

**Peter G. Brewer**  
*Curriculum Vitae*

**PERSONAL**

Date of Birth: December 30, 1940  
Place of Birth: Ulverston, Cumbria, U K  
Nationality: U S, Naturalized, 1982

**PROFESSIONAL**

Current Position: Senior Scientist  
Monterey Bay Aquarium Research Institute  
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**PROFESSIONAL EXPERIENCE**

- Senior Scientist, Monterey Bay Aquarium Research Institute, 1996 - present
- President and Chief Executive Officer, Monterey Bay Aquarium Research Institute, 1991-1996
- Adjunct Senior Scientist, Woods Hole Oceanographic Institution, 1991-present
- Courtesy Professor, Stanford University – School of Earth Sciences, 1991-present
- Program Director, Marine Chemistry, National Science Foundation, 1981-1983
- Senior Scientist, Woods Hole Oceanographic Institution, 1978-1991
- Associate Scientist, Woods Hole Oceanographic Institution, 1971-1978
- Assistant Scientist, Woods Hole Oceanographic Institution, 1967-1971

**HONORS AND PROFESSIONAL AFFILIATIONS**

- Fellow, American Association for the Advancement of Science, 1992
- Fellow, American Geophysical Union, 1989
- Member, MEDEA, 1994 - present
- Member, Environmental Task Force (ETF) 1992-1993
- Member, Board of Directors, Monterey Bay Aquarium Research Institute, 1991-1996
- Member, Board of Trustees, Monterey Bay Aquarium, 1991-1996
- Member, Advisory Board, Applied Physics Laboratory, University of Washington, 1991-1996
- Member, American Geophysical Union; Secretary Oceanography Section, 1982-1984; President elect 1992-1994; President, Oceanography Section, 1994-1996
- Member, American Association for the Advancement of Science, Associate Editor, Journal of Oceanography, 1994-present
- Associate Editor, Deep-Sea Research, 1984-1987
- Associate Editor, Journal of Marine Research, 1974-1981
- Associate Editor, Geophysical Research Letters, 1977-1979
- Chairman, U S Global Ocean Flux Study Executive Committee, 1985-1991
- Vice Chairman, Joint Global Ocean Fluxes Committee, SCOR, 1987-1990
- Member, NAS Ocean Studies Board 1986-1994
- Chairman, Ocean Studies Board CO<sub>2</sub> panel 1987-1991
- Member, Committee on Climate Change and the Ocean (CCCCO), 1987-1990
- Member, GEOSECS Scientific Advisory Committee, 1972 - 1978
- Member, TTO Executive Committee, 1978- 1981
- Vice Chairman, Gordon Research Conference on Chemical Oceanography, January, 1980
- Visiting Professor, University of Washington, Fall Quarter, 1979
- Chairman, Gordon Research Conference on Chemical Oceanography, August 1981
- Member, National Academy of Sciences, Carbon Dioxide Advisory Committee, 1982-1983
- Member, NAS Panel on Policy Implications of Greenhouse Gas Warming: Mitigation, 1989-1991
- Convener, NATO ARI on Chemical Dynamics of the Upper Ocean, Jouy en Jossas, France, August 1983
- Member, SCOR Working Group 75 on Ocean CO<sub>2</sub> Monitoring

## **EDUCATION**

B Sc, Liverpool University, England, 1962

Ph D, Liverpool University, England, 1967

## **EDUCATIONAL EXPERIENCE**

Taught course in Ocean Chemistry in MIT/WHOI Joint Program in Oceanography, 1968-1980

Served as thesis advisor, to the following scientists:

Dr. James W. Murray, Full Professor, University of Washington

Dr. George T. F. Wong, Full Professor, Old Dominion

University Dr. Mary Scranton, Full Professor, SUNY Stony  
Brook

Dr. Robert Anderson, Senior Research Staff, Lamont-Doherty Geological Observatory

