

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 CO₂ 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 CO₂ 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, Narrangansett - 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

2009

- Brewer, P.G. and E.T. Peltzer (2009) Limits to marine life. *Science*, 324, 347-348.
- Ilyina, T., R.E. Zeebe, and P.G. Brewer (2009) Predicting an ocean increasingly transparent to sound at marine mammal frequencies. *Nature Geosci*, submitted.
- Zhang, X., P. Walz, W.J. Kirkwood, K.C. Hester, W. Ussler, E.T. Peltzer, and P.G. Brewer (2009) Development and deployment of a deep-sea Raman probe for measurement of pore water geochemistry. *Deep-Sea Res.*, submitted.
- 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.

2008

- Brewer, P.G. and J. P. Barry (2008) The other CO₂ 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 (14C, 13C, 2H) 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 CO₂ 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 CO₂-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 CO₂ 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. Khesghi, 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 CO₂ Enrichment Experiment in a New Light: Laser Raman Detection of Dissolved CO₂ 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.
- 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. *Environ. Sci. Technol.* Submitted.
- 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. *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 CO₂ 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 rates of pure methane hydrate and carbon dioxide hydrate in under-saturated seawater at 1000m depth. *Geochim. Cosmochim. Acta.*, 68 (2), 285-292.
- Brewer, P.G. (2004) Direct injection of CO₂ in the ocean. In: "Toward CO₂ Stabilization: Issues, Strategies, and Consequences" C. Field and M. R. Raupach, eds. Island Press. 469-478.
- Caldeira, K., M. G. Morgan, D. Baldocchi, P. G. Brewer, C.-T. Chen, G.-J. Nabuurs, N. Nakicenovic, G.P. Robertson (2004) A portfolio of carbon management options. In: "Toward CO₂ Stabilization: Issues, Strategies, and Consequences" C. Field and M.R. Raupach, eds. Island Press. 103-129.
- Aya, I., Kojima, R., Yamane, K., Brewer, P.G., Peltzer, E.T. (2004) *In situ* experiments of cold CO₂ release in mid-depth. *Energy*, v. 29 (9 - 10), 1499 - 1509.
- Brewer, P.G., Malby, G., Pasteris, J.D., White, S.N., Peltzer, E.T., Wopenka, B., Freeman, J., Brown, M.O. (2004) Development of a laser Raman spectrometer for deep-ocean science. *Deep-Sea Res. I*, v. 51, 739-753.
- Tsouris, C., Brewer, P.G., Peltzer, E., Walz, P., Riestenberg, D., Liang, L., West, O.R. (2004) Hydrate composite particles for ocean carbon sequestration: field verification. *Environ. Sci. Technol.*, v. 38, 2470-2475.
- Pasteris, J.D., B. Wopenka, J.J. Freeman, P.G. Brewer, S.N. White, E.T. Peltzer, G. Malby. (2004) Spectroscopic successes and challenges: Raman spectroscopy at 3.6km depth in the ocean. *Applied Spectroscopy*, v. 58 (7), 195A - 208A.
- Brewer, P.G., E.T. 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 of Oceanography*, v. 60, 751-758.
- Barry, J.P., K.R. Buck, C.F. Lovera, L. Kuhnz, P.J. Whaling, E.T. Peltzer, P. Walz, P.G. Brewer (2004) Effects of direct ocean CO₂ injection on deep-sea meiofauna. *Journal of Oceanography*, v. 60, 759-766.
- Nakayama, N., E.T. Peltzer, P. Walz, P.G. Brewer. First results from a controlled deep-sea CO₂ perturbation experiment: evidence for rapid equilibration of the oceanic CO₂ system at depth. *J. Geophys. Res.*, Submitted.
- Brewer, P.G., E.T. Peltzer, P. Walz, I. Aya, K. Yamane, R. Kojima, Y. Nakajima, N. Nakayama, P. Haugan, T. Johannessen. Deep Ocean Experiments with fossil fuel carbon dioxide: creation and sensing of a controlled plume at 4 km depth. *J. Mar. Res.*, Submitted.
- White, S.N., P.G. Brewer, E.T. Peltzer (2004) Determination of gas bubble fractionation rates in the deep ocean by laser Raman spectroscopy. *Mar. Chem.* Submitted.
- Rehder, G., S.H. Kirby, W.B. Durham, L.A. Stern, E.T. Peltzer, J. Pinkston, and P.G. Brewer (2004) Dissolution rates of pure methane hydrate and carbon dioxide hydrate in under-saturated seawater at 1000m depth. *Geochim. Cosmochim. Acta.*, 68 (2), 285-292.
- Brewer, P.G. (2004) Direct injection of CO₂ in the ocean. In: "Toward CO₂ Stabilization: Issues, Strategies, and Consequences" C. Field and M. R. Raupach, eds. Island Press. 469-478.
- Caldeira, K., M. G. Morgan, D. Baldocchi, P. G. Brewer, C.-T. Chen, G.-J. Nabuurs, N. Nakicenovic, G.P. Robertson (2004) A portfolio of carbon management options. In: "Toward CO₂ Stabilization: Issues, Strategies, and Consequences" C. Field and M.R. Raupach, eds. Island Press. 103-129.
- Aya, I., Kojima, R., Yamane, K., Brewer, P.G., Peltzer, E.T. (2004) *In situ* experiments of cold CO₂ release in mid-depth. *Energy*, v. 29 (9 - 10), 1499 - 1509.
- Brewer, P.G., Malby, G., Pasteris, J.D., White, S.N., Peltzer, E.T., Wopenka, B., Freeman, J., Brown, M.O. (2004) Development of a laser Raman spectrometer for deep-ocean science. *Deep-Sea Res. I*, v. 51, 739-753.
- Tsouris, C., Brewer, P.G., Peltzer, E., Walz, P., Riestenberg, D., Liang, L., West, O.R. (2004) Hydrate composite particles for ocean carbon sequestration: field verification. *Environ. Sci. Technol.*, v. 38, 2470-2475.

