gooday, A.J., Martinez Arbizu P., Sweetman A., and Ziegler A.; (2015). Nodule Mining and Ocean Stewardship in the CCZ: An overview of the ABYSSLINE project with results on macrofaunal diversity and community structure. Oral presentation. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.

Wiklund H., Dahlgren T.G., and Glover A.G.; (2015). Phylogenetics of the Clarion-Clipperton Zone abyssal fauna: species concepts, diversity and origins. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.

Ziegler, A.F., Smith, C.R., and Amon, D.J.; (2015). A qualitative assessment of megafaunal diversity and biogeography of the UK-1 mining claim area within the Clarion-Clipperton Zone. Poster presentation. 14th Deep-sea Biology Symposium, Aveiro, Portugal, September 2015.

2014 Conference Presentations Arising from UK1 AB01 (2013) Environmental Datasets

Dahlgren, T., Wiklund, H., and Glover, A.;(2014). Express-taxonomy for deep-sea diversity assessments using molecular markers, World Conference on Marine Biodiversity, 12-16 October 2014. Qingdao, China.



Glover, A.;(2014). Environmental Futures in the Deep-Sea Mining Frontier, 16th Biennial Challenger Society Marine Conference, September 2014.

Goineau, A. and Gooday, A.;(2014). Evaluation of benthic foraminiferal assemblage characteristic in the abyssal eastern equatorial Pacific, an area of likely future polymetallic nodule mining. World Conference on Marine Biodiversity, 12-16 October 2014. Qingdao, China.

Gooday, A., Pawlowski, J., Goineau, A., and Levin, L.;(2014). Challenges associated with the evaluation of foraminiferal biodiversity and functioning in the context of deep-sea mining. World Conference on Marine Biodiversity, 12-16 October 2014. Qingdao, China.

Wiklund, H., Dahlgren, T., and Glover, A.;(2014). Biodiversity and taxonomy of the UK1 polymetallic nodule exploration claim area in the Clarion-Clipperton Zone, Central Pacific abyss, World Conference on Marine Biodiversity, 12-16 October 2014. Qingdao, China.