

Emmanuel K. Skarsoulis

Curriculum Vitae

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Research Interests

Ocean Acoustics: Ocean acoustic propagation modelling, inverse problems – ocean acoustic tomography and localization, long-range propagation, active/passive acoustic detection analysis, related signal processing issues, ocean acoustic experiments.

Bioacoustics: Acoustics of cetaceans, passive localization of vocalizing whales.

Fluid Mechanics: Unsteady and free surface flows, ocean surface waves, geophysical fluid dynamics.

Education

1985-1988 PhD Technische Universität Hamburg (TUHH) - Fluid Mechanics / bubble dynamics.

1979-1984 National Technical University of Athens (NTUA), Department of Naval Architecture and Marine Engineering - Marine Hydrodynamics.

Teaching/educational activities

2010-12 Development of Ocean Sound Lab educational software for an introduction to underwater sound (web site: osl.iacm.forth.gr)

2008 Organization of the International Summer School in Underwater Acoustics (FORTH, June 2008).

2005 Lecture series on statistical inverse problem theory, ocean acoustic tomography and underwater acoustic localization in the framework of THALATTA research and training network on underwater acoustic technology.

2004 Lecture series on acoustical oceanography, underwater acoustic detection, ray theory and time-domain modeling in the framework of THALATTA research and training network on underwater acoustic technology.

2000-2003 Visiting Professor at the Department of Applied Mathematics. Univ. Crete.

1993-1994 Lecturer at the Department of Meteorology of the Air Force Academy, Athens.

Research Projects

2018-19 Green's function emergence through cross-correlation of shipping noise, US-ONR.

2016-17 Behavior and sensitivity of phase arrival times in the Fram-Strait area (PHASE-FS), US-ONR.

2014-15 Phase behavior and implications for travel-time observables (PHASE-2), US-ONR.

2014-15	Passive acoustic localization in the sea based on multipath (SEA-EARS), GSRT – Excellence-II Grants.
2014	Experiment for passive acoustic detection and localization of whales in the Ionian Sea (EDELWEIS-14), Ocean Care - CH.
2013-15	Environment and natural hazards: New methods for monitoring and study of the ocean environment (PEFYKA) - GSRT) – KRIPIS.
2013-14	Behavior and sensitivity of phase arrival times (PHASE), US-ONR.
2011-12	Travel-time and amplitude sensitivity kernels (TASK), US-ONR.
2009-10	Arctic Ocean ESONET mission (AOEM-ARCOONE), EU-FP6.
2005-10	Developing Arctic modeling and observing capabilities for long-term environmental studies (DAMOCLES), EU-FP6.
2006-08	Travel-time sensitivity kernels in long-range propagation (TSK), US-ONR.
2005-06	Climate of the Arctic and its role for Europe - A European component of the International Polar Year (IPY-CARE), EU-FP6.
2001-04	Performance analysis of underwater acoustic detection systems (CASPER), Hellenic Navy / MOD.
1998-2001	Ocean tomography operational package and utilization support (OCTOPUS), EU-MAST.
1998-99	Passive acoustic detection system analysis (PDA), IACM, Hellenic Navy.
1993-96	A pilot tomography system for monitoring the Western Mediterranean Basin (THETIS-2), EU-MAST.
1993-94	Study of underwater acoustic characteristics of the Aegean Sea (AMFITRITI), Hellenic Navy / MOD.
1991-93	Enhanced acoustic tomography and its application to circulation and deep convection in the Western Mediterranean (THETIS), EU-MAST.

Memberships

- Acoustical Society of America (ASA)
- ASA Committee on Acoustical Oceanography (2003-2011)
- Hellenic Institute of Acoustics (HELINA)
- European Acoustics Association (EAA)

Miscellaneous

<i>Military Service</i>	Hellenic Navy (1988-1990)
<i>Foreign languages</i>	English, German
<i>Scholarships - Awards</i>	Deutscher Akademischer Austauschdienst (DAAD) Greek State Scholarship Foundation (IKY) Technical Chamber of Greece (TEE) Tiftixis Foundation FORTH Award for Applied Research

Publications

A. Journal publications

1. G.A. Athanassoulis, T.A. Loukakis, E.K. Skarsoulis, Wave climate of the Northeastern Mediterranean Sea. I. Annual wave height isopleths, *Technika Chronika*, Vol. B-13, pp. 115-133, 1993.
2. G.A. Athanassoulis, E.K. Skarsoulis, K.A. Belibassakis, Bivariate distributions with given marginals, with an application to wave climate description, *Applied Ocean Research*, Vol. 16, pp. 1-17, 1994.