- Pasteris, J.D., B. Wopenka, J.J. Freeman, P.G. Brewer, S.N. White, E.T. Peltzer, G. Malby. (2004) Spectroscopic successes and challenges: Raman spectroscopy at 3.6km depth in the ocean. *Applied Spectroscopy*, v. 58 (7), 195A - 208A.
- Brewer, P.G., E.T 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 of Oceanography*. In Press.
- Barry, J.P., K.R. Buck, C.F. Lovera, L. Kuhnz, P.J. Whaling, E.T. Peltzer, P. Walz, P.G. Brewer (2004) Effects of direct ocean CO₂ injection on deep-sea meiofauna. *Journal of Oceanography*. In Press.

2003

- Kleinberg, R.L., P.G. Brewer, G. Malby, E.T. Peltzer, G. Friederich, J. Yesinowski, and C. Flaum. Seafloor nuclear magnetic resonance assay of methane hydrate in sediment and rock. *J. Geophys. Res.*, 108:B3, doi:10.1029/2001JB0000919 (2003).
- "Deep Sea NMR: Methane Hydrate Growth Habit in Porous Media and its Relationship to Hydraulic Permeability, Deposit Accumulation, and Submarine Slope Stability", R.L. Kleinberg, C. Flaum, D.D.Griffin, P.G. Brewer, G.E. Malby, E.T. Peltzer, J.P. Yesinowski, *Journal of Geophysical Research B*, 108, B 10, doi:10.1029/2003JB002389 (2003).
- Brewer, P.G., E.T. Peltzer, G. Rehder, R. Dunk, Advances in Deep-Ocean CO₂ Sequestration Experiments. In: "*Greenhouse Gas Control Technologies*" pp. 1667-1670. J. Gale and Y. Kaya, Eds., Pergamon (2003).
- Aya, I., R. Kojima, K. Yamane, P.G. Brewer, E.T. Peltzer (2003) *In situ* experiments of cold CO₂ release in middepth. In: "*Greenhouse Gas Control Technologies*" pp. 739-744. J. Gale and Y. Kaya, Eds., Pergamon.
- Brewer, P.G., Direct Injection of Carbon Dioxide into the Oceans. In: "*The Carbon Dioxide Dilemma: Promising Technologies and Policies.*" National Academies Press, pp. 43-51 (2003).
- Brewer, P.G. Foreword. In: "*Ocean Biogeochemistry: A synthesis of the Joint Global Ocean Flux Study (JGOFS)*", pp. I – VIII. M.J. Fasham, ed., Springer (2003).
- Barry, J.P., Seibel, B.A., Drazen, J.C., Tamburri, M.N., Buck, K.R., Lovera, C., Kuhnz, L., Peltzer, E.T., Osborn, K., Whaling, P.J., Walz, P., Brewer, P.G. (2003). Deep-Sea field experiments on the biological impacts of direct deep-sea CO₂ injection. In: "*Proceedings of the Second Annual Conference on Carbon Sequestration*" U.S. Dept. of Energy.

