

Publications

Brown, M. G., W. H. Munk, J. L. Spiesberger and P. F. Worcester, 1980, Long-range acoustic transmission in the northwest Atlantic, *J. Geophys. Res.* 85, 2699–2703.

Brown, M. G., 1982, Application of the WKB Green's function to acoustic propagation in horizontally stratified oceans, *J. Acoust. Soc. Am.* 71, 1427–1432.

The Ocean Tomography Group: D. Behringer, T. Birdsall, M. Brown, B. Cornuelle, R. Heinmiller, R. Knox, K. Metzger, W. Munk, J. Spiesberger, R. Spindel, D. Webb, P. Worcester and C. Wunsch, 1982, A demonstration of ocean acoustic tomography, *Nature* 299, 121–125.

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Cornuelle, B., C. Wunsch, D. Behringer, T. Birdsall, M. Brown, R. Heinmiller, R. Knox, K. Metzger, W. Munk, J. Spiesberger, R. Spindel, D. Webb and P. Worcester, 1985, Tomographic maps of the ocean mesoscale – 1: Pure acoustics, *J. Phys. Ocean.* 15, 133–152.

Brown, M. G., 1986, The transient wavefields in the vicinity of the cuspid caustics, *J. Acoust. Soc. Am.* 79, 1367–1384.

Brown, M. G., 1986, The transient wavefields in the vicinity of the elliptic, hyperbolic and parabolic umbilic caustics, *J. Acoust. Soc. Am.* 79, 1385–1401.

Brown, M. G., and F. D. Tappert, 1986, Causality, caustics and the structure of transient wave-fields, *J. Acoust. Soc. Am.* 80, 251–255.

Brown, M. G., and F. D. Tappert, 1987, Catastrophe theory, caustics and travel time diagrams in seismology, *Geophys. J. Roy. Astr. Soc.* 88, 217–229.

Brown, M. G., 1987, On the singularity index and the unfolding of the diffraction catastrophes, *Wave Motion* 9, 107–110.

Palmer, D. R., M. G. Brown, F. D. Tappert and H. F. Bezdek, 1988, Classical chaos in nonseparable wave propagation problems, *Geophys. Res. Lett.* 15, 569–572.

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Brown, M. G., F. D. Tappert and G. J. Goni, 1991, An investigation of sound ray dynamics in a range dependent model of the ocean volume using an area-preserving mapping, *Wave Motion* 14, 93–99.

Tappert, F. D., M. G. Brown and G. J. Goni, 1991, Weak chaos in an area-preserving mapping for sound ray propagation, *Phys. Lett. A* 153, 181–185.

Brown, M. G., F. D. Tappert and S. E. R. B. Sundaram, 1991, Chaos in small amplitude surface gravity waves over slowly varying bathymetry, *J. Fluid Mech.* 227, 35–46.

Brown, M. G., and K. B. Smith, 1991, Ocean stirring and chaotic low-order dynamics, *Phys. Fluids A* 3, 1186–1192.

Smith, K. B., M. G. Brown and F. D. Tappert, 1992, Ray chaos in underwater acoustics, *J. Acoust. Soc. Am.* 91, 1939–1949.

Smith, K. B., M. G. Brown and F. D. Tappert, 1992, Acoustic ray chaos induced by mesoscale ocean structure, *J. Acoust. Soc. Am.* 91, 1950–1959.

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Brown, M. G., and R. M. Samelson, 1994, Particle motion in vorticity-conserving, two-dimensional incompressible flows, *Phys. Fluids* 6, 2875–2876.

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Rypina, I. I., I. A. Udovydchenkov and M. G. Brown, 2006, A transformation of the environment eliminates parabolic equation phase errors, *J. Acoust. Soc. Am.* 120, 1295–1304.

Olascoaga, M. J., I. I. Rypina, M. G. Brown, F. J. Beron-Vera, H. Kocak, L. E. Brand, G. R. Halliwell and L. K. Shay, 2006, Persistent transport barrier on the West Florida Shelf, *Geophys. Res. Lett.* 33, L22603, doi:10.1029/2006GL027800.

