

CURRICULUM VITAE

EDWARD T. PELTZER, III

Senior Research Specialist
Monterey Bay Aquarium research Institute
7700 Sandholdt Road
Moss Landing, CA 95039

Tel: (831) 775-1851

Fax: (831) 775-1620

Email: etp3@mbari.org

- **EDUCATION:**

- **B.S.: Chemistry, Bucknell University, Lewisburg, PA, 1972.**
- **Ph.D.: Oceanography, Scripps Institution of Oceanography, University of California, San Diego, 1979.**

- **PROFESSIONAL EXPERIENCE:**

- Research Associate, Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA, December 1977 to May 1985.
- Research Specialist, Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA, June 1985 to June 1997.
- Senior Research Technician, Research and Development Division, Monterey Bay Aquarium Research Institute, Moss Landing, CA, July 1997 to June 1999.
- Adjunct Oceanographer, Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA, August 1998 to July 2001.
- Senior Research Specialist, Research and Development Division, Monterey Bay Aquarium Research Institute, Moss Landing, CA, July 1999 to present.

- **PROFESSIONAL ACTIVITIES:**

- Associate Editor, Marine Chemistry, January 1996 through October 2017.
- Member of:
 - American Chemical Society
 - American Geophysical Union
 - The Oceanography Society

- **RESEARCH INTERESTS:**

1. Application of the fundamental laws of physical chemistry to problems in ocean chemistry.
2. Free Ocean CO₂ Enrichment Experiments.
3. Gas hydrates in marine sediments:
 - a. development of new analytical techniques for the measurement of the major components and selected trace gases in gas hydrates.
 - b. analysis of samples collected with ROV and laboratory synthetics.
4. Laser Raman Spectroscopy from ROVs:
 - a. Gas hydrates and natural gas seeps in the deep-sea.
 - b. Gas loss from petroleum oil proxies.
5. Deep ocean disposal of fossil fuel carbon dioxide and processes controlling its long-term sequestration as a gas hydrate.
6. The role of dissolved organic matter in the global ocean carbon cycle:
 - a. development of new techniques for the measurement of DOC and DON;
 - b. estimation of the sources and sinks of dissolved organic matter by modelling the observed distributions of DOC and DON.
7. The geochemistry of naturally occurring organic compounds in atmospheric aerosols and seawater as a indicator of sources and transport mechanisms.
8. The geochemistry of alpha-hydroxy and di-carboxylic acids in carbonaceous chondrites, deep-sea sediments and seawater.

• **PEER REVIEWED PUBLICATIONS:**

1. Heine, H. W., J. D. Myers and E. T. Peltzer (1970). Stereospecific deaminations of some N-alkylaziridines by m-chloroperbenzoic acid. *Angewandte Chemie, International Edition in English* 9: 374.
2. Peltzer, E. T. and J. L. Bada (1978). alpha-Hydroxycarboxylic acids in the Murchison Meteorite. *Nature* 272: 443-444.
3. Hoopes, E. A., E. T. Peltzer and J. L. Bada (1978). Determination of amino acid enantiomeric ratios by gas liquid chromatography of the N-trifluoro-acetyl-L-prolyl-peptide methyl esters. *Journal of Chromatographic Science* 16: 556-560.
4. Zafiriou, O. C., J. Alford, M. Herrera, E. T. Peltzer, R. B. Gagosian and S. C. Liu (1980). Formaldehyde in remote marine air and rain: flux measurements and estimates. *Geophysical Research Letters* 7: 341-344.
5. Gagosian, R. B., E. T. Peltzer and O. C. Zafiriou (1981). Atmospheric transport of continentally derived lipids to the tropical north Pacific. *Nature* 291: 312-314.
6. Peltzer, E. T. and J. L. Bada (1981). Low molecular weight alpha-hydroxy carboxylic and dicarboxylic acids in reducing marine sediments. *Geochimica Cosmochimica Acta* 45: 1847-1854.