2002

- Brewer, P.G., C. Paull, E.T. Peltzer, W. Ussler, G. Rehder, and G. Friederich. Measurement of the fate of gas hydrates during transit through the ocean water column. *Geophys. Res. Lett.*, v. 29, doi:10.1029/2002GL014727 (2002).
- Rehder, G., P.G. Brewer, E.T. Peltzer, and G. Friederich. Enhanced lifetime of methane bubble streams within the deep ocean. *Geophys. Res. Lett.*, 29(15), 10.1029/2001GL013966 (2002).
- Brewer, P.G., Peltzer, E.T., Friederich, G., and G. Rehder. Experimental determination of the fate of rising CO₂ droplets in sea water. *Environ. Sci. Technol.* v.36, 5441-5446 (2002).
- Peltzer, E.T., P.G. Brewer, R.M. Dunk, J. Erickson, G. Rehder, and P. Walz. Recent advances in deep-sea CO₂ sequestration experiments. Preprints, ACS Fuel Chemistry Division (2002).
- Brewer, P.G., J. Pasteris, G. Malby, E.T. Peltzer, S. White, J. Freeman, B. Wopenka, M. Brown, and D. Cline. Laser Raman spectroscopy at 3600m ocean depth. *Eos, Trans. AGU*, v. 83,469-470 (2002).
- C.K. Paull, P.G. Brewer, W. Ussler III, E.T. Peltzer, G. Rehder, and D. Clague. 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 Lett.*, doi 10.1007/s00367-002-0113-y (2002).
- Brewer, P.G."International Priorities of the U.S. Ocean Sciences Community" U.S. Dept. of State Bureau of Oceans and International Scientific Affairs, Washington, D.C. Nov. 12, 2002.

2001

- Kleinberg, R.L. and P.G. Brewer (2001) Probing gas hydrate deposits. *Am. Sci.*, v. 89, 244-251. Ocean Sciences at the New Millennium. (2001) P.G. Brewer and T. Moore, eds. University Corp. Atmos. Res., pp.152.

2000

- Brewer, P.G. Major International programs in Ocean Sciences: Ocean Chemistry. In "Fifty Years of Ocean Discovery: The National Science Foundation". Proceedings National Academy of Sciences, (2000).
- Brewer, P.G., Chemical Oceanography. In: "Introduction to Earth Systems: Processes and Issues", 182-193. G. Ernst, ed., 566 pp. Cambridge Univ. Press. 2000

- 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*, v. 72, 83-93.
- 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* v. 72, 95-101
- Brewer, P.G. (2000) Gas Hydrates and Global Climate Change. *Proceedings of the Third International Conference on Gas Hydrates. Annals New York Academy of Sciences*, 195-199.
- Brewer, P.G. (2000). *Contemplating Action: Storing carbon dioxide in the ocean*. Roger Revelle Commemorative Lecture. *Oceanography*, v. 13, 84-92.
- Peltzer, E.T., and P.G. Brewer (2000) Practical physical chemistry and empirical predictions of methane hydrate stability. In "Natural Gas Hydrate in Oceanic and Permafrost Environments" M. Max, Ed., Kluwer, 17-28.

1999

- 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*, v. 284, 943-945.
- K.-U. Hinrichs, J.M. Hayes, S. P. Sylva, P.G. Brewer, and E.F. DeLong. (1999) Methane-consuming archaea – Molecular-isotopic and phylogenetic evidence. *Nature*, v. 398, 802-805.
- Future of Gas Hydrate Research (1999) Sloan, E.D., P.G. Brewer, C.K. Paull, T.S. Collett, W.P. Dillon, W.S. Holbrook, and K.A. Kvenvolden. *EOS, Trans. Am. Geophys. Union*, v. 80, 247.

1998

- Brewer, P.G., F. M. Orr, Jr., G. Friederich, K. A. Kvenvolden, and D.L. Orange. (1998) Gas hydrate formation in the deep sea: *In situ* experiments with controlled release of methane, natural gas and carbon dioxide. *Energy and Fuels*, v.12, 183-188.

1997

- Brewer, P.G., F.M. Orr, Jr., G. Friederich, K.A. Kvenvolden, D.L. Orange, J. McFarlane, and W. Kirkwood (1997). Deep ocean field test of methane hydrate formation. *Geology*, v. 25, 407-410.
- Brewer, P.G., C. Goyet, and G. Friederich (1997) Direct observation of the ocean CO₂ increase revisited. *Proceedings National Academy of Sciences*, v. 94, 8308-8313.
- Brewer, P.G., (1997) Ocean chemistry of the fossil fuel CO₂ signal: the haline signature of "Business as usual." *Geophysical Research Letters*, v. 24, 1367-1369.
- Brewer, P.G., Chair, Panel on Boundary Layer Dynamics. (1997) *Boundary Layer Dynamics: NRL Strategic Series*. Naval Studies Board, pp. 40. National Academy Press.
- MEDEA. *Ocean Dumping of Chemical Munitions: Environmental Effects in Arctic Seas*. MEDEA Report. 1997.