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Rypina, I. I., M. G. Brown and H. Kocak, 2009, Transport in an idealized three-gyre system with application to the Adriatic Sea, *J. Phys. Ocean.* 39, 675–690, doi:10.1175/2008JPO3975.1.

Beron-Vera, F. J., and M. G. Brown, 2009, Underwater acoustic beam dynamics, *J. Acoust. Soc. Am.* 126, 80–91.

Beron-Vera, F. J., M. J. Olascoaga, M. G. Brown, H. Kocak and I. I. Rypina, 2010, Invariant-tori-like Lagrangian coherent structures in geophysical flows, *Chaos* 20, 017514, doi:10.1063/1.3271342.

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Brown, M. G., 2011, Noise interferometry in an inhomogeneous environment in the geometric limit, *J. Acoust. Soc. Am.* 130(4), EL173–EL179.

Beron–Vera, F. J., M. J. Olascoaga, M. G. Brown and H. Kocak, 2012, Zonal jets as meridional transport barriers in the subtropical and polar lower stratosphere, *J. Atmos. Sci.* 69, 741–752, doi:10.1175/JAS–D–11–084.1.

Udovydchenkov, I. A., M. G. Brown, T. F. Duda, J. A. Mercer, R. K. Andrew, P. F. Worcester, M. A. Dzieciuch, B. M. Howe and J. A. Colosi, 2012, Modal analysis of the range evolution of broadband wavefields in the North Pacific Ocean: Low mode numbers, *J. Acoust. Soc. Am.* 131, 4409–4427.

Udovydchenkov, I. A., M. G. Brown and T. F. Duda, 2012, Piecewise coherent mode processing acoustic measurements made on two nearby vertical line arrays, *J. Acoust. Soc. Am.* 131, EL492–EL498.

Olascoaga, M. J., M. G. Brown, F. J. Beron–Vera and H. Kocak, 2012, Stratospheric winds, transport barriers and the 2011 Arctic ozone hole, *Nonlin. Proc. Geophys.* 19, 1–6, doi:10.5194/npg–19–1–2012.

Brown, M. G., and I. A. Udovydchenkov, 2013, Underwater communication using weakly dispersive modes, *Acoust. Phys.* 59(5), 533–538, doi:10.1134/S1063771013050199.

Udovydchenkov, I. A., M. G. Brown, T. F. Duda, P. F. Worcester, M. A. Dzieciuch, J. A. Mercer, R. K. Andrew, B. M. Howe and J. A. Colosi, 2013, Weakly dispersive modal pulse propagation in the North Pacific Ocean, *J. Acoust. Soc. Am.* 134, 3386–3394.

Song, H. C., B. M. Howe, M. G. Brown and R. K. Andrew, 2014, Diversity–based acoustic communication with a glider in deep water, *J. Acoust. Soc. Am.* 135, 1023–1026, doi:10.1121/1.4864299

Brown, M. G., O. A. Godin, N. J. Williams, N. A. Zabolin, L. Zabolina and G. J. Banker, 2014, Acoustic Green’s function extraction from ambient noise in a coastal ocean environment, *Geophys. Res. Lett.* 41, doi:10.1002/2014GL060926.

Godin, O. A., N. A. Zabolin, L. Zabolina, M. G. Brown, N. J. Williams, 2014, Passive acoustic measurements of flow velocity in the Straits of Florida, submitted to *J. Acoust. Soc. Am.*

19. Other works, publications and abstracts:

Bache, T. C., T. G. Barker, M. G. Brown, K. D. Pyatt and H. J. Swanger, 1980, The underwater acoustic signature of a nuclear explosion at the ocean surface, *Systems Science and Software Technical Report SSS–R–80–4586*, 1980.

Brown, M. G., 1982, Inverting for the ocean sound speed structure, Ph.D. dissertation, University of California, San Diego.

Brown, M. G., 1983, The identification and inversion of acoustic multipath data at long range in the ocean, *PAME Proceedings, NORDA Technical Note 176*, 189–199.