3. The THETIS Group, Open-ocean deep convection explored in the Mediterranean, *EOS Transactions of the American Geophysical Union*, Vol. 75, No 19, pp. 217-221, 1994.
4. G.A. Athanassoulis, E.K. Skarsoulis, Arrival-time perturbations of broadband tomographic signals due to sound-speed disturbances. A wave theoretic approach, *Journal of the Acoustical Society of America*, Vol. 97, pp. 3575-3588, 1995.
5. E.K. Skarsoulis, G.A. Athanassoulis, U. Send, Ocean acoustic tomography based on peak arrivals, *Journal of the Acoustical Society of America*, Vol. 100, pp. 797-813, 1996.
6. U. Send, G. Krahnemann, D. Mauuary, Y. Desaubies, F. Gaillard, T. Terre, J. Papadakis, M. Taroudakis, E. Skarsoulis, and C. Millot, Acoustic observations of heat content across the Mediterranean Sea, *Nature*, Vol. 385, pp. 615-617, 1997
7. E.K. Skarsoulis, Second-order Fourier synthesis of broadband acoustic signals using normal modes, *Journal of Computational Acoustics*, Vol. 5, pp. 355-370, 1997.
8. E.K. Skarsoulis, G.A. Athanassoulis, Second-order perturbations of peak arrival times due to sound speed variations, *Journal of the Acoustical Society of America*, Vol. 104, pp. 3313-3325, 1998.
9. E.K. Skarsoulis, Fast Coupled-Mode Approximation for Broadband Pulse Propagation in a Range-Dependent Ocean, *IEEE Journal of Oceanic Engineering.*, Vol. 24, pp. 172-182, 1999.
10. E.K. Skarsoulis, U. Send, One-step analysis of non-linear travel-time data in ocean acoustic tomography, *Journal of Atmospheric and Oceanic Technology*, Vol. 17, pp. 240-254, 2000.
11. E.K. Skarsoulis, A matched-peak inversion approach for ocean acoustic travel-time tomography, *Journal of the Acoustical Society of America*, Vol. 107, pp. 1324-1332, 2000.
12. E.K. Skarsoulis, Multi-section matched-peak tomographic inversion with a moving source, *Journal of the Acoustical Society of America*, Vol. 110, pp. 786-797, 2001.
13. D. Kindler, U. Send, E.K. Skarsoulis, Relative-time inversions in the Labrador Sea acoustic tomography experiment, *Acta Acoustica*, Vol. 87, pp. 738-747, 2001.
14. A. Frantzis, J. Goold, E. Skarsoulis, M. Taroudakis, V. Kandia, Clicks from Cuvier's beaked whales, *Ziphius Cavirostris*, *Journal of the Acoustical Society of America*, Vol. 112, pp. 34-37, 2002.
15. E.K. Skarsoulis, Waveform perturbation of tomographic receptions due to sound-speed variations, *Acta Acoustica*, Vol. 89, pp. 789-798, 2003.
16. G.N. Makrakis, E.K. Skarsoulis, Asymptotic approximation of ocean-acoustic pulse propagation in the time domain, *Journal of Computational Acoustics*, Vol. 12, pp. 197-216, 2004.
17. E.K. Skarsoulis B.D. Cornuelle, Travel-time sensitivity kernels in ocean acoustic tomography, *Journal of the Acoustical Society of America*, Vol. 116, pp. 227-238, 2004.
18. E.K. Skarsoulis, U. Send, G. Piperakis, P. Testor, Acoustic thermometry of the western Mediterranean basin, *Journal of the Acoustical Society of America*, Vol. 116, pp. 790-798, 2004.
19. E.K. Skarsoulis, M.A. Kalogerakis, Ray-theoretic localization of an impulsive source in a stratified ocean using two hydrophones, *Journal of the Acoustical Society of America*, Vol. 118, pp. 2934-2943, 2005.
20. G.S. Piperakis, E.K. Skarsoulis, G.N. Makrakis, Rytov approximation of tomographic receptions in weakly range-dependent ocean environments, *Journal of the Acoustical Society of America*, Vol. 120, pp. 120-134, 2006.