1995

- Brewer, P. G., D. M. Glover, C. Goyet, and D. K. Shafer (1995). pH of the North Atlantic Ocean: Improvements to the global model for sound absorption in sea water. *Journal of Geophysical Research*, v. 100, 8761-8776.
- 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*, v.22, 945-948.
- Friederich, G. E., Brewer, P. G., Herlien R., and F. P. Chavez (1995). Measurement of sea surface partial pressure of CO₂ from a moored buoy. *Deep-Sea Research*, v. 42, 1175-1186.

1993

- Peltzer, E. T. and P. G. Brewer (1993). Some practical aspects of measuring DOC - sampling artifacts and analytical problems with marine samples. *Marine Chemistry*, v. 41, 243-252.
- Goyet, C., and P. G. Brewer (1993). Biochemical properties of the oceanic carbon cycle. In: *Modeling Oceanic Climate Interactions*, J. Willebrand and D.L.T. Anderson, eds., Springer Verlag, p. 271-298.

1992

- Goyet, C., D. R. Walt, and P. G. Brewer (1992). Development of a fiber optic sensor for measurement of pCO₂ in sea water: design criteria and sea trials. *Deep-Sea Research*, v. 39, 1015-1026.

1991

Goyet, C., A. L. Bradshaw, and P. G. Brewer (1991). The carbonate system in the Black Sea. *Deep-Sea Research*, v. 38, 1049-1068.

1990

Brewer, P. G., S. Tsunogai and C. S. Wong (1990). Special Issue: Marine Geochemistry – Preface. *Geochemical Journal*, v. 24, 193-195.

1989

Brewer, P. G., C. Goyet, and D. Dyrssen (1989). Carbon dioxide transport by ocean currents at 25° N latitude in the Atlantic Ocean. *Science*, v. 246, 477-479.

1988

Bradshaw, A. L. and P. G. Brewer (1988). High precision measurements of alkalinity and total carbon dioxide in sea water by potentiometric titration. 1. Presence of unknown protolytes(s)? *Marine Chemistry*, v. 23, 69-86.

Brewer, P. G. and F. S. Rowland (1988). Chemistry at the Air-Sea Interface. In: *Proceedings CHEMRAWN IV. Modern Chemistry and Chemical Technology Applied to the Ocean and its Resources. Applied Geochemistry*, v. 3, 37-48.

Bradshaw, A. L. and P. G. Brewer (1988). High precision measurements of alkalinity and total carbon dioxide in sea water by potentiometric titration. 2. Measurements on standard solutions. *Marine Chemistry*, v. 24, 155-162.

Glover, D. M. and P. G. Brewer (1988). Estimates of wintertime mixed layer nutrient concentrations in the North Atlantic. *Deep-Sea Research*, v. 35, 1525-1546.

1987

Scranton, M. I., F. L. Sayles, M. P. Bacon, and P. G. Brewer (1987). Temporal changes in the hydrography and chemistry of the Cariaco Trench. *Deep-Sea Research*, v. 34, 945-963.

Brewer, P. G. and D. M. Glover (1987). Ocean Chemical Fluxes 1983-1986. *Reviews of Geophysics*, v. 25, 1376-1386.

1986

Brewer, P. G., A. L. Bradshaw, and R. T. Williams (1986). Measurements of total carbon dioxide and alkalinity in the North Atlantic Ocean in 1981. In: *The Global Carbon Cycle: Analysis of the Natural Cycle and Implications of Anthropogenic Alterations for the Next Century*, D. Reichle, ed., Springer-Verlag, New York, pp. 358-381.

Brewer, P. G., D. L. Musgrave, and A. L. Bradshaw (1986). Reconciling carbon and oxygen signals in the upper ocean. In: *Workshop on Upper Ocean Processes*, Horn Point, MD, R. Eppley and H. Ducklow, eds., *GOFS Report Series*, pp. 124-130.

Brewer, P. G. (1986). J. P. Riley. An Appreciation. *Science of the Total Environment*, v. 49, 7-9.

Brewer, P. G. (1986). What controls the variability of carbon dioxide in the surface ocean? A plea for complete information. In: *Dynamic Processes in the Chemistry of the Upper Ocean*, NATO ARI, Jouy-en-Jossas, 1983, J. D. Burton, P. G. Brewer, and R. Chesselet, eds., Plenum Press, New York, 215-281.

Brewer, P. G., K. W. Bruland, R. W. Eppley, and J. J. McCarthy (1986). The Global Ocean Flux Study (GOFS): Status of the U.S. GOFS program. *Eos*, 67, 827-832.

1985

Brewer, P. G. and D. Dyrssen (1985). Chemical Oceanography of the Persian Gulf. *Prog. Oceanog.*, v. 14, 41-55.