Brown, M. G., 1983, An introductory wave mechanics course in the Ocean Engineering program at the University of Miami, *Proc. ASEE Conf.*, Rochester, N. Y.

Brown, M. G., 1986, Underwater sound, in *McGraw–Hill Yearbook of Science and Technology*, McGraw–Hill, New York, 476–478.

Brown, M. G., and B. K. Emmett, 1986, Edge diffraction of transient non–dispersive waves and the B1 impulse catastrophe | Theory and experiment, *Univ. of Miami Technical Report*,

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Goni, G. J., F. D. Tappert and M. G. Brown, 1989, Numerical experiments on the standard mapping, University of Miami Technical Report, RSMAS-TR-89-005.

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Brown, M. G., and H. A. DeFerrari, 1991, Are centimeter accuracy measurements of relative sea floor displacements feasible?, in Proceedings of the International Symposium on Marine Positioning (IN-SMAP 90), Marine Technology Society, PIP printing, Rockville, 88-92.

Brown, M. G., 1993, Chaos in Ocean Physics, in Proceedings of the Aha Huliko'a Hawaiian Winter Workshop on Statistical Methods in Physical Oceanography, P. Muller and D. Henderson (eds), SOEST Publication Services, 373-380.

Brown, M. G., 1996, Nonlinear waveform inversion in crosswell tomography, in Proceedings of the Super Crosswell Tomography and CORK Experiment Workshop of the JAMSTEC International Symposium on Deep Sea Research in Subduction Zones, Spreading Centers, and Backarc Basins, Tokyo, Japan.

Brown, M. G., 2003, Review of "Seismic Ray Theory" by Vlastislav Cerveny, J. Acoust. Soc. Am. 113, 14.

Duda, T. F., A. K. Morozov, B. M. Howe, M. G. Brown, K. Speer, P. Lazarevich, P. F. Worcester and B. D. Cornuelle, 2006, Evaluation of a long-range joint acoustic navigation/thermometry system, Oceans06, Marine Technology Society, Boston, 060407-31, 6 pp.

Tomsovic, S. and M. G. Brown, Ocean acoustics: a novel laboratory for wave chaos, in New Directions in Linear Acoustics and Vibration, R. Weaver and M. Wright, (eds), Cambridge University Press, Cambridge, 2008, 186-206.

20. Other works accepted for publication

PROFESSIONAL

21. Funded Research Performed (include all grants received in the last five years, identifying the principal investigator and the amounts and dates of the awards):

Brown, M. G., Time domain studies of acoustic wave propagation in the ocean, ONR, 12/82-11/83, \$68,000.

Brown, M. G., Time domain studies of acoustic wave propagation in the ocean, ONR, 12/83-9/84, \$73,257.

Brown, M. G., Time domain studies of acoustic wave propagation in the ocean, ONR, 10/84-9/86, \$172,000.

Brown, M. G., Catastrophic and chaotic ocean physics, NSF, 11/87-10/90, \$158,000.

Brown, M. G. (PI), and F. D. Tappert, Predictability of deterministic underwater sound

fields,

ONR, 10/88–9/90, \$240,000.

Tappert, F. D. (PI), and M. G. Brown, Full wave reverberation modeling, ONR, 10/90–9/92, \$442,000.

Brown, M. G., Empirical nonlinear ocean dynamics, ONR, 10/90–9/92, \$124,000.

Brown, M. G. (PI), F. D. Tappert and J. Willemsen, Wave chaos in ocean acoustics, NSF, 10/91–9/93, \$250,000.

Brown, M. G., Low-order nonlinear ocean dynamics, ONR, 10/92–9/94, \$115,000.

Brown, M. G. (PI), H. A. DeFerrari, F. D. Tappert, T. Yamamoto and H. Nguyen, Acoustics local area network, ONR, 10/92–9/94, \$185,765.

Brown, M. G., Analysis of measured spatio-temporal sound fields in deep and shallow water, ONR, 10/92–9/94, \$229,979.

Brown, M. G., Global acoustic propagation modelling, ARPA via SIO, 4/93–3/94, \$80,000.