Dr. Hein J. W. de Baar, Netherlands Institute for Sea Research

## **ADMINISTRATIVE EFFORT**

- U.S. JGOFS Planning Report Number 11 (1990). U.S. Joint Global Ocean Flux Study Long Range Plan. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 208 pp.
- U.S. JGOFS Planning Report Number 12 (1990). Isotopic Tracers in U.S. JGOFS. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 121 pp.
- U.S. GOFS Planning Report Number 10 (1989). Sediment Trap Technology and Sampling. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 94 pp.
- U.S. GOFS Planning Report Number 7 (1988). Upper Ocean Processes. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 88 pp.
- U.S. GOFS Planning Report Number 8 (1988). Data Management. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 52 pp.
- U.S. GOFS Planning Report Number 9 (1988). Pacific Planning Report. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 192 pp.
- U.S. GOFS Planning Report Number 4 (1987). Modeling in GOFS. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 142 pp.
- U.S. GOFS Planning Report Number 5 (1987) Benthic Studies in GOFS. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 149 pp.
- U.S. GOFS Planning Report Number 6 (1987). Ocean Margins in GOFS. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 245 pp.
- U.S. GOFS Report 1 (1986). Report of the ad-hoc Group on Particle Fluxes in the Ocean. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 108 pp.
- U.S. GOFS Report 2 (1986). 1. Plans for North Atlantic GOFS Pilot Program; 2. Pacific GOFS Pilot Program;  
3. Modeling in GOFS. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 55 pp.
- U.S. GOFS Report 3 (1986). Report of a Workshop on Upper Ocean Processes. U.S. Joint Global Ocean Flux Study (JGOFS) Planning Office, Woods Hole, MA, 141 pp.

## **EXPEDITION EXPERIENCE**

- 1996 Maiden Voyage: San Diego - Moss Landing. R.V. WESTERN FLYER. Chief Scientist.
- 1991-present. Numerous cruises on R.V. POINT LOBOS. Chief Scientist.
- 1988 R.V. OCEANUS, Cruise 205, Woods Hole - Ft. Lauderdale. Chief Scientist.
- 1986 R.V. OCEANUS, Cruise 174, Bermuda - Woods Hole. Chief Scientist.
- 1985 R.V. ENDEAVOR, Cruise 134, Narragansett - Bermuda. Chief Scientist.
- 1985 R.V. OCEANUS, Cruise 168, Woods Hole - Bermuda. Chief Scientist.
- 1985 R.V. OCEANUS, Cruise 162, Woods Hole - Bermuda. Chief Scientist.
- 1984 R.V. OCEANUS, Cruise 155, Woods Hole - Woods Hole. Chief Scientist.

\*\*\*\* No expeditionary work 1982-1983. Service at National Science Foundation \*\*\*\*

- 1981 R.V. KNORR, TTO Let 7, St. John's - Woods Hole. Chief Scientist.

- 1981 R.V. KNORR, TTO Leg 1, Woods Hole - Bahamas. Chief Scientist.
- 1980 R.V. KNORR, TTO Test Cruise, N.W. Atlantic. Chief Scientist.
- 1979 R.V. KNORR, Cruise 73, Panama - Panama. Chief Scientist.
- 1978 R.V. KANA KEOKI, Honolulu - Honolulu. Co-Chief Scientist.
- 1977 R.V. ATLANTIS II, Cruise 93, Persian Gulf. Chief Scientist.
- 1977 R.V. OCEANUS, Cruise 22, Woods Hole - Barbados. Co-Chief Scientist.
- 1976 R.V. KNORR, Cruise 54, North Sea. Chief Scientist.
- 1975 R.V. KNORR, Cruise 51, Glasgow - Woods Hole. Chief Scientist.
- 1975 R.V. ATLANTIS II, Cruise 86, Gulf of Maine. Associate Scientist.
- 1974 R.V. MELVILLE, GEOSECS Pacific, Tahiti - Tahiti. Chief Scientist.
- 1973 R.V. ATLANTIS II, Cruise 79, Cariaco Trench. Associate Scientist.
- 1973 R.V. KNORR, GEOSECS Leg 8, Cape Town - Dakar. Co-Chief Scientist.
- 1972 R.V. KNORR, GEOSECS Leg 6, Buenos Aires - Ushuaia. Co-Chief Scientist.
- 1972 R.V. MELVILLE, GEOSECS Test Cruise, San Diego. Associate Scientist.
- 1971 R.V. CHAIN, Cruise 100, Leg 2, Red Sea. Chief Scientist.
- 1970 R.V. KNORR, Cruise 12, N.W. Atlantic. Assistant Scientist.
- 1970 R.V. GOSNOLD, Cruise 159, Gulf of Maine. Assistant Scientist.
- 1970 C.R.S. HUDSON, "Hudson 70", Antarctic. Assistant Scientist.
- 1969 R.V. ATLANTIS II, Cruise 49, Black Sea. Assistant Scientist.
- 1968 R.V. CHAIN, Cruise 82, N.E. Atlantic. Assistant Scientist.
- 1968 R.V. GOSNOLD, Cruise 113, Puerto Rico. Assistant Scientist.
- 1967 R.V. ATLANTIS II, Cruise 35, Sargasso Sea. Assistant Scientist.
- 1966 R.R.S. DISCOVERY, N.E. Atlantic. Student.
- 1964 R.R.S. DISCOVERY, International Indian Ocean Expedition. Student.
- 1963 R.R.S. DISCOVERY, International Indian Ocean Expedition. Student.