DeBaar, H. J. W., P. G. Brewer, and M. P. Bacon (1985). Anomalies in rare earth distributions in sea water: Gd and Tb. *Geochimica et Cosmochimica Acta*, v. 49, 1943-1959.

DeBaar, H. J. W., M. P. Bacon, P. G. Brewer, and K. W. Bruland (1985). Rare earth elements in the Pacific and Atlantic Oceans. *Geochimica et Cosmochimica Acta*, v. 49, 1961-1969.

Brewer, P. G., J. L. Sarmiento, and W. M. Smethie (1985). The Transient Tracers in the Ocean (TTO) Program: The North Atlantic Study, 1981; The Tropical Atlantic Study, 1983. *Journal of Geophysical Research*, v. 90, 6903-6905.

1983

- Deuser, W. G., P. G. Brewer, T. D. Jickells, and R. F. Commeau (1983). Biological control of the removal of abiogenic particles from the surface ocean. *Science*, v. 219, 388-391.
- DeBaar, H. J. W., M. P. Bacon, and P. G. Brewer (1983). Rare earth distributions with a positive cerium anomaly in the western North Atlantic Ocean. *Nature*, v. 301, 324-327.
- Anderson, R. F., M. P. Bacon, and P. G. Brewer (1983). Removal of ^{230}Th and ^{231}Pa from the open ocean. *Earth and Planetary Science Letters*, v. 62, 7-23.
- Brewer, P. G. (1983). Carbon Dioxide and the Oceans. In: *Changing Climate. Report of the Carbon Dioxide Assessment Committee*, National Academy Press, Washington, DC, pp. 186-215.
- Anderson, R. F., M. P. Bacon, and P. G. Brewer (1983). Removal of ^{230}Th and ^{231}Pa at ocean margins. *Earth and Planetary Science Letters*, v. 66, 73-90.
- Brewer, P. G., W. S. Broecker, W. J. Jenkins, P. B. Rhines, C. G. Rooth, J. M. Swift, and T. Takahashi (1983). A climatic freshening of the deep North Atlantic (north of 50°N) over the past 20 years. *Science*, v. 222, 1237-1239.

1982

- Anderson, R. F., M. P. Bacon, and P. G. Brewer (1982). Elevated concentrations of actinides in Mono Lake. *Science*, v. 216, 514-516.

1981

- Balistrieri, L., P. G. Brewer, and J. W. Murray (1981). Scavenging residence times of trace metals and surface chemistry of sinking particles in the deep ocean. *Deep-Sea Research*, v. 28A, 101-121.
- Spencer, D. W., M. P. Bacon, and P. G. Brewer (1981). Models of the distribution of ^{210}Pb in a section across the north equatorial Atlantic Ocean. *Journal of Marine Research*, v. 39, 119-138.

1980

- Goldman, J. C. and P. G. Brewer (1980). Effect of nitrogen source and growth rate on phytoplankton-mediated changes in alkalinity. *Limnology and Oceanography*, v. 25(2), 352-357.
- Brewer, P. G., Y. Nozaki, D. W. Spencer, and A. P. Fleer (1980). Sediment trap experiments in the deep North Atlantic: isotopic and elemental fluxes. *Journal of Marine Research*, v. 38(4), 703-728.
- Bacon, M. P., P. G. Brewer, D. W. Spencer, and J. W. Murray (1980). Lead-210, Polonium-210, manganese and iron in the Cariaco Trench. *Deep-Sea Research*, v. 27A, 119-135.
- Bradshaw, A. L., P. G. Brewer, D. K. Shafer, and R. T. Williams (1980). Measurements of total carbon dioxide and alkalinity by potentiometric titration in the GEOSECS program. *Earth and Planetary Science Letters*, v. 55, 99-115.
- Spencer, D. W., M. P. Bacon, and P. G. Brewer (1980). The distribution of ^{210}Pb and ^{210}Po in the North Sea. *Thal. Jugoslavica*, v. 16, 125-154.

1978

- Scranton, M. I. and P. G. Brewer (1978). Consumption of dissolved methane in the deep ocean. *Limnology and Oceanography*, v. 23, 1207-1213.
- Bacon, M. P., D. W. Spencer, and P. G. Brewer (1978). Lead-210 and Polonium-210 as marine geochemical tracers: Review and discussion of some recent results from the Labrador Sea. In: *Proceedings Conference on the National Radiation Environment III*, T. F. Gesell and W. F. Lowder, eds., US DoE Report CONF-780422, 1, 473-501.
- Brewer, P. G. (1978). Direct observation of the oceanic CO_2 increase. *Geophysical Research Letters*, v. 5, 997-1000.