7. Gagosian, R. B., O. C. Zafiriou, E. T. Peltzer and J. B. Alford (1982). Lipids in aerosols from the tropical North Pacific: temporal variability. *Journal of Geophysical Research* 87: 11,133-11,144.
8. Peltzer, E. T., J. L. Bada, G. Schlesinger and S. L. Miller (1984). The chemical conditions on the parent body of the Murchison meteorite: some conclusions based on amino, hydroxy and dicarboxylic acids. *Advances in Space Research* 4: 69-74.
9. Zafiriou, O. C., R. B. Gagosian, E. T. Peltzer, J. B. Alford and T. Loder (1985). Air-to-sea fluxes of lipids at Enewetak Atoll. *Journal Geophysical Research* 90: 2409-2423.
10. Gagosian, R. B. and E. T. Peltzer (1986). The importance of atmospheric input of terrestrial organic material to deep-sea sediments. *Advances in Organic Geochemistry 1985 Organic Geochemistry* 10: 661-669.
11. Peltzer, E. T. and R. B. Gagosian (1987). Sampling and analysis of lipids in aerosols from the remote marine atmosphere. *Analytica Chimica Acta* 198: 125-144.
12. Gagosian, R. B., E. T. Peltzer and J. T. Merrill (1987). Long range transport of terrestrially-derived lipids in aerosols from the south Pacific. *Nature* 325: 800-803.
13. Peltzer, E. T. and R. B. Gagosian (1989). Organic Geochemistry of aerosols over the Pacific Ocean. In: *Chemical Oceanography*, 10, R. A. Duce, guest editor; J. P. Riley and R. Chester, editors. pp. 281-338. Academic Press, London.
14. Sicre, M.-A., R. B. Gagosian and E. T. Peltzer (1990). Evaluation of the atmospheric transport of marine-derived particles using long-chain unsaturated ketones. *Journal of Geophysical Research* 95: 1789-1795.
15. Sharp, J. H. and E. T. Peltzer (1993). Procedures subgroup report. *Marine Chemistry* 41: 37-49.
16. Peltzer, E. T. and P. G. Brewer (1993). Some practical aspects of measuring DOC-sampling artifacts and analytical problems with marine samples. *Marine Chemistry* 41: 243-252.
17. Goyet, C. and E. T. Peltzer (1994). Comparison of the August-September 1991 and 1979 surface partial pressure of CO₂ distribution in the Equatorial Pacific Ocean near 150degW. *Marine Chemistry* 45: 257-266.
18. Sharp, J. H., R. Benner, L. Bennett, C. A. Carlson, S. E. Fitzwater, E. T. Peltzer and L. M. Tupas (1995). Analyses of dissolved organic carbon in seawater: the JGOFS EQPAC methods comparison. *Marine Chemistry* 48: 91-108.
19. Vodacek, A., F. E. Hoge, R. N. Swift, J. K. Yungel, E. T. Peltzer and N. V. Blough (1995). The use of in situ and airborne fluorescence measurements to determine UV absorption coefficients and DOC concentrations in surface waters. *Limnology and Oceanography* 40: 411-415.
20. Goyet, C., D. Davis, E. T. Peltzer and P. G. Brewer (1995). Development of improved space sampling strategies for ocean chemical properties: total carbon dioxide and dissolved nitrate. *Geophysical Research Letters* 22: 945-948.
21. Chen, R. F., B. Fry, C. S. Hopkinson, D. J. Repeta and E. T. Peltzer (1996). Dissolved organic carbon on Georges Bank. *Continental Shelf Research* 16: 409-420.
22. Peltzer, E. T., B. Fry, P. H. Doering, J. H. McKenna, B. Norrman and U. L. Zweifel (1996). A comparison of methods for the measurement of dissolved organic carbon in natural waters. *Marine Chemistry* 54: 85-96.
23. Peltzer, E. T. and N. A. Hayward (1996). Spatial and temporal variability of total organic carbon along 140degW in the equatorial Pacific ocean in 1992. *Deep Sea Research II (Equatorial Pacific 2)* 43: 1155-1180.
24. Fry, B., E. T. Peltzer, C. H. Hopkinson, A. Nolin and L. Redmond (1996). Analysis of Marine DOC using a Dry Combustion Method. *Marine Chemistry* 54: 191-201.