Brown, M. G., Analysis of measured spatio-temporal sound fields in deep and shallow water (AASERT supplement), ONR, 6/93–5/96, \$70,394.

Brown, M. G., Transient wave propagation in underwater acoustics: theory and applications, ONR, 10/94–9/96, \$240,000.

Brown, M. G. (PI), and T. Yamamoto, Nonlinear waveform inversion in crosswell tomography, ONR, 10/94–9/96, \$120,000.

Brown, M. G., Semiclassical approximations and predictability in ocean acoustics, ONR, 10/96–12/97, \$149,111.

Brown, M. G., Semiclassical approximations and predictability in ocean acoustics, ONR, 10/97–9/99, \$280,000.

Brown, M. G., Ocean surface gravity wave kinematics, NSF, 3/98–2/01, \$225,000.

Brown, M. G., Semiclassical approximations and predictability in ocean acoustics, ONR, 10/99–9/01, \$300,000.

Brown, M. G., Predictability limitations of long-range sound propagation, ONR, 1/02–12/02, \$100,000.

Brown, M. G., Predictability limitations of long-range sound propagation, ONR, 1/03–12/05, \$482,000.

Beron-Vera, F. J. (PI), M. J. Olascoaga, M. G. Brown and H. Kocak, Nonintegrable Hamiltonian systems in ocean dynamics, NSF, 9/04–8/08, \$950,000.

Brown, M. G., Long-range underwater sound propagation: environmental variability, signal stability and signal coherence, ONR, 1/06–12/08, \$504,000.

Beron-Vera, F. J. (PI), M. J. Olascoaga, M. G. Brown and H. Kocak, Nonintegrable Hamiltonian systems in geophysical fluid dynamics, NSF, 9/08-8/12, \$763,000.

Brown, M. G., Long-range underwater sound propagation: environmental variability, signal stability and signal coherence, ONR, 1/09-12/11, \$519,000.

Brown, M. G., Ocean remote sensing using ambient noise, NSF, 10/11-9/14, \$475,000.

Brown, M. G., Long-range underwater sound propagation: environmental variability, signal stability and signal coherence, ONR, 1/12-12/14, \$390,000.

22. Editorial responsibilities:

Referee for Journal of Geophysical Research (Oceans and Solid Earth sections), Journal of the Acoustical Society of America, Journal of Physical Oceanography, Geophysical Journal of the Royal Astronomical Society/Geophysical Journal International, Journal of Fluid Mechanics, Reviews of Geophysics, Wave Motion, Nature, Science, Geophysical Research Letters, Physics of Fluids/Physics of Fluids A, Radio Science, Journal of Atmospheric and Oceanic Technology, Bulletin of the Seismological Society of America, Nonlinear Processes in Geophysics, Deep-Sea Research, IEEE Journal of Ocean Engineering, Journal of Sound and Vibration, Journal of Nonlinear Science, Journal of Computational Acoustics, European Journal of Mechanics, Physics Letters A, Encyclopedia of Applied Physics, Office of Naval Research (proposals), National Science Foundation (proposals). Professional and Honorary Organizations (member; officer; date)

23. Honors and Awards:

Recipient of 1989 A. B. Wood Medal and Prize of the Institute of Acoustics, U.K., for important contributions to underwater acoustics.

Fellow, Acoustical Society of America, 2004-present

24. Post-Doctoral Fellowships:

25. Other Professional Activities (e.g., papers presented; performances; conference proceedings; seminar or conference panel member; catalogue work; etc.):

Sea Time

Participant on several short (day-week) acoustical oceanography cruises. Chief Scientist on six two-day cruises in the Florida Straits on the RV Walton Smith to deploy/recover acoustical oceanography instrumentation.

Patent

Yamamoto, T., M. Brown, T. Torii and A. Berman, Bottom shear modulus profiler, U. S. Patent

No. 4,807,199, granted 1989.

Abstracts and Poster Papers

The Ocean Tomography Group, 1982, Ocean acoustic tomography, EOS Trans. Am. Geophys. Union 63, 361.