1977

- Murray, J. W. and P. G. Brewer (1977). The mechanisms of removal of iron, manganese and other trace metals from seawater. In: *Marine Manganese Deposits*, G. P. Glasby, ed., Elsevier, Holland, pp. 291-325.
- Scranton, M. I. and P. G. Brewer (1977). Occurrence of methane in the near-surface waters of the western subtropical North Atlantic. *Deep-Sea Research*, v. 24, 127-138.
- Wong, G. T. F. and P. G. Brewer (1977). The marine chemistry of iodine in anoxic basins. *Geochimica et Cosmochimica Acta*, v. 41, 151-159.

- Brewer, P. G. and W. M. Hao (1977). Oceanic elemental scavenging. In: Chemical Modelling in Aqueous Systems, E. Jenne, ed., ACS Symposium Series, No. 93, pp. 266-274.
- Spencer, D. W., P. G. Brewer, A. Fleer, S. Honjo, S. Krishnaswami, and Y. Nozaki (1977). Chemical fluxes from a sediment trap experiment in the deep Sargasso Sea. *Journal of Marine Research*, 36, 493-523.

1976

- Wong, G. T. F. and P. G. Brewer (1976). The determination of iodide in seawater by instrumental neutron activation analysis. *Analytica Chimica Acta*, v. 81, 81-90.
- Millero, F. J., A. Gonzalez, P. G. Brewer, and A. Bradshaw (1976). The density of North Atlantic and North Pacific deep waters. *Earth and Planetary Science Letters*, v. 32, 468-472.
- Brewer, P. G. and J. C. Goldman (1976). Alkalinity changes generated by phytoplankton growth. *Limnology and Oceanography*, v. 21, 108-117.
- Brewer, P. G., D. W. Spencer, P. E. Biscaye, A. Hanley, P. L. Sachs, C. L. Smith, S. Kadar, and J. Fredericks (1976). The distribution of particulate matter in the Atlantic Ocean. *Earth and Planetary Science Letters*, v. 32, 393-402.
- Bacon, M. P., D. W. Spencer, and P. G. Brewer (1976). $^{210}\text{Pb}/^{226}\text{Ra}$ and $^{210}\text{Po}/^{210}\text{Pb}$ disequilibria in seawater and suspended particulate matter. *Earth and Planetary Science Letters*, v. 32, 277-296.
- Wong, G. T. F., P. G. Brewer, and D. W. Spencer (1976). The distribution of particulate iodine in the Atlantic Ocean. *Earth and Planetary Science Letters*, v. 32, 441-450.

1975

- Brewer, P. G. (1975). Minor elements in seawater. In: *Chemical Oceanography, Volume I, Second Edition*, J. P. Riley and G. Skirrow, eds., Academic Press, pp. 415-496.
- Brewer, P. G. and A. Bradshaw (1975). The effect of non-ideal composition of seawater on salinity and density. *Journal of Marine Research*, v. 33, 157-175.
- Brewer, P. G., G. T. F. Wong, M. P. Bacon, and D. W. Spencer (1975). An oceanic calcium problem? *Earth and Planetary Science Letters*, v. 26, 81-87.
- Brewer, P. G. and D. W. Spencer (1975). Minor element models in coastal waters. In: *Marine Chemistry in the Coastal Environment*, T. M. Church, ed., ACS Symposium Series, 18, 80-96.

1974

- Wong, G. T. F. and P. G. Brewer (1974). The determination and distribution of iodate in South Atlantic waters. *Journal of Marine Research*, v. 32, 25-36.
- Brewer, P. G. and D. W. Spencer (1974). The distribution and flux of some trace elements between dissolved and particulate phases in the Black Sea. In: *The Black Sea: Its Geology, Chemistry and Biology*, E. T. Degens and D. A. Ross, eds., Mem. 20, Am. Assn. Petrol. Geol., pp. 137-143.
- Brewer, P. G., et al. (1974). Interlaboratory lead analyses of standardized samples of seawater. *Marine Chemistry*, v. 2, 69-84.
- Brewer, P. G., R. A. Horne, and T. R. S. Wilson (1974). Water constituent sensors. In: *Geoscience Instrumentation*, E. A. Wolff, ed., Wiley and Sons, New York, pp. 530-544.

1973

- Brewer, P. G. and J. W. Murray (1973). Carbon, nitrogen and phosphorus in the Black Sea. *Deep-Sea Research*, v. 20, 803-818.

1972

- Brewer, P. G., D. W. Spencer, and D. E. Robertson (1972). Trace element profiles from the GEOSECS II test station in the Sargasso Sea. *Earth and Planetary Science Letters*, v. 16, 111-116.
- Spencer, D. W., P. G. Brewer, and P. L. Sachs (1972). Aspects of the distribution and trace element composition of suspended matter in the Black Sea. *Geochimica et Cosmochimica Acta*, v. 36, 71-86.