21. E.K. Skarsoulis, M.A. Kalogerakis, Two-hydrophone localization of a click source in the presence of refraction, *Applied Acoustics*, Vol. 67, pp. 1202-1212, 2006.
22. E.K. Skarsoulis, G.S. Piperakis, Use of acoustic navigation signals for simultaneous localization and sound-speed estimation, *Journal of the Acoustical Society of America*, Vol. 125, pp. 1384-1393, 2009.
23. E.K. Skarsoulis, B.D. Cornuelle, M.A. Dzieciuch, Travel-time sensitivity kernels in long-range propagation, *Journal of the Acoustical Society of America*, Vol. 126, pp. 2223-2233, 2009.
24. E.K. Skarsoulis, B.D. Cornuelle, M.A. Dzieciuch, Second-order sensitivity of acoustic travel times to sound-speed perturbations, *Acta Acoustica*, Vol. 97, pp. 533-543, 2011.
25. E.K. Skarsoulis, B.D. Cornuelle, M.A. Dzieciuch, Long-range asymptotic behavior of vertical travel-time sensitivity kernels, *Journal of the Acoustical Society of America*, Vol. 134, pp. 3201-3210, 2013.
26. M.A. Dzieciuch, B.D. Cornuelle, E.K. Skarsoulis, Structure and stability of wave-theoretic kernels in the ocean, *Journal of the Acoustical Society of America*, Vol. 134, pp. 3318-3331, 2013.
27. P.N. Mikhalevsky, H. Sagen, P.F. Worcester, A.B. Baggeroer, J. Orcutt, S.E. Moore, C.M. Lee, K.J. Vigness-Raposa, L. Freitag, M. Arrott, K. Atakan, A. Beszczynska-Moeller, T.F. Duda, B.D. Dushaw, J.-C. Gascard, A.N. Gavrilov, H. Keers, A.K. Morozov, W.H. Munk, M. Rixen, S. Sandven, E. Skarsoulis, K.M. Stafford, F. Vernon, M.Y. Yuen, Multipurpose acoustic networks in the integrated Arctic Ocean observing system, *Arctic*, Vol. 68 Suppl., pp. 1-17, 2015.
28. E.K. Skarsoulis, S.E. Dosso, Linearized two-hydrophone localization of a pulsed acoustic source in the presence of refraction: Theory and simulations, *Journal of the Acoustical Society of America*, Vol. 138, pp. 2221-2234, 2015.
29. H. Sagen, B.D. Dushaw, E.K. Skarsoulis, D. Dumont, M.A. Dzieciuch, A. Beszczynska-Moeller, Time series of temperature in Fram Strait determined from the 2008-2009 DAMOCLES acoustic tomography measurements and an ocean model, *Journal of Geophysical Research - Oceans*, Vol. 121, pp. 4601-4617, 2016.
30. E.K. Skarsoulis, G. Piperakis, M. Kalogerakis, E. Orfanakis, P. Papadakis, S.E. Dosso, A. Frantzis, Underwater Acoustic Pulsed Source Localization with a Pair of Hydrophones, *Remote Sensing*, Vol. 10, 883; doi:10.3390/rs10060883, 2018.

B. Conference Proceedings (selected)

1. E.K. Skarsoulis, G.A. Athanassoulis, The use of classical maximum likelihood method for estimating directional wave spectra from heave-pitch-roll time series, *3rd International Offshore and Polar Engineering Conference*, Vol. 3, pp. 1-8, Singapore, 1993.
2. G.A. Athanassoulis, G.N. Makrakis, E.K. Skarsoulis, A wave theoretic inversion scheme for acoustic parameter identification and its application to ocean tomography, *2nd Workshop on Wave Propagation Problems*, pp. 111-128, Heraklion, 1992.
3. G.A. Athanassoulis, J.S. Papadakis, E.K. Skarsoulis, M.I. Taroudakis, A comparative study of two wave-theoretic inversion schemes in ocean acoustic tomography, *Full Field Inversion Methods in Ocean and Seismic Acoustics*, pp. 127-132, SACLANTCEN, 1994.
4. E.K. Skarsoulis, An adaptive scheme for ocean acoustic tomography of large sound-speed variations, *Proc. 3rd European Conf. on Underwater Acoustics*, Vol. 2, pp. 803-808, Heraklion, 1996.