## **PUBLICATIONS**

### **2014**

- Brewer, P.G., Peltzer, E.T., Walz, P.M., Coward, E.K., Laura A. Stern, L.A., Kirby, S.H., Pinkston, J. (2014) Deep Sea Field Test of the CH<sub>4</sub> Hydrate to CO<sub>2</sub> Hydrate Spontaneous Conversion Hypothesis. *Energy & Fuels*, In Press.
- Brewer, P.G. (2014) News & Views: Arctic Shelf Methane Alarms. *Nature Geosciences*, 7, 6-7.
- Brewer, P.G. and A.F. Hofmann (2014) A plea for temperature in descriptions of the oceanic oxygen status. *Oceanography*, 27, 160-167.
- Brewer, P.G. and A.F. Hofmann (2014) Evaluating microbial chemical choices: the ocean chemistry basis for the competition between use of O<sub>2</sub> or NO<sub>3</sub> as an electron acceptor. *Deep-Sea Research I*, 87, 35-42  
doi.org/10.1016/j.dsr.2014.02.002.
- William J. Kirkwood, Peter M. Walz, Edward T. Peltzer, James P. Barry, Robert A. Herlien, Kent L. Headley, Chad Key, George I. Matsumoto, Thom Maughan, Thomas C. O'Reilly, Karen A. Salamy, Farley Shane, Peter G. Brewer (2014) Design, Construction, Operation and Performance of a Deep-Sea Free Ocean CO<sub>2</sub> Enrichment (FOCE) Experimental System. *Deep-Sea Research*. In Press.
- Hoegh-Guldberg, O., R. Cai, E.S. Poloczanska, P.G. Brewer, S. Sundby, K. Hilmi, V.J. Fabry, and S. Jung, 2014: The Ocean. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1655-1731.
- James P. Barry, Chris Lovera, Kurt R. Buck, Edward T. Peltzer, Josi R. Taylor, Peter Walz, Patrick J. Whaling, and Peter G. Brewer (2014) Use of a Free Ocean CO<sub>2</sub> Enrichment (FOCE) System to Evaluate the Effects of Ocean Acidification on the Foraging Behavior of a Deep-Sea Urchin. *Environ. Sci. Technol.*, 2014, 48 (16), pp 9890–9897 DOI: 10.1021/es501603r.

### **2013**

- Brewer, P.G. (2013) A short history of ocean acidification science in the 20<sup>th</sup> century: A chemist's view. *Biogeosciences*,

- Meeting Report: Brewer, P.G., W.J. Kirkwood, and J.-P. Gattuso (2013) Progress in Controlled In Situ Ocean Acidification Experiments. *Eos, Transactions, Amer. Geophys. Union*.
- Brewer, P.G. (2013) News & Views: Arctic Shelf Methane Alarms. *Nature Geosciences*. In Press.
- Brewer, P.G. and A.F. Hofmann (2013) New metrics for the impact of changing ocean chemistry on marine life: beyond ocean acidification. *Oceanography*. In Press.
- Brewer, P.G. and A.F. Hofmann (2013) Evaluating microbial chemical choices: the ocean chemistry basis for the competition between use of O<sub>2</sub> or NO<sub>3</sub> as an electron acceptor. *Deep-Sea Research*. Submitted.
- J.P. Barry, K.R. Buck, C. Lovera, P.G. Brewer, B.A. Seibel, J.C. Drazen, M.N. Tamburri, P.J. Whaling<sup>1</sup>, L. Kuhnz, E. Pane (2013) The response of abyssal organisms to low pH conditions during a series of CO<sub>2</sub>- release experiments simulating deep-sea carbon sequestration. *Deep-Sea Res.*
- W.J. Kirkwood and P.G. Brewer (2013) Deep Ocean In Situ Raman Spectroscopy (Ch. 20). In: "Subsea Optics and Imaging", J. Watson and A. Zielinski, Eds., Woodhead Publishing,46, ISBN: 978 0 85709 341 7 E- ISBN: 978 0 85709 352 3