1971

- Brewer, P. G., T. R. S. Wilson, J. W. Murray, R. G. Munns, and C. D. Densmore, (1971). Hydrographic observations on the Red Sea brines indicate a marked increase in temperature. *Nature*, v. 231, 37-38.
- Brewer, P. G. and D. W. Spencer (1971). Colorimetric determination of manganese in anoxic waters. *Limnology and Oceanography*, v. 16, 107-110.

Spencer, D. W. and P. G. Brewer (1971). Vertical advection, diffusion and redox potentials as controls on the distribution of manganese and other trace metals dissolved in waters of the Black Sea. *Journal of Geophysical Research*, v. 76, 5877-5892.

1970

- Brewer, P. G., D. W. Spencer, and P.E. Wilkniss (1970). Anomalous fluoride concentrations in the North Atlantic. *Deep-Sea Research*, v. 17, 1- 7.
- Spencer, D. W. and Brewer, P. G. (1970). Analytical methods in oceanography, Part 1: Inorganic Methods. In: C.R.C. *Critical Reviews in Solid State Sciences*, Vol. 1, pp. 409-478.
- Turner, J. S., T. G. L. Shirtcliffe and P. G. Brewer (1970). Elemental variations of transport coefficients across density interfaces in multiple diffusive systems. *Nature*, v. 338, 1083-1084.

1969

- Brewer, P. G., D. W. Spencer, and C. L. Smith (1969). Determination of trace metals in sea water by atomic absorption spectrophotometry. *A.S.T.M. Special Publication*, 443, 70-77.
- Spencer, D. W. and P. G. Brewer (1969). The distribution of copper, zinc and nickel in sea water of the Gulf of Maine and the Sargasso Sea. *Geochimica et Cosmochimica Acta*, v. 33, 325-339.
- Brewer, P. G., C. D. Densmore, R. Munns, and R. J. Stanley (1969). Hydrography of the Red Sea brines. In: *Hot Brines and Recent Heavy Metal Deposits in the Red Sea*, E. T. Degens and D. A. Ross, eds., pp. 138- 147.
- Brewer, P. G. and D. W. Spencer (1969). A note on the chemical composition of the Red Sea brines. In: *Hot Brines and Recent Heavy Metal Deposits in the Red Sea*, E. T. Degens and D. A. Ross, eds., pp. 174-179.

1967

- Brewer, P. G. and J. P. Riley (1967). A study of some manual and automatic procedures for the determination of nitrate and silicate in sea water. *Deep-Sea Research*, v. 14, 475-477.

1966

- Brewer, P. G. and J. P. Riley (1966). The automatic determination of silicate- silicon in natural waters with special reference to sea water. *Anal. Chim. Acta*, v. 35, 514-519.
- Brewer, P. G., K. M. Chan, and J. P. Riley (1966). Automatic determination of certain micro-nutrients in sea water. In: *Automation in Analytical Chemistry, Technicon Symposium*, pp. 308-314.

1965

- Brewer, P. G., J. P. Riley and F. Culkin (1965). The chemical composition of the hot salty water from the bottom of the Red Sea. *Nature*, v. 206, 1345-1346.
- Brewer, P. G., J. P. Riley and F. Culkin (1965). The chemical composition of the hot salty water from the bottom of the Red Sea. *Deep-Sea Research*, v. 14, 475-477.
- Brewer, P. G. and J. P. Riley (1965). The automatic determination of nitrate in sea water. *Deep-Sea Research*, v. 12, 765-772.

GOVERNMENT TESTIMONY

- Brewer, P. G. (1989) *Global Change: The relevance of oceanic chemical, geological and biological processes*. Testimony before the Committee on Commerce, Science, and Transportation, United States Senate. S. Hrg. 101-95, 51-55.

BOOKS EDITED

- Peter G. Brewer, editor (1982). *Oceanography, The Present and Future*, Springer-Verlag, New York, 392 pp.
- J.D. Burton, P.G. Brewer and R. Chesselet, editors (1983). *Dynamic Processes in the Chemistry of the Upper Ocean*, NATO Conference Series, Series IV, Marine Sciences, Volume 17, Plenum Press, New York, 246 pp.

TECHNICAL REPORTS, BOOK REVIEWS, ETC

- Brewer, P. G. (1967). *Investigation of a Red Sea deep brine and certain micro-nutrients of seawater*. Ph.D. Thesis, University of Liverpool, 147 pp.
- Brewer, P. G. and D. W. Spencer (1970). *Trace element intercalibration study*. WHOI Report No. 70-62.