5. E.K. Skarsoulis, G. Piperakis, Adaptive inversions from the Thetis-2 tomography experiment, *Proc. 4th European Conf. on Underwater Acoustics*, Vol. 2, pp. 599-604, Rome, 1998.
6. E.K. Skarsoulis, Ocean acoustic tomography in the Mediterranean sea, *Proc. Conf. Acoustic Technology*, Hellenic Naval Academy, Dec. 1998.
7. E.K. Skarsoulis, M.A. Kalogerakis, A computer system for underwater passive acoustic detection analysis, *Proc. Conf. Acoustic Technology*, Hellenic Naval Academy, Dec. 1998.
8. U. Send, E. Skarsoulis, G. Piperakis, F. Gaillard, D. Mauuary, Observing the western Mediterranean basin with acoustics, *Proc. Conf. The Ocean Observing System for Climate*, St. Raphael, October 1999.
9. U. Send, E. Skarsoulis, M. Kalogerakis, F. Gaillard, C. Maillard, D. Mauuary, Operational tools for ocean acoustic tomography (TOMOLAB), *Proc. Conf. The Ocean Observing System for Climate*, St. Raphael, October 1999.
10. E.K. Skarsoulis, A matched-peak approach for relative-time inversions in ocean acoustic tomography, *Proc. 5th European Conf. on Underwater Acoustics*, Vol. 2, pp. 1323-1328, Lyon, 2000.
11. U. Send, E.K. Skarsoulis, D. Mauuary, F. Gaillard, J.-M. Goudeville, Ocean acoustic tomography operational package and utilization support, *Proc. EurOCEAN 2000*, pp. 688-694, Hamburg, 2000.
12. E.K. Skarsoulis, Matched-peak inversion in ocean acoustic travel-time tomography, Invited paper, *Forum Acusticum 2002*, Sevilla 2002.
13. E.K. Skarsoulis, U. Send, G. Piperakis, Ocean acoustic tomography in the western Mediterranean sea, *7th European Conf. on Underwater Acoustics*, Delft, 2004.
14. E.K. Skarsoulis, A. Frantzis, M. Kalogerakis, Passive localization of pulsed sound sources using a 2-hydrophone array, *7th European Conf. on Underwater Acoustics*, Delft, 2004.
15. T. Avsic, U. Send, E.K. Skarsoulis, Six years of tomography observation in the central Labrador sea, *Proc. Int. Conf. Underwater Acoustic Measurements: Technologies & Results*, Heraklion 2005.
16. E.K. Skarsoulis and M.A. Kalogerakis, A wave-front method for passive localization of a pulsed source in a stratified ocean using two hydrophones, *Proc. 8th Eur. Conf. Underwater Acoustics*, S. M. Jesus and O. C. Rodríguez (Ed.), pp. 651-656, 2006
17. G. Bouchage and E.K. Skarsoulis, Single-hydrophone localization of an impulsive source in a stratified ocean, *Proc. 8th Eur. Conf. Underwater Acoustics*, S. M. Jesus and O. C. Rodríguez (Ed.), pp. 743-748, 2006
18. H. Sagen, S. Sandven, E. Skarsoulis, G. Piperakis, M. Kalogerakis, P. Worcester, Damocles: The Fram Strait acoustic tomography system, *Proc. Underwater Acoustic Measurements 2007*
19. H. Sagen, S. Sandven, P. Worcester, M. Dzieciuch, E. Skarsoulis, The Fram Strait acoustic tomography system, *Proc. 9th Eur. Conf. Underwater Acoustics*, M. Zakharia (Ed.), pp. 13-18, 2008.
20. E. Skarsoulis, G. Piperakis, M. Kalogerakis, H. Sagen, Ocean acoustic tomography: Travel-time inversion in the eastern Fram Strait, *Proc. 9th Eur. Conf. Underwater Acoustics*, M. Zakharia (Ed.), pp. 19-23, 2008.
21. E. Skarsoulis, M. Kalogerakis, J. Papadakis, G. Piperakis, TRITON: a prototype software environment for underwater bistatic acoustic detection analysis, *Proc. UDT Europe*, 2009.
22. H. Sagen, S. Sandven, A. Beszczynska-Moeller, O. Boebel, T. Duda, L. Freitag, J.C. Gascard, A. Gavrilov, C. Lee, D. Mellinger, P. Mikhalevsky, S. Moore, A. Morozov, M.