25. Vodacek, A., N. V. Blough, M. D. DeGrandpre, E. T. Peltzer and R. K. Nelson (1997). Seasonal variations of CDOM and DOC in the Middle Atlantic Bight: Terrestrial inputs and photooxidation. *Limnology and Oceanography* 42: 674-686.
26. Archer, D., E. T. Peltzer and D. L. Kirchman (1997). A timescale for dissolved organic carbon production in equatorial Pacific surface waters. *Global Biogeochemical Cycles* 11: 435-452.
27. Goyet, C. and E. T. Peltzer (1997). Variation of CO₂ partial pressure in surface seawater in the equatorial Pacific Ocean. *Deep Sea Research* 44: 1611-1625.
28. Archer, D., J. Aiken, W. Balch, R. Barber, J. Dunne, P. Flament, W. Gardner, C. Garside, C. Goyet, E. Johnson, D. Kirchman, M. McPhaden, J. Newton, E. Peltzer, L. Welling, J. White and J. Yoder (1997). A meeting place of great ocean currents: shipboard observations of a convergent front at 2degN in the Pacific. *Deep Sea Research II* 44: 1827-1849.
29. Hansell, D. A. and E. T. Peltzer (1998). Spatial and temporal variations of total organic carbon in the Arabian Sea. *Deep Sea Research II* 45: 2171-2193.
30. Walsh, J. J., D. A. Dieterle, F. E. Muller-Karger, R. Bohrer, W. P. Bissett, R. J. Varela, R. Aparicio, R. Diaz, R. Thunell, G. T. Taylor, M. I. Scranton, K. A. Fanning, E. T. Peltzer (1999). Simulation of carbon-nitrogen cycling during spring upwelling in the Cariaco Basin. *Journal Geophysical Research* 104: 7807-7825.
31. Brewer, P. G., G. Friederich, E. T. Peltzer and F. M. Orr, Jr. (1999). Direct experiments on the ocean disposal of fossil fuel CO₂. *Science* 284: 943-945.
32. Carlson, C. A., D. A. Hansell, E. T. Peltzer and W. O. Smith, Jr. (2000). Stocks and dynamics of dissolved and particulate organic matter in the southern Ross Sea, Antarctica. *Deep Sea Research II* 47: 3201-3225.
33. Peltzer, E. T. and P. G. Brewer (2000). Practical physical chemistry and empirical predictions of methane hydrate stability. In: M.D. Max (ed.), *Natural Gas Hydrate in Oceanic and Permafrost Environments*. Kluwer Academic Publishers, The Netherlands. pp. 17-28.
34. Brewer, P. G., E. T. Peltzer, G. Friederich, I. Aya and K. Yamane (2000). Experiments on the ocean sequestration of fossil fuel CO₂: pH measurements and hydrate formation. *Marine Chemistry* 72: 83-93.
35. Tamburri, M., E. T. Peltzer, G. Friederich, I. Aya, K. Yamane and P. G. Brewer (2000). A field study of the effects of CO₂ disposal on mobile deep-sea animals. *Marine Chemistry* 72: 95-101.
36. Xu, W., Lowell, R.P. and Peltzer, E.T. (2001). Effect of seafloor temperature and pressure variations on methane flux from a gas hydrate layer: Comparison between current and late Paleocene climate conditions. *Journal Geophysical Research* 106: 26,413-26,423.
37. Brewer, P.G., J. Pasteris, G. Malby, E.T. Peltzer, S. White, J. Freeman, B. Wopenka, M. Brown and D. Cline (2002). Laser Raman spectroscopy at 3600m ocean depth. *Eos, Trans. AGU* 83(42): 469-470.
38. Sharp, J.H., C.A. Carlson, E.T. Peltzer, D.M. Castle-Ward, K.B. Savidge and K.R. Rinker (2002). Final dissolved organic carbon broad community intercalibration and preliminary use of DOC reference materials. *Marine Chemistry* 77: 239-253.
39. Rehder, G., P.G. Brewer, E.T. Peltzer and G. Friederich (2002). Enhanced lifetime of methane bubble streams within the deep ocean. *Geophysical Research Letters* 29(15) doi:10.1029/2001GL013966.
40. Paull, C.K., P.G. Brewer, W. Ussler III, E.T. Peltzer, G. Rehder, and D. Clague (2002). An experiment demonstrating that marine slumping is a mechanism to transfer methane from seafloor gas-hydrate deposits into the upper ocean and atmosphere. *Geo-Marine Letters*, doi:10.1007/s00367-002-0113-y.
41. Brewer, P.G., C. Paull, E.T. Peltzer, W. Ussler, G. Rehder and G. Friederich (2002). Measurement of the fate of gas hydrates during transit through the ocean water column. *Geophysical Research Letters* 29(22) doi:10.1029/2002GL014727.
42. Brewer, P.G., E.T. Peltzer, G. Friederich and G. Rehder (2002). Experimental determination of the fate of rising CO₂ droplets in sea water. *Environmental Science & Technology* 36: 5441-5446.
43. Dickson, A., R. Bidigare, J. Hedges, K. Johnson, D. Leblanc, C. Lee, F. Millero, J. Moffet, W. Moore, E. Peltzer and S. van den Berg (2002). *Chemical Reference Materials: Setting the Standards for Ocean Science*. Ocean Studies Board, National Research Council Report. National Academies Press, Washington, DC. 130p.
44. Kleinberg, R.L., C. Flaum, C. Straley, P.G. Brewer, G.E. Malby, E.T. Peltzer III, G. Friederich and J.P. Yesinowski (2003). Seafloor Nuclear Magnetic Resonance Assay of Methane Hydrate in Sediment and Rock. *Journal of Geophysical Research*, 108(B3): 2137. doi:10.1029/2001JB000919.
45. Kleinberg, R.L., C. Flaum, D.D. Griffin, P.G. Brewer, G.E. Malby, E.T. Peltzer, J.P. Yesinowski (2003). Deep sea NMR: Methane hydrate growth habit in porous media and its relationship to hydraulic permeability, deposit accumulation and submarine slope stability. *Journal Geophysical Research* 108(B10): 2508. doi:10.1029/2003JB002389.
46. Rehder, G., S.H. Kirby, W.B. Durham, L.A. Stern, E.T. Peltzer, J. Pinkston, P.G. Brewer (2004). Dissolution rates of pure methane hydrate and carbon-dioxide hydrate in undersaturated seawater at 1000-m depth. *Geochimica Cosmochimica Acta* 68: 285-292. doi:10.1016/j.gca.2003.07.001.