Brown, M. G., 1983, Linearized travel time, intensity and waveform inversions – A comparison, J. Acoust. Soc. Am. Suppl. 73, S37. (Invited paper)

Brown, M.G., 1983, Impulsive wave propagation and the cuspid caustics, J. Acoust. Soc. Am. Suppl. 74, S97.

- Brown, M. G., 1983, Impulsive wave propagation and the elliptic, hyperbolic, and parabolic umbilic caustics, *J. Acoust. Soc. Am. Suppl.* 74, S97.
- Brown, M. G., and F. D. Tappert, 1984, Catastrophe theory, caustics and travel time diagrams, *J. Acoust. Soc. Am. Suppl.* 75, S25.
- Brown, M. G., and F. D. Tappert, 1984, Catastrophe theory, caustics and travel time diagrams in seismology, *Terra Cognita*, May.
- Brown, M. G., 1984, Numerical considerations in ray tracing and ray expansions of the acoustic wavefield, *J. Acoust. Soc. Am. Suppl.* 76, S39.
- Brown, M. G., and B. K. Emmett, 1985, Edge diffraction of transient nondispersive waves – Theory and experiment, *J. Acoust. Soc. Am. Suppl.* 77, S61.
- Brown, M. G., 1985, Transient wavefields and caustics, *URSI North American Radio Science Meeting, Vancouver, Canada*, 132. (Invited paper)
- Brown, M. G., and F. D. Tappert, 1985, Causality, caustics and the structure of transient wave-fields, *J. Acoust. Soc. Am. Suppl.* 78, S22.
- Brown, M. G., 1985, Vortex generation on a beta-plane, *EOS Trans. Am. Geophys. Union* 66, 933–934.
- Brown, M. G., 1986, On the singularity index and the unfolding of the diffraction catastrophes, *J. Acoust. Soc. Am. Suppl.* 80, S91.
- Brown, M. G., 1986, Catastrophic constraints and the kinematic inverse problem, *EOS Trans. Am. Geophys. Union* 67, 1098–1099.
- Brown, M. G., and P. E. Bullwinkel, 1987, Matched catastrophe deconvolution with application to the inversion of marine seismic refraction data, *J. Acoust. Soc. Am. Suppl.* 82, S73.
- Tappert, F. D., M. G. Brown, D. R. Palmer and H. F. Bezdek, 1988, Chaos in underwater acoustics, *J. Acoust. Soc. Am. Suppl.* 83, S36. (Invited paper)
- Palmer, D. R., M. G., Brown, F. D. Tappert and H. F. Bezdek, 1988, Chaotic behavior of ray trajectories in a range-dependent ocean environment, *J. Acoust. Soc. Am. Suppl.* 83, S37.
- Tappert, F. D. and M. G. Brown, 1988, Chaos in shallow water propagation, *J. Acoust. Soc. Am. Suppl.* 83, S37.
- Bezdek, H. F., D. R. Palmer, M. G. Brown and F. D. Tappert, 1988, Chaos in nonseparable wave propagation problems, *Nonlinear Dynamical Systems Symposium, Santa Cruz, CA*.
- Brown, M. G., F. D. Tappert, D. R. Palmer and H. F. Bezdek, 1988, Chaos in nonseparable wave propagation problems, *17th Intl. Conf. on Mathematical Geophysics, Barcelona*.
- Tappert, F. D., G. J., Goni and M. G. Brown, 1988, Chaos and hyperchaos in shallow water acoustics, *J. Acoust. Soc. Am. suppl.* 84, S152.

Brown, M. G., and F. D. Tappert, 1989, Oceanographic applications of chaos in Hamiltonian systems, ONR Nonlinear Oceanography Workshop, APL, Johns Hopkins Univ.

Tappert, F. D., M. G. Brown and G. Goni, 1989, Exponential growth of multipaths under chaotic conditions in a simple deterministic range-dependent waveguide, J. Acoust. Soc. Am. Suppl. 85, S70.