## 2012

- 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 CO<sub>2</sub> enrichment experiment on Heron Island (GBR). *Nature Scientific Reports*. 2, 413; DOI:10.1038/srep00413 (2012).
- Brewer, P.G., A.F. Hofmann, and E.T. Peltzer (2012) Ocean recipes from chemistry and sound. *Deep-Sea Research*. Submitted.
- 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 (3), 237-249. doi: 10.1366/11-06539.
- Klapp, S.A., F. Enzmann, P.M. Walz, T. Huthwelker, J. Tuckerman, J.-O. Schwarz, T. Pape, E. T. Pletzer, R. Mosko, D. Wangner, F. Marone, M. Kersten, G. Bohrmann, W.F. Kuhs, M. Stampanoni, and P. G. Brewer (2012) Microstructure characteristics during hydrate formation and dissociation revealed by X-ray tomographic microscopy. *Geo-Mar. Lett.*, doi: 10.1007/s00367-012-0276-0.
- Book Review: "Ocean Acidification" Edited by J.-P. Gattuso and Lina Hansson, Oxford University Press, (2012). *Limnol. Oceanogr. Bull.*
- Hofmann, A.F., Peltzer, E.T., and Brewer, P.G. (2012) Kinetic bottlenecks to chemical exchange rates for deep- sea animals – Part 1: Oxygen. *Biogeosciences Discuss.*, 9,13817-13856, doi:10.5194/bgd-9-13817-2012
- Hofmann. A.F., Peltzer, E.T., and Brewer, P.G. (2012) Kinetic bottlenecks to chemical exchange rates for deep- sea animals II: Carbon dioxide. *Biogeosciences Discuss.*, 9, 15787-15821, doi:10.5194/bgd-9-15787-2012
- Hofmann, A.F., P.M. Walz, H. Thomas, and P.G. Brewer (2012) High resolution topography-following mapping of ocean hypoxia using an autonomous underwater vehicle: the limits of the Santa Monica Basin "dead zone." *J. Atmos. Oceanic. Techno.*, Submitted.

## 2011

- Zhang, X., Hester, K.C., Ussler, W., Walz, P.M., Peltzer, E.T., and Brewer, P.G. (2011) In situ Raman-based measurements of high dissolved methane concentrations in hydrate-rich ocean sediments. *Geophys. Res. Lett.*,doi:10.1029/2011GL047141.
- Brewer, P.G., Ussler, W, Peltzer, E., Walz, P., Kirkwood W., and Hester, K.C. (2011) Accurate in situ observation of deep-sea sediment dissolved methane profiles in hydrate bearing provinces. Proceedings of the 7<sup>th</sup> International Conference on Gas Hydrates (ICGH 2011), Edinburgh, Scotland, United Kingdom, July 17-21, 2011.
- Klapp, S.A., Murshed, M.M., Pape, T., Bohrman, G., Brewer, P.G., and Kuhs, W. (2011) Dual hydrate structures sI and sII at the Chapopote Knoll, southern Gulf of Mexico. Proceedings of the 7<sup>th</sup> International Conference on Gas Hydrates (ICGH 2011), Edinburgh, Scotland, United Kingdom, July 17-21, 2011.
- Hofmann, A.F., Peltzer, E.T., Walz, P.M., Brewer, P.G. (2011) Hypoxia by degrees: Establishing definitions for a changing ocean. *Deep-Sea Res. I*. 58, 1212-1226. doi:10.1016/j.dsr.2011.09.004.

## 2010

- Klapp, S.A., M.M. Murshed, T. Pape, H. Klein, G. Bohrmann, P.G. Brewer, and W.F. Kuhs (2010) Mixed gas hydrate structures at the Chapopote asphalt volcano, southern Gulf of Mexico. *Earth Planet. Sci. Lett.*, doi: 10.1016/j.epsl.2010.09.001.
- NRC, 2010, Verifying Greenhouse Gas Emissions: Methods to Support International Climate Agreements, National Academies Press, Washington, D.C., 132 pp, In Press.
- Ilyina, T., R.E. Zeebe, and P.G. Brewer (2010) Predicting an ocean increasingly transparent to sound at marine mammal frequencies. *Nature Geosci.*, **3**, 18-22, doi:10.1038/ngeo719.
- Zhang, X., P. 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 Res.*, **57**, 297-306, doi:10.1016/j.dsr.2009.11.004.