47. Aya, I., R. Kojima, K. Yamane, K. Shiozaki, P.G. Brewer, E.T. Peltzer III (2004). In situ experiments of cold CO₂ release in mid-depth. *Energy* 29: 1499-1509. doi:10.1016/j.energy.2004.03.055.
48. Brewer, P.G., G. Malby, J.D. Pasteris, S.N. White, E.T. Peltzer, B. Wopenka, J. Freeman, M.O. Brown (2004). Development of a laser Raman spectrometer for deep-ocean science. *Deep Sea Research* 51: 739-753. doi:10.1016/j.dsr.2003.11.005.
49. Sicre, M-A., E.T. Peltzer (2004). Lipid geochemistry of remote aerosols from the southwestern Pacific Ocean sector. *Atmos. Environ.* 38: 1615-1624. doi:10.1016/j.atmosenv.2003.12.012.
50. Tsouris, C., P.G. Brewer, E. Peltzer, P. Walz., D. Riestenberg, L. Liang, O. West (2004). Hydrate composite particle for ocean carbon sequestration: Field verification. *Environmental Science & Technology* 38: 2470-2475. doi:10.1012/es034990a.
51. Pasteris, J.D., B. Wopenka, J.J. Freeman, P.G. Brewer, S.N. White, E.T. Peltzer, G.E. Malby (2004). Raman Spectroscopy in the deep ocean: Successes and challenges. *Appl. Spectro.* 58(7): 195A-208A.
52. Brewer, P.G., E. Peltzer, I. Aya, P. Haugan, R. Bellerby, K. Yamane, R. Kojima, P. Walz, Y. Nakajima (2004). Small scale field study of an ocean CO₂ plume. *Journal Oceanography* 60: 751-758.
53. Barry, J.P., K.R. Buck, C.F. Lovera, L. Kuhn, P.J. Whaling, E.T. Peltzer, P. Walz, P.G. Brewer (2004). Effects of direct ocean CO₂ injection on deep-sea meiofauna. *Journal Oceanography* 60: 759-766.
54. Brewer, P.G., E.T. Peltzer, P. Walz, I. Aya, K. Yamane, R. Kojima, Y. Nakajima, N. Nakayama, P. Haugan, T. Johannessen (2005). Deep Ocean Experiments with fossil fuel carbon dioxide: creation and sensing of a controlled plume at 4 km depth. *Journal of Marine Research* 63: 9-33.
55. Nakayama, N., E.T. Peltzer, P. Walz, P.G. Brewer (2005). First results from a controlled deep sea CO₂ perturbation experiment: Evidence for rapid equilibration of the oceanic CO₂ system at depth. *Journal of Geophysical Research* 110, C09S11 doi:10.1029/2004JC002597.
56. Riestenberg, D., C. Tsouris, P.G. Brewer, E.T. Peltzer, P. Walz, A. Chow, E. Adams (2005). Field studies on the formation of sinking CO₂ particles for ocean carbon sequestration: Effects of injector geometry on particle density and dissolution rate and model simulation of plume behavior. *Environmental Science & Technology* 39: 7287-7293.
57. Dunk, R.M., E.T. Peltzer, P. Walz, P.G. Brewer (2005). Seeing a deep ocean CO₂ enrichment experiment in a new light: Laser raman detection of dissolved CO₂ in seawater. *Environmental Science & Technology* 39: 9630-9636.
58. White, S.N., W. Kirkwood, A. Sherman, M. Brown, R. Henthorn, K. Salamy, P. Walz, E.T. Peltzer and P.G. Brewer (2005). Development and deployment of a precision underwater positioning system for in situ laser Raman spectroscopy in the deep ocean. *Deep Sea Research I* 52: 2376-2389. doi:10.1016/j.dsr.2005.09.002. ISBN: 978-0-08-044704-9.
59. Haugan, P.M., P.G. Brewer, E.T. Peltzer, P. Walz, I. Aya, K. Yamane, R. Kojima, Y. Nakajima, N. Nakayama, J. Hove, T. Johannessen, R.G.J. Bellerby, G. Alendal (2005). Ocean abyssal carbon experiments at 0.7 and 4 KM depth. In: *Greenhouse Gas Control Technologies 7*. E.S. Rubin et al. (eds). pp. 801-808. doi:10.1016/B978-008044704-9/50081-1.
60. Hester, K.C., S.N. White, E.T. Peltzer, P.G. Brewer, E.D. Sloan (2006). Raman spectroscopic measurements of synthetic gas hydrates in the ocean. *Marine Chemistry* 98: 304-314.
61. White, S.N., P.G. Brewer, E.T. Peltzer (2006). Determination of gas bubble fractionation rates in the deep ocean by laser Raman spectroscopy. *Marine Chemistry* 99: 12-23.
62. White, S.N., R.M. Dunk, E.T. Peltzer, J.J. Freeman, P.G. Brewer (2006). In situ Raman analyses of deep-sea hydrothermal and cold seep systems (Gorda Ridge and Hydrate Ridge). *Geochemistry, Geophysics and Geosystems* 7 (5) doi:10.1029/2005GC001204.
63. Alendal, G., P.M. Haugan, R. Gangsto, K. Caldeira, E. Adams, P.G. Brewer, E.T. Peltzer, G. Rehder and T. Sato (2006). Comment on Fate of a Rising CO₂ Droplets in Seawater. *Environmental Science & Technology* 40 (11): 3653-3654. doi:10.1021/es052458c.
64. Brewer, P.G., B. Chen, R. Warzinski, A. Baggeroer, E.T. Peltzer, R.M. Dunk and P.M. Walz (2006). Three-dimensional acoustic monitoring and modeling of a deep-sea CO₂ droplet cloud. *Geophysical Research Letters* 33 (L23607). doi:10.1029/2006GL027181.
65. Hester, K.C., R.M. Dunk, S.N. White, P.G. Brewer, E.T. Peltzer and E.D. Sloan (2007). Gas hydrate measurements at Hydrate Ridge using Raman spectroscopy. *Geochimica Cosmochimica Acta* 71: 2947-2959. doi:10.1016/j.gca.2007.03.032.
66. Paull, C.K., W. Ussler III, E.T. Peltzer, P.G. Brewer, R. Keaten, P.J. Mitts, J.W. Nealon, J. Greinert, J-C. Herguera and M.E. Perez (2007). Authigenic carbon entombed in methane-soaked sediments from the northeastern transform margin of the Guaymas Basin, Gulf of California. *Deep Sea Research II* 54: 1240-1267. doi:10.1016/j.dsr2.2007.04.009.
67. Hester, K.C., R.M. Dunk, P.M. Walz, E.T. Peltzer, E.D. Sloan and P.G. Brewer (2007). Direct measurements of multi-component hydrates on the seafloor: Pathways to growth. *Fluid Phase Equilibria* 261: 396-406. doi:10.1016/j.fluid.2007.07.053.