Brown, M. G., F. D. Tappert, G. J. Goni and K. B. Smith, 1989, Chaos in underwater acoustics, Institute of Acoustics Sonar Signal Processing Conference, University of Technology, Loughborough, U. K. (Invited paper)

Brown, M. G., K. B. Smith and F. D. Tappert, 1990, Sound ray chaos induced by oceanic internal waves and mesoscale structure, J. Acoust. Soc. Am. Suppl. 86, S55.

Tappert, F. D., M. G. Brown and G. J. Goni, 1990, A search for wave chaos in a simple range-dependent underwater acoustic waveguide, J. Acoust. Soc. Am. Suppl. 86, S55.

Brown, M. G., F. D. Tappert and G. J. Goni, 1990, An investigation of sound ray dynamics in a range-dependent model of the ocean volume using an area preserving mapping, J. Acoust. Soc. Am. Suppl. 86, S130.

Brown, M. G., and K. B. Smith, 1990, Stirring the ocean by chaotic advection: an analysis of SOFAR float trajectories, IUTAM Symposium on Fluid Mechanics of Stiring and Mixing, UCSD, August 20-24.

Brown, M. G., and H. A. DeFerrari, 1990, A system for the precise measurement of relative seafloor displacements using acoustic phase information, International Symposium on Marine Positioning, Miami, 15-19 October.

Bauer, S. T., and M. G. Brown, 1991, Empirical low-order El Nino dynamics, The Oceanography Society meeting, St. Petersburg, 25-29 March.

Brown, M. G., 1991, Chaos in small amplitude surface gravity waves over slowly varying bathymetry, ONR Nonlinear Ocean Waves Workshop, APL, Johns Hopkins University, 30-31 May.

Brown, M. G., and K. B. Smith, 1991, Stirring the oceans by chaotic advection, IAPSO-IUGG meeting Vienna, August 11-24. (Invited paper)

Brown, M., F. Tappert, K. Smith, G. Goni and S. Sundaram, 1991, Linear waves, rays and chaos, IAPSO-IUGG meeting, Vienna, August 11-24.

Bauer, S. T., and M. G. Brown, 1991, Empirical low-order El Ni~no dynamics, IAPSO-IUGG meeting, Vienna, August 11-24.

Tappert, F. D., K. B. Smith and M. G. Brown, 1992, Chaos in ocean acoustic waveguides, SIAM 40th anniversary meeting, Los Angeles.

Brown, M. G., 1992, A Maslov-Chapman wave-field representation for broadband, wide-angle, oneway propagation in range-dependent environments, J. Acoust. Soc. Am. Suppl. 92, S273.

Brown, M. G., 1993, Chaotic ocean dynamics: A critical assessment, Aha Huliko'a Hawaiian Winter Workshop, University of Hawaii, January 12–15. (Invited paper)

DeFerrari, H. A., M. G. Brown, F. D. Tappert, C. Monjo and L. Nghiem-Phu, 1993, Fluctuations and predictability of sound propagation at moderate frequencies in bottom-limited sound channels, *J. Acoust. Soc. Am. Suppl.* 93, S2270.

Tappert, F. D., M. G. Brown, H. A. DeFerrari, C. Monjo and L. Nghiem-Phu, 1993, Modeling issues for predicting sound propagation at moderate frequencies in bottom-limited sound channels, *J. Acoust. Soc. Am. Suppl.* 93, S2270.

Brown, M. G., and S. T. Bauer, 1993, Empirical low-order ocean-atmosphere dynamics?, AGU Chapman Conference on Fractals, Chaos, and Predictability in Oceanography and Meteorology, Galway, Ireland, September 20–22. (Invited paper)

Brown, M. G., 1994, Global acoustic propagation modelling using MaCh1, *J. Acoust. Soc. Am. Suppl.* 95, 2880.

Brown, M. G., and R. M. Samelson, 1995, Particle motion in vorticity-conserving, two-dimensional incompressible flows, European Geophysical Society meeting, Hamburg, April 3–8. (Invited paper)

Brown, M. G., and J. Viechnicki, 1995, On the feasibility of modal group delay-based tomography in the deep ocean, *J. Acoust. Soc. Am. Suppl.* 97, 3235.

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