- Brewer, P. G. (1971). Hydrographic and chemical data from the Black Sea. WHOI Report No. 71-65.
- Park, P. K., D. W. Spencer, and P. G. Brewer (1972). GEOSECS Leg 6 Preliminary Report. Buenos Aires to Ushuaia.
- Reid, J. L., P. G. Brewer, and L. I. Gordon (1973). GEOSECS Leg 8 Preliminary Report. Capetown to Dakar.
- Brewer, P. G., R. T. Williams, and W. C. Patzert (1974). GEOSECS Pacific Expedition Leg 9 Preliminary Report. Papeete to Papeete.
- Brewer, P. G., A. P. Fleer, S. Kadar, D. Shafer, and C. L. Smith (1978). Chemical oceanographic data from the Persian Gulf and Gulf of Oman. WHOI Report No. 78-37.
- Bradshaw, A. L. and P. G. Brewer (1982). The titration of sea water with strong acid: An evaluation of the GEOSECS total carbon dioxide-alkalinity potentiometric titration procedure. In: Report on carbon dioxide standardizations, G. Ostlund and D. Dyrssen, eds., DoE CO₂ Report series.
- Takahashi, T., R. T. Williams, P. G. Brewer, D. Bos, A. L. Bradshaw, D. W. Chipman, and R. F. Weiss (1982). Reproducibility and internal consistency of carbonate chemistry measurements at GEOSECS intercalibration station, 28.5° N and 121.5° W in the eastern Pacific Ocean. In: Report on Carbon Dioxide Standardizations, G. Ostlund and D. Dyrssen, eds., DoE CO₂ Report Series.
- Brewer, P. G. (1982). Carbon dioxide and ocean chemistry. In: Proceedings of the Workshop on First Detection of Carbon Dioxide Effects, H. Moses and M. MacCracken, eds., U.S. DoE CO₂ Report Series 018.
- Brewer, P. G. (1983). The T.T.O. North Atlantic Study. A Progress Report. In: Proceedings: Carbon Dioxide Research Conference: Carbon Dioxide, Science and Consensus, U.S. DoE CO₂ Report Series 021.
- Report of the WMO (CAS) meeting of experts on the CO₂ concentrations from pre-industrial times to I.G.Y.WCP-53. WMO Project on research and monitoring of atmospheric CO₂. Report No. 10, pp. 34.
- Future of Gas Hydrate Research (1999) Sloan, E.D., P.G. Brewer, C.K. Paull, T.S. Collett, W.P. Dillon, W.S. Holbrook, and K.A. Kvenvolden. EOS, Trans. Am. Geophys. Union, v. 80, 247.
- Brewer, P. G. (1978). Oceans by Karl K. Turekian, Prentice Hall, New York, Second Edition. *Geochimica et Cosmochimica Acta*, 41, 687.
- Brewer, P. G. (1978). Methods of Seawater Analysis by K. Grasshoff, Verlag Chemie. *Deep Sea Research*, 25, 425.
- Brewer, P. G. (1982). Marine Electrochemistry, A Practical Introduction, M. Whitfield and D. Jagner, eds., J. Wiley and Sons, New York. *Geochimica et Cosmochimica Acta*, 46.
- Brewer, P. G. (1986). Mapping Strategies in Chemical Oceanography, A. Zirino, ed., Am. Chem. Soc., Adv. Chem. Ser. 209, *Marine Chemistry*, 20, 207-208.
- Brewer, P. G. (1990). Productivity of the Ocean. Present and Past. W. H. Berger, V. S. Smetacek, and G. Wefer, eds., Wiley-Interscience. *Science*, 247, 865.
- Brewer, P.G. (1997) *Oceanography: An Illustrated Guide*, C.P. Summerhayes & S.A. Thorpe, eds., Manson. *Nature*, 385, 408.
- Brewer, P.G. (1998) Gas Hydrates. Relevance to world margin stability and climatic change. J.P. Henriot and J. Mienert, Eds. *Geol. Soc. Spec. Publ.* 137. In: *Organic Geochemistry*, 9, 1017.

POPULAR ARTICLES

- Brewer, P. G., D. W. Spencer, and P. L. Sachs (1970). Trace metals in the Black Sea. *Oceanus*, 15, 23-25.
- Spencer, D. W., S. Honjo, and P. G. Brewer (1978). Particles and particle fluxes in the ocean. *Oceanus*, 21, 20-25.
- Brewer, P. G. (1978). Carbon dioxide and climate. *Oceanus*, 21, 13-17.
- McCarthy, J. J., P. G. Brewer, and G. Feldman. *Global Ocean Flux*. *Oceanus*, 29, 16-26.