68. Tsouris, C., P. Szymcek, P. Taboada-Serrano, S.D. McCallum, P. Brewer, E. Peltzer, P. Walz, E. Adams, A. Chow, W.K. Johnson and J. Summers (2007). Scaled-Up Ocean Injection of CO₂-Hydrate composite particles. *Energy & Fuels* 21: 3300-3309.
69. Hester, K. C., E. T. Peltzer, W. J. Kirkwood, and P. G. Brewer (2008). Unanticipated consequences of ocean acidification: A noisier ocean at lower pH. *Geophysical Research Letters* 35: L19601, doi:10.1029/2008GL034913.
70. Kessler, J.D., W.S. Reeburgh, D.L. Valentine, F.S. Kinnaman, E.T. Peltzer, P.G. Brewer, J. Southon, and S.C. Tyler (2008). A survey of methane isotope abundance (¹⁴C, ¹³C, ²H) from five nearshore marine basins that reveals unusual radiocarbon levels in subsurface waters, *J. Geophysical Research*, 113, C12021. doi:10.1029/2008JC004822.
71. Zhang, X.; K. C. Hester, O. Mancillas, E. T. Peltzer, P.M. Walz, P. G. Brewer (2009). Geochemistry of chemical weapon breakdown products on the seafloor: 1,4-thioxane in sea water. *Environmental Science & Technology* 43: 610-615. doi:10.1021/es802283y.
72. Brewer, P. G. and E. T. Peltzer (2009). Limits to Marine Life. *Science*. 324: 347-348. doi:10.1126/science.1170756.
73. Rehder, G., I. Leifer, P.G. Brewer, G. Friederich, and E.T. Peltzer (2009). Controls on methane bubble dissolution inside and outside the hydrate stability field from open ocean field experiments and numerical modeling. *Marine Chemistry* 114: 19-30. doi:10.1016/j.marchem.2009.03.004.
74. Hester, K.C., E.T. Peltzer, P.M. Walz, R.M. Dunk, E.D. Sloan, and P.G. Brewer (2009). A natural hydrate dissolution experiment on complex multi-component hydrates on the sea floor. *Geochim. Cosmochim. Acta* 73: 6747-6756. doi:10.1016/j.gca.2009.08.007.
75. Zhang, X., P.M. Walz, W.J. Kirkwood, K.C. Hester, W. Ussler, E.T. Peltzer, and P.G. Brewer (2010). Development and deployment of a deep-sea Raman probe for measurement of pore water geochemistry. *Deep Sea Research I* 57: 297-306. doi:10.1016/j.dsr.2009.11.004.
76. Zhang, X., K.C. Hester, W. Ussler, P.M. Walz, E.T. Peltzer and P.G. Brewer (2011). In situ Raman-based measurements of high dissolved methane concentrations in hydrate-rich ocean sediments. *Geophysical Research Letters* 38 L08605. doi:10.1029/2011GL047141.
77. Hofmann, A.F., E.T. Peltzer, P.M. Walz, P.G. Brewer (2011). Hypoxia by degrees: Establishing definitions for a changing ocean. *Deep Sea Research I* 58: 1212-1226. doi:10.1016/j.dsr.2011.09.004.
78. Klapp, S.A., F. Enzmann, P.M. Walz, T. Huthwelker, J. Tuckermann, J.-O. Schwarz, T. Pape, E.T. Peltzer, R. Mokso, D. Wangner, F. Marone, M. Kersten, G. Bohrmann, W.F. Kuhs, M. Stapanoni and P.G. Brewer (2012). Microstructure characteristics during hydrate formation and dissociation revealed by X-ray tomographic microscopy. *Geo-Marine Letters*. doi:10.1007/s00367-012-0276-0.
79. Zhang, X., W.J. Kirkwood, P.M. Walz, E.T. Peltzer, and P.G. Brewer (2012). A Review of Advances in Deep-Ocean Raman Spectroscopy. *Applied Spectroscopy* 66: 237-249.
80. Kline, D.I., L. Teneva, K. Schneider, T. Miard, A. Chai, M. Marker, K. Headley, B. Opdyke, M. Nash, M. Valetich, J. Caves, B. Russell, S. Connell, W. Kirkwood, P. Brewer, E. Peltzer, J. Silverman, K. Caldeira, R. Dunbar, J. Koseff, S. Monismith, G. Mitchell, S. Dove, O. Hoegh-Guldberg (2012). A short-term in situ CO₂ enrichment experiment on Heron Island (GBR). *Scientific Reports* 2: 413. doi:10.1038/srep00413.
81. Hofmann, A.F., E.T. Peltzer, and P.G. Brewer (2013). Kinetic bottlenecks to chemical exchange rates for deep-sea animals II: Carbon Dioxide. *Biogeosciences* 10: 2409-2425. doi:10.5194/bg-10-2409-2013.
82. Hofmann, A.F., E.T. Peltzer, and P.G. Brewer (2013). Kinetic bottlenecks to chemical exchange rates for deep-sea animals I: Oxygen. *Biogeosciences* 10: 5049-5060. doi:10.5194/bg-10-5049-2013.
83. Hofmann, A.F., P.M. Walz, H. Thomas, E.T. Peltzer and P.G. Brewer (2013). High-Resolution Topography-Following Chemical Mapping of Ocean Hypoxia by Use of an Autonomous Underwater Vehicle: The Santa Monica Basin Example. *J. of Atmos. and Oceanic Tech.* 30: 2630-2646.
84. Brewer, P.G., A.F. Hofmann, E.T. Peltzer and W. Ussler (2014). Evaluating microbial chemical choices: the ocean chemistry basis for the competition between use of O₂ or NO₃⁻ as an electron acceptor. *Deep Sea Research I* 87: 35-42. doi:10.1016/j.dsr.2014.02.002.
85. Gattuso, J.-P., W. Kirkwood, J.P. Barry, E. Cox, F. Gazeau, L. Hansson, I. Hendriks, D.I. Kline, P. Mahacek, S. Martin, P. McElhany, E.T. Peltzer, J. Reeve, D. Roberts, V. Saderne, K. Tait, S. Widdicombe, and P.G. Brewer (2014). Free Ocean CO₂ Enrichment (FOCE) systems: present status and future developments. *Biogeosciences* 11: 4057-4075. doi:10.5194/bg-11-4057-2014.
86. Barry, J.P., C. Lovera, K.R. Buck, E.T. Peltzer, J.R. Taylor, P.M. Walz, P.J. Whaling, P.G. Brewer (2014). Use of a Free Ocean CO₂ Enrichment (FOCE) system to evaluate the effects of ocean acidification on the foraging behavior of a deep-sea urchin. *Environmental Science & Technology* 48(16): 9890-9897. doi: 10.1021/es501603r.
87. Brewer, P.G., E.T. Peltzer, P.M. Walz, E.K. Coward, L.A. Stern, S.H. Kirby and J. Pinkston (2014). Deep Sea Field Test of the CH₄ Hydrate to CO₂ Hydrate Spontaneous Conversion Hypothesis. *Energy & Fuels* doi:10.1021/ef501430h.