## 2009

- 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.
- Brewer, P.G. (2009) Consider all consequences. *Nature Reports: Climate Change*, **3**, 117-118.
- Brewer, P.G. and E.T. Peltzer (2009) Limits to marine life. *Science*, **324**, 347-348.
- Brewer, P.G. (2009) A changing ocean seen with clarity. *Proc. Natl. Acad. Sci.*, **106**, 12213-12214.
- 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. *Environ. Sci. Technol.*, **43**, 610-615
- 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 field experiments and numerical modeling. *Mar. Chem.*, **114**, 19-30.
- Hester, K.C. and P.G. Brewer (2009) Clathrate hydrates in nature. *Ann. Rev. Mar. Sci.*, **1**, 303-327.
- Brewer, P.G. (2009) The influence of David Keeling on oceanic CO<sub>2</sub> measurements. In: *Carbon Sequestration and its role in the global carbon cycle*. AGU Geophysical Monograph **183**, p. 37-48. B.J. McPherson and E.T. Sundquist, eds.

## 2008

- Brewer, P.G. and J. P. Barry (2008) The other CO<sub>2</sub> problem. *Scientific American: Earth 3.0*, 22-23
- Hester, K.C., R. M. Dunk, E.T. Peltzer, P.M. Walz, E.D. Sloan, and P.G. Brewer (2008) In situ and laboratory characterization of thermogenic gas hydrates at Barkley Canyon. *J. Geophys. Res.*
- 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, *Geophys. Res. Lett.*, **35**, L19601, doi:10.1029/2008GL034913.
- Brewer, P.G., N. Nakayama (2008) What lies beneath: A plea for complete information. *Environ. Sci. Technol.*, **42**, 194-1399.
- Kessler, J.D., W. S. Reeburgh, D.L. Valentine, F.S. Kinnaman, E.T. Pletzer, P.G. Brewer, J. Southon, and S.C. Tyler (2008) A survey of methane isotope abundance (<sup>14</sup>C, <sup>13</sup>C, <sup>2</sup>H) from five nearshore marine basins that reveals unusual radiocarbon levels in subsurface waters. *J. Geophys. Res.*, **113**, C12021, doi:1029/2008JC004822.

## 2007

- Brewer, P.G. (2007) Evaluating a technological fix for climate. *Proc. Natl. Acad. Sci.*, **104**, 9915-9916.
- Brewer, P.G., The influence of David Keeling on oceanic CO<sub>2</sub> measurements. In "Carbon Sequestration Science and Technology", E.T. Sundquist and J. Brown, Eds., Am. Geophys. Union. In Press.
- K.C. Hester, R.M. Dunk, P.G. 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 Equil.*, **261**, 396-406

- . Thistle, D., L. Sedlacek, K.R. Carman, J.W. Fleegeer, P.G. Brewer, J.P. Barry (2007) Exposure to carbon dioxide- rich seawater is stressful for some deep-sea species: an in situ, behavioral study. *Mar. Ecol. Progr. Ser.*, 340, 9-16.
- K.C. Hester, R.M. Dunk , S.N. White, P.G. Brewer, E.T. Peltzer, E.D. Sloan (2007). Gas hydrate measurements at Hydrate Ridge using Raman spectroscopy. *Geochim. Cosmochim. Acta.*, 71, 2947-2959.
- Tsouris, C., P. Szymcek, P. Taboada-Serrano, S.D. McCallum. P.G. Brewer, E.T. Peltzer, P. Walz, E. Adams, A.Chow, W.K. Johnson, J. Summers (2007) Scaled-up injection of CO<sub>2</sub>-hydrate composite particles. *Energy & Fuels*, 21, 3300-3309.
- Paull, C.K., W. Ussler, E.T. Peltzer, P.G. Brewer, R. Keaten, P.J. Mitts, J.W. Nealson, J. Greinert, J.-C. Herguera, M. E. Perez (2007) Authigenic carbon entombed in methane-soaked sediments from the northeastern transform margin of the Guayamas Basin, Gulf of California. *Deep-Sea Res, II*, 54, 1240-1267.