- Rixen, E. Skarsoulis, K. Stafford, E. Tveit, P. Worcester, Acoustic technologies for observing the interior of the Arctic Ocean, *Proc. Oceanobs '09*, Venice, 2009.
23. B. Dushaw, W. Au, A. Beszczynska-Moeller, R. Brainard, B. Cornuelle, T. Duda, M. Dzieciuch, A. Forbes, L. Freitag, J.C. Gascard, A. Gavrilov, J. Gould, B. Howe, S. Jayne, O. Johannessen, J. Lynch, D. Martin, D. Menemenlis, P. Mikhalevsky, J. Miller, S. Moore, W. Munk, J. Nystuen, R. Odom, J. Orcutt, T. Rossby, H. Sagen, S. Sandven, J. Simmen, E. Skarsoulis, B. Southall, K. Stafford, R. Stephen, K. Vigness-Raposa, S. Vinogradov, K. Wong, P. Worcester, C. Wunsch, A global ocean acoustic observing network, Community White Paper, *Proc. Oceanobs '09*, Venice, 2009.
 24. E. Skarsoulis, G. Piperakis, M. Kalogerakis, H. Sagen, S. Haugen, A. Beszczynska-Moeller, P. Worcester, Tomographic inversions from the Fram Strait 2008-9 experiment, *Proc. 10th Eur. Conf. Underwater Acoustics*, Constantinople, 2010.
 25. E. Skarsoulis, M. Kalogerakis, J. Papadakis, G. Piperakis, A prototype software environment for bistatic acoustic detection analysis, *Proc. 10th European Conf. on Underwater Acoustics*, pp. 366-369, Constantinople, 2010.
 26. S.Sandven, H.Sagen, L.Bertino, A Beszczynska-Möller, E.Fahrbach, P.F.Worcester, M.A.Dzieciuch, W.Walczowski, P.Wieczorek, E.Skarsoulis, A.Morozov, D.Dumont, C.Lee, B.D.Dushaw, E.Hansen, H.Rohr, The Fram Strait integrated ocean observing and modelling system, *Proc. 6th EUROGOOS Conf.*, Sopot, 2011.
 27. M. Kalogerakis, E. Skarsoulis, G. Piperakis, E. Haviaris, Ocean Sound Lab: A software environment for introduction to underwater acoustics, *Proc. 11th European Conf. on Underwater Acoustics*, Edinburgh, 2012.
 28. E. Skarsoulis, B. Cornuelle, M. Dzieciuch, Perturbation relations and sensitivity kernels for arrival amplitude and phase, *Proc. 11th European Conf. on Underwater Acoustics*, Edinburgh, 2012.
 29. M. Kalogerakis, E. Skarsoulis, G. Piperakis, Evaluating and Understanding the Usability of an Educational Software Environment for Public Aquaria and Museum Exhibitions, *Proc. 1st International Conference for Advanced Research in Scientific Areas (ARSA 2012)*, pp. 2038-2041, 2012
 30. E. Skarsoulis, B. Cornuelle, M. Dzieciuch, Sensitivity behavior of phase and peak arrival times, *Proc. 1st International Conference on Underwater Acoustics*, pp. 1221-1228, Corfu, 2013.
 31. E. Skarsoulis, B. Cornuelle, M. Dzieciuch, Travel-time sensitivity kernels in a shallow-water environment, *Proc. 2nd International Conference on Underwater Acoustics*, pp. 683-690, Rhodes, 2014.
 32. E. Skarsoulis, P. Papadakis, M. Kalogerakis, G. Piperakis, E. Orfanakis, A passive acoustic localization system for broadband sources, *Proc. 3rd International Conference on Underwater Acoustics*, pp. 341-348, Platania, 2015.
 33. E.K. Skarsoulis, G.S. Piperakis, E. Orfanakis, P. Papadakis, Prediction of shipping noise in the Eastern Mediterranean Sea, *Proc. Internoise 2016*, pp. 329-336, Hamburg, 2016.
 34. P. Papadakis, G. Piperakis, E. Skarsoulis, E. Orfanakis and M. Taroudakis, Development and testing of low-cost autonomous underwater acoustic recorders, *Proc. 4th International Conference on Underwater Acoustics*, pp. 627-634, Skiathos, 2017.
 35. E. Skarsoulis, G. Piperakis, E. Orfanakis, P. Papadakis, M. Taroudakis, Modelling of underwater noise due to ship traffic in the Eastern Mediterranean Sea, *Proc. 4th International Conference on Underwater Acoustics*, pp. 889-896, Skiathos, 2017.
 36. M.A. Kalogerakis, E.K. Skarsoulis, On the design of digital game-based learning environments for education of the general public on focused scientific topics with an

application to underwater acoustics, in *Interactivity, Game Creation, Design, Learning, and Innovation*, Proc. 6th International Conference, ArtsIT 2017, and Second International Conference, DLI 2017, Heraklion 2017, A. Brooks, E. Brooks, N. Vidakis (Eds.), pp. 324-336, Springer, 2018.

C. Monographs

1. E.K. Skarsoulis, *Instationäre Theorie der Porenkeime*, VDI Fortschritt-Berichte, Reihe 7 Strömungstechnik, Nr. 141, 1988.
2. G.A. Athanassoulis, E.K. Skarsoulis, *Wind and Wave Atlas of the North-Eastern Mediterranean Sea*, NTUA/HNGS OC-20/92, Athens, 1992.