88. Herguera, J.C., C.K. Paull, E. Perez, W. Ussler III, E.T. Peltzer (2014). Limits to the sensitivity of living benthic foraminifera to pore water carbon isotope anomalies in methane vent environments. *Paleoceanography*, 29: 273–289, doi:10.1002/2013PA002457.
89. Kirkwood, W.J., P.M. Walz, E.T. Peltzer, J.P. Barry, R.A. Herlien, K.L. Headley, C. Kecz, G.I. Matsumoto, T. Maughan, T.C. O'Reilly, K.A. Salamy, F. Shane, P.G. Brewer (2015). Design, Construction, and Operation of an Actively Controlled Deep-Sea CO₂ Enrichment Experiment Using a Cabled Observatory System. *Deep Sea Research I* 97: 1-9. doi:10.1016/j.dsr.2014.11.005.
90. Brewer, P.G., E.T. Peltzer, J. Ryan, W.J. Kirkwood, A.F. Hofmann (2015) Ocean chemistry and the speed of sound in sea water. *Marine Chemistry* 177: 591-605. doi: 10.1016/j.marchem.2015.09.009.
91. Brewer, P.G., E.T. Peltzer (2016). Ocean chemistry, ocean warming, and emerging hypoxia: Commentary. *J. Geophysical Research (Oceans)*, doi: 10.1002/2016JC011651.
92. Gwiazda, R., C.K. Paull, D.W. Caress, T. Lorenson, P.G. Brewer, E.T. Peltzer, P.M. Walz, K. Anderson, E. Lundsten (2016). Eel Canyon Slump Scar and Associated Fluid Venting. In: G. Lamarche et al. (eds.), *Submarine Mass Movements and their Consequences, Advances in Natural and Technological Hazards Research*, 41: 411-418. doi: 10.1007/978-3-319-20979-1_41.
93. Peltzer, E.T., X. Zhang, P.M. Walz, M. Luna, P.G. Brewer (2016). *In Situ* Raman measurement of HS⁻ and H₂S in sediment pore waters and use of the HS⁻:H₂S ratio as an indicator of pore water pH. *Marine Chemistry* 184: 32-42. doi: 10.1016/j.marchem.2016.05.006.
94. Brewer, P.G., E.T. Peltzer, P.M. Walz, M. Wojciechowicz (2017). The Speciation of Water in Sea Water and in Gelatinous Marine Animals. *Marine Chem.* 195: 94-104. doi: 10.1016/j.marchem.2017.05.002.
95. Brewer, P.G., and E.T. Peltzer (2017). Depth Perception: The need to report ocean biogeochemical rates as functions of temperature, not depth. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*. doi: 10.1098/rsta.2016.0319.
96. Brewer, P.G., E.T. Peltzer, P.M. Walz and W.J. Kirkwood (2017). Creating the Art of Deep-Sea Experimental Chemistry with MBARI ROVs. *Oceanography* 30: 48-59. doi: 10.5670/oceanog.2017.423.
97. Stark, J.S., Roden, N.P., Johnstone, G.J., Milnes, M., Black, J.G., Whiteside, S., Kirkwood, W., Newbery, K., Stark, S., Van Ooijen, E., Tilbrook, B., Peltzer, E.T., Berry, K., Roberts, D. (2018). Carbonate chemistry of an in-situ free-ocean CO₂ enrichment experiment (antFOCE) in comparison to short term variation in Antarctic coastal waters. *Scientific Reports* 8. doi: 10.1038/s41598-018-21029-1.
98. Brewer, P.G., E.T. Peltzer, P.M. Walz (2019). How much H₂O is there in the ocean? The Structure of Water in Sea Water. *J. Geophysical Research (Oceans)* 124: 212-226. doi: 10.1029/2018JC014457.
99. Stark, J.S., Peltzer, E.T., Kline, D.I., Queirós, A.M., Erin Cox, T., Headley, K., Barry, J., Gazeau, F., Runcie, J.W., Widdicombe, S., Milnes, M., Roden, N.P., Black, J., Whiteside, S., Johnstone, G., Ingels, J., Shaw, E., Bodrossy, L., Diego Gaitan-Espitia, J., Kirkwood, W., Pierre Gattuso, J. (2019). Free Ocean CO₂ Enrichment (FOCE) experiments: scientific and technical recommendations for future *in situ* ocean acidification projects. *Progress in Oceanography*. doi: 10.1016/j.pocean.2019.01.006.
100. Brewer, P.G. & E.T. Peltzer (2019). The Molecular Basis for the Heat Capacity and Thermal Expansion of Natural Waters. *Geophysical Research Letters* 46: 13,227-13,233. doi: 10.1029/2019GL085117.
101. Hoque, M.M.M., K. Kawamura, T. Nagayama, B. Kunwar, E.T. Peltzer, & R.B. Gagosian (2020). Molecular characteristics of water-soluble dicarboxylic acids, ω-oxocarboxylic acids, pyruvic acid and α-dicarbonyls in the aerosols from the eastern North Pacific. *Marine Chemistry* 224 103812. doi: 10.1016/j.marchem.2020.103812
102. Brewer, P.G., E.T. Peltzer, and K. Lage. (2021). Life at low Reynolds Number Re-visited: The apparent activation energy of viscous flow in sea water. *Deep Sea Research Part I: Oceanographic Research Papers*. doi: 10.1016/j.dsr.2021.103592
103. Brewer, P.G., E.T. Peltzer, and K. Lage. (2022). Life at low Reynolds number re-visited: The efficiency of microbial propulsion. *Deep Sea Research Part I: Oceanographic Research Papers*, 185: 1–5. <https://doi.org/10.1016/j.dsr.2022.103790>
104. Brewer, P.G., E.T. Peltzer, and K. Lage. (2023). The Molecular Ocean. *Molecular Frontiers Journal*, 7:, 3-19 (2023). <https://doi.org/10.1142/S2529732523400047>