## 2006

- Brewer, P. G., B. Chen, R. Warzinski, A. Baggeroer, E. T. Peltzer, R. M. Dunk, and P. Walz (2006), Three-dimensional acoustic monitoring and modeling of a deep-sea CO<sub>2</sub> droplet cloud, *Geophys. Res. Lett.*, 33, L23607, doi:10.1029/2006GL027181.
- D. Thistle, L. Sedlacek, K. R. Carman, J. W. Fleegeer, P. G. Brewer, and J. P. Barry (2006) Simulated sequestration of industrial carbon dioxide at a deep-sea site: effects on harpacticoid-copepod species. *J. Exp. Mar. Biol. Ecol.*, 330, 151-158.
- Hester, K.C., S.N. White, E.T. Peltzer, P.G. Brewer, and E.D. Sloan (2006) Raman spectroscopic measurements of synthetic gas hydrates in the ocean. *Mar. Chem.*, 98, 304-314.
- White, S.N., P.G. Brewer, and W.J. Kirkwood (2006) Raman instrumentation for deep-sea in situ geochemical analyses. *Sea Technology*, 17-24.
- 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 a recent paper by Zhang. *Environ. Sci. Technol.*, 40, 3653-3654.

## 2005

- White, S. N., R. M. Dunk, E. T. Peltzer, J. J. Freeman, and P.G. Brewer (2005) In situ Raman analyses of deep- sea hydrothermal and cold seep systems (Gorda Ridge & Hydrate Ridge), *Geochem. Geophys. Geosyst.*, 7, Q05023, doi: 10.1029/2005GC001204.
- Caldeira, K., M. Akai, P. Brewer, B. Chen, P. Haugan, T. Iwama, P. Johnston, H. Kheshgi, Q. Li, T. Ohsumi, H. Poertner, C. Sabine, Y. Shirayama, and J. Thomson (2005) Ocean Storage. In: (B. Metz and O. Davidson, eds.) *Carbon Dioxide Capture and Storage: A Special Report of IPCC Working Group III*, Cambridge University Press, Cambridge UK.
- White, S.N., Kirkwood, W., Sherman, A., Brown, M., Henthorn, R., Salamy, K., Walz, P., Peltzer, E.T., and Brewer, P.G. (2005). Development and deployment of a precision underwater positioning system for in situ laser Raman spectroscopy in the deep ocean. *Deep-Sea Res. I*, 52, 2376-2389.
- Dunk, R.M., E.T. Peltzer, P. Walz, P.G. Brewer (2005) Seeing a Deep Ocean CO<sub>2</sub> Enrichment Experiment in a New Light: Laser Raman Detection of Dissolved CO<sub>2</sub> in Seawater. *Environ. Sci. Technol.*, 39, 9630-9636. Hester, K.C., S.N. White, E.T. Peltzer, P.G., and E.D. Sloan (2005) Raman spectroscopic measurement of *in situ* ocean clathrate hydrates. *Mar. Chem.* Submitted.
- Riestedberg, D., C. Tsouris, P. G. Brewer, E.T. Peltzer, P. Walz, A. Chow, E. Adams. (2005) Field Studies on the Formation of Sinking CO<sub>2</sub> Particles for Ocean Carbon Sequestration: Effects of Injector Geometry on Particle Density and Dissolution Rate and Model Simulation of Plume Behavior. *Environ. Sci. Technol.* Submitted.
- Nakayama, N., E.T. Peltzer, P. Walz, P.G. Brewer. (2005) First results from a controlled deep-sea CO<sub>2</sub> perturbation experiment: evidence for rapid equilibration of the oceanic CO<sub>2</sub> system at depth. *J. Geophys. Res.*, In Press.
- 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. *J. Mar. Res.*, In Press.

White, S.N., P.G. Brewer, E.T. Peltzer (2005) Determination of gas bubble fractionation rates in the deep ocean by laser Raman spectroscopy. *Mar. Chem.* In Press.

## 2004

Cicerone, R., J. Orr, P.G. Brewer, P. Haugan, L. Merlivat, T. Ohsumi, S. Pantoja, and H.O. Poertner (2004) The ocean in a high CO<sub>2</sub> world. *Eos*, 85, 351-353.

Rehder, G., S.H. Kirby, W.B. Durham, L.A. Stern, E.T. Peltzer, J. Pinkston, and P.G. Brewer (2004) Dissolution

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