- **CONFERENCE PROCEEDINGS & TECHNICAL REPORTS:**

1. Peltzer, E.T., J.B. Alford and R.B. Gagosian (1984). Sampling, separation and quantitative identification of lipids in remote marine aerosols. Woods Hole Oceanographic Institution Technical Report, WHOI-84-9.
2. Tracy, M.E., E.T. Peltzer and C. Goyet (1994). Measuring xCO₂ using the CAT/NDIR method: system set-up, calibration, maintenance and shutdown. Woods Hole Oceanographic Institution Technical Report, WHOI-94-01.
3. Lantry, T., M.F. Lamb, J.C. Hendee, R. Wanninkhof, R.A. Feely, F.J. Millero, R. Byrne, E.T. Peltzer, D. Wilson and G. Berberian (1995). Chemical and Hydrographic Measurements from the Equatorial Pacific during Boreal Spring 1992. NOAA Data Report ERL AOML-27.

4. Lamb, M.F., T. Lantry, J. Hendee, K.E. McTaggart, P.P. Murphy, R.A. Feely, R. Wanninkhof, F.J. Millero, R. Byrne, E.T. Peltzer, D. Frazel (1995). Chemical and Hydrographic Measurements from the Equatorial Pacific during Boreal Autumn 1992. NOAA Data Report ERL PMEL-56.
5. Peltzer, E.T., P.G. Brewer, G. Friederich and G. Rehder (2000). Direct observation of the fate of oceanic carbon dioxide release at 800m. Preprints of Symposia, Division of Fuel Chemistry, American Chemical Society, 45 (4), 794-798.
6. Brewer, P.G., E.T. Peltzer and F.M. Orr, Jr. (2001). Direct Experiments on the Ocean Disposal of Fossil Fuel CO₂. *Proceedings of the Society of Petroleum Engineers Annual Technical Conference and Exhibition held in New Orleans, LA, Sept. 30-Oct. 3, 2001. SPE71454.*
7. Erickson J, P. Brewer, G. Friederich, E.T. Peltzer (2001). Design and testing of a pressure retaining sampler for sedimentary gases and gas-hydrates. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans Conference 4: 2396-2399.*
8. Aya, I., R. Kojima, K. Yamane, P.G. Brewer, E.T. Peltzer (2003). In situ experiments of cold CO₂ release in mid-depth. Greenhouse gas control technologies. *Proceedings of the 6th International Conference on Greenhouse Gas Control Technologies, 1-4 October 2002, Kyoto, Japan, pp. 739-744.*
9. Brewer, P.G., E.T. Peltzer, G. Rehder, R. Dunk (2003). Advances in deep-ocean CO₂ sequestration experiments. *Proceedings of the 6th International Conference on Greenhouse Gas Control Technologies, 1-4 October 2002, Kyoto, Japan, pp. 1667-1670.*
10. White, S.N., W.J. Kirkwood, A. Sherman, M. Brown, R. Henthorn, K.A. Salamy, E.T. Peltzer, P. Walz and P.G. Brewer (2004). Laser Raman spectroscopic instrumentation for in situ geochemical analyses in the deep ocean. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans Conference, Kobe, Japan, pp. 95-100.*
11. Kirkwood, W., D. Graves, M. Conway, D. Pargett, J. Scholfield, P. Walz, R.M. Dunk, E.T. Peltzer, J. Barry and P.G. Brewer (2005). Engineering development of the free ocean CO₂ enrichment (FOCE) experiment. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans Conference, Washington, D.C.*
12. Paull, C.K., W. Ussler III, E.T. Peltzer, P.G. Brewer, R. Keaten, P. Mitts, J.C. Herguera, E. Perez, J. Nealon, T.H. Naehr, J. Greinert and J.A. Barron (2005). Carbon signatures entombed in methane-soaked hydrate-bearing sediments: Preliminary results. *Proceedings of the Fifth International Conference on Gas Hydrates, V.3, Exploration, Resources and Environment, Trondheim, Norway, pp. 699-708.*
13. Sherman, A., E.T. Peltzer, W.J. Kirkwood, R.M. Dunk, P.M. Walz, J. Scholfield, C. Everlove, P.G. Brewer (2006). Lessons learned while optimizing instrument sensitivity for deep ocean Raman spectroscopy. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans Conference, Boston, MA, USA.*
14. P. M. Walz, W. J. Kirkwood, E.T. Peltzer, K.C. Hester, and P.G. Brewer (2008). Creating controlled CO₂ perturbation experiments on the seafloor - development of FOCE techniques. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans Conference, Kobe, Japan.*
15. Marker, M., D.I. Kline, W.J. Kirkwood, K. Headley, P.G. Brewer, E.T. Peltzer, T. Miard, A. Chai, M. James, K. Schneider, J. Silverman, K. Caldeira, J.R. Koseff, S. Monismith, B. Opdyke, R. Dunbar, R. White, S. Dove, and O. Hoegh-Guldberg (2010). The Coral Proto - Free Ocean Carbon Enrichment System (CP-FOCE): Engineering and Development. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans Conference, Sydney, Australia.*
16. Zhang, X., W.J. Kirkwood, K.C. Hester, P.M. Walz, W. Ussler, E.T. Peltzer, F. Shane and P.G. Brewer (2011). In Situ Raman Probe for Quantitative Observation of Sediment Pore Waters in the Deep Ocean - Development and Applications. *Proceedings of Oceans '11 - IEEE Santander Conference, Santander, Spain.*
17. Brewer, P.G., W. Ussler, E.T. Peltzer, P.M. Walz, W.J. Kirkwood, K. Hester and X. Zhang (2011). Accurate in situ Observation of Deep-Sea Sediment Dissolved Methane Profiles in Hydrate Bearing Provinces. *Proceedings of the 7th International Conference on Gas Hydrates (ICGH 2011), Edinburgh, Scotland, United Kingdom, July 17-21.*
18. Klapp, S.A., F. Enzmann, P. Walz, T. Huthwelker, J. Tuckermann, J-O. Schwarz, T. Pape, E.T. Peltzer, K.C. Hester, X. Zhang, R. Mokso, D. Wangner, F. Marone, M. Kersten, G. Bohrmann, W.F. Kuhs, M. Stampanoni, P.G. Brewer (2011). Fluid Flow in Natural Gas Hydrates Revealed by X-Ray Tomographic Microscopy. *Proceedings of the 7th International Conference on Gas Hydrates (ICGH 2011), Edinburgh, Scotland, United Kingdom, July 17-21.*
19. Zhang, X., Kirkwood, W.J., Hester, K.C., Walz, P.M., Ussler, W., Peltzer, E.T., Shane, F., Brewer, P.G. (2011). In situ Raman probe for quantitative observation of sediment pore waters in the Deep Ocean - Development and applications. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans '11 Conference, Santander, Spain, June 6-9.*

20. Kecz, C.D., E.T. Peltzer, P.M. Walz, K. Headley, B. Herlien, W. Kirkwood, T. O' Reilly, K.A. Salamy, F. Shane, J. Scholfield and P.G. Brewer (2011). Design and Development of the CO₂ Enriched Seawater Distribution System. *Proceedings of Oceans '11 - MTS/IEEE Kona Conference*, Kona, Hawai'i. September 19-22.
21. Kirkwood, W.J., Peltzer, E., Walz, P., Headley, K., Kecz, C., Shane, F., Scholfield, J., O'Reilly, T., Maughan, T., Salamy, K., Brewer, P.G. (2013). XFOCE: An open source technology consortium for ocean acidification research. 2013 IEEE International Underwater Technology Symposium, UT 2013, Tokyo, Japan, March 5-8.
22. Kecz, C.D., E.T. Peltzer, P.M. Walz, K. Headley, R.A. Herlien, T. Maughan, G.I. Matsumoto, T.C. O' Reilly, K.A. Salamy, F. Shane, C. Lovera, J. Schofield, W. Kirkwood, J.P. Barry, and P.G. Brewer (2013). Open Source Instrumentation Nodes for the Greater Oceanographic Community. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans '13 Conference*, San Diego, CA, September 23-26. (130502-067).
23. Shane, F.F., K. Headley, P. Walz, C. Kecz, G.I. Matsumoto, R.A. Herlien, E.T. Peltzer, J. Scholfield, K. Salamy, T. Maughan, T.C. O'Reilly, C. Lovera, W.J. Kirkwood, J. Barry, and P.G. Brewer (2013). xFOCE: An Open Source, Multi-disciplinary Resource for in-Situ Ocean Acidification Research. *Proceedings of the Marine Technology Society / Institute of Electrical and Electronics Engineers Oceans '13 Conference*, San Diego, CA, September 23-26. (130502-070).
24. Brewer, P.G., E.T. Peltzer, P.M. Walz, E.K. Coward, S.H. Kirby, L.A. Stern, J. Pinkston (2014). Deep Sea Field Test of the CH₄ Hydrate to CO₂ Hydrate Spontaneous Conversion Hypothesis. *8th International Conference on Gas Hydrates*, Beijing China, July 28-August 1.
25. Peltzer, E.T., W. Sauthoff, P.M. Walz, P.G. Brewer (2014). Deep-Sea Observations of a Rising Methane Saturated Decane Plume Within the Hydrate Phase Space. *8th International Conference on Gas Hydrates*, Beijing China, July 28-August 1.
26. Walz, P.M., E.T. Peltzer, R. Gwiazda, K. Anderson, C.K. Paull, P.G. Brewer, T.D. Lorenson, R.G. Grim, A. Sum (2014). In Situ and Laboratory Raman Observations of an Oil Associated Gas Hydrate in the Eel River Basin. *8th International Conference on Gas Hydrates*, Beijing China, July 28-August 1.

2024-01-18.