

Libe Washburn

Department of Geography and Institute for Computational Earth System Science
University of California, Santa Barbara, CA 93106-4060

office: (805)-893-7367

lab: (805)-893-8480

fax: (805)-893-2578

internet: washburn@icess.ucsb.edu

Education

B.S Mechanical Engineering, University of Arizona, May 1974

M.S. Engineering Science, University of California at San Diego, Sept. 1978

Ph.D. Engineering Science, University of California at San Diego, Oct. 1982

Positions Held

1998 – present Professor, Department of Geography, University of California, Santa Barbara, CA

1993 - 1998 Associate Professor, Department of Geography, University of California, Santa Barbara, CA

1991 - 1993 Assistant Professor, Department of Geography, University of California, Santa Barbara, CA

1985 - 1990 Research Assistant Professor of Physical Oceanography, Center for Earth Sciences,
University of Southern California, Los Angeles, CA

1982 - 1985 Postgraduate Research Oceanographer, Scripps Institution of Oceanography, La Jolla, California

1977 - 1982 Research Assistant and Teaching Assistant, Dept. of Applied Mechanics and Engineering
Sciences, University of California, San Diego, CA

1975 - 1977 Aeroballistics Engineer, General Dynamics, Convair Division, San Diego, CA

Research Interests:

Physical-biological interactions
Mesoscale ocean dynamics
Turbulence and mixing processes

Coastal circulation
Buoyancy-driven flows
Marine pollution

Professional Societies:

American Geophysical Union
American Meteorological Society

Tau Beta Pi Engineering Honorary
American Association for the advancement of
Science

The Oceanography Society

Alliance for Marine Remote Sensing

Publications

- Washburn, L., 1982. Horizontal observations of temperature microstructure within the seasonal thermocline, Ph.D. dissertation. University of California, San Diego.
- Washburn, L., and C.H. Gibson, 1982. Measurement of oceanic temperature microstructure using a small conductivity probe, *J. Geophys. Res.*, 87, C6, 4230-4240.
- Washburn, L., and C.H. Gibson, 1984. Horizontal variability of temperature microstructure at the base of a mixed layer during MILE, *J. Geophys. Res.*, 89, C7, 3507-3522.
- Washburn, J.O., and L. Washburn, 1984. Active aerial dispersal of minute, wingless arthropods: exploitation of boundary layer velocity gradients, *Science*, 223, 1088-1089.
- Flament, P.J., A. Armi, and L. Washburn, 1985. The evolving structure of an upwelling filament. *J. Geophys. Res.*, 90, C6, 11765-11778.
- Dickey, T.D., D.A. Siegel, A. Bratkovich, and L. Washburn, 1986. Observations of optical features associated with thermohaline structures. *Proc. Soc. Photo-opt. Instr. (Ocean Optics VIII)*, 308-313.
- Washburn, L., and T.K. Deaton, 1986. A simple system for mapping conductivity microstructure, *J. Atmospheric and Oceanic Technology*, 3, 3, 345-355.
- Washburn, L., 1987. Two dimensional mapping of temperature microstructure in a coastal region. *J. Geophys. Res.*, 92, C10, 10787-10798.
- Washburn, L., and R.H. Kaese, 1987. Double diffusion and the distribution of density ratio in the Mediterranean waterfront SE of the Azores. *J. Phys. Oceanogr.*, 17, 1, 12-25.
- Washburn, L., and L. Armi, 1988. Observations of frontal instabilities on an upwelling filament. *J. Phys. Oceanogr.*, 18, 8, 1075-1092.
- Siegel, D.A., T.D. Dickey, L. Washburn, M.K. Hamilton, and B.G. Mitchell, 1989. Optical determination of particulate production in the open ocean. *Deep-Sea Res.*, 36, 2, 211-222.
- Washburn, L., D.A. Siegel, T.D. Dickey, and M.K. Hamilton, 1989. Isopycnal mixing and the distribution of particles across the North Pacific Sub-tropical Front. *Deep-Sea Res.*, 36, 11, 1607-1620.
- Washburn, L., and L. Armi, 1990. Observations of lateral instabilities on an upper ocean density front. *Stratified Flows*, 941-949, American Society of Civil Engineers, 1112 p.
- Washburn, L., D.C. Kadko, B.H. Jones, T. Hayward, P.M. Kosro, T.P. Stanton, S.Ramp, and T. Cowles, 1991. Water mass subduction and the transport of phytoplankton in a coastal upwelling system, *J. Geophys. Res.*, 96, C8, 14,927-14,945.
- Kadko, D.C., L. Washburn, and B.H. Jones, 1991. Evidence of subduction within cold filaments of the Northern California Coastal Transition Zone, *J. Geophys. Res.*, 96, C8, 14,909-14,926.
- Mackas, D.L., L. Washburn, and S.L. Smith, 1991. Zooplankton community pattern associated with a California Current Cold Filament, *J. Geophys. Res.*, 96, C8, 14,781-14,797.
- Huyer, A., P. M. Kosro, J. Fleischbein, S.R. Ramp, T. Stanton, L. Washburn, F.P. Chavez, T.J. Cowles, S.D. Pierce, and R.L. Smith, 1991. Currents and water masses of the Coastal Transition Zone off Northern California, June to August 1988. *J. Geophys. Res.*, 96, C8, 14,809-14,831.
- Strub, P.T., P.M. Kosro, A. Huyer, C. James, L.J. Walstad, R.L. Smith, J.A. Barth, R.R. Hood, M.R. Abbot, K.H. Brink, T.L. Hayward, P.P. Niiler, M.S. Swenson, R.K. Dewey, F. Chavez, S.R. Ramp, M.L. Batteen, R.L. Haney, D.L. Mackas, L. Washburn, D.C. Kadko, R.T. Barber, D.B. Haidvogel, 1991. The nature of cold filaments in the California Current System, *J. Geophys. Res.*, 96, C8, 14,743-14,768.

- Wu, Y., L. Washburn, and B.H. Jones, 1991. Mixing and dispersion processes in the vicinity of an ocean outfall system in Southern California, Coastal Zone 91 - Proceedings of The Seventh Symposium on Coastal and Ocean Mangement, American Society of Civil Engineers, 124-134.
- Jones, B.H., L. Washburn, and Y. Wu, 1991. The dispersion of ocean outfall plumes: Physical and biological dynamics, Coastal Zone 91 - Proceedings of The Seventh Symposium on Coastal and Ocean Mangement, American Society of Civil Engineers, 74-85.
- Jones, B.H., C.N.K. Mooers, M. Reinecker, T.P. Stanton, and L. Washburn, 1991. Chemical and biological structure of a cool filament observed off Northern California in July 1986 (OPTOMA-21), *J. Geophys. Res.*, 96, C12, 22,207-22,225.
- Washburn, L., B.H. Jones, A. Bratkovich, T.D. Dickey, and M.S. Chen, 1992. Mixing, dispersion, and resuspension in the vicinity of an ocean wastewater plume, *J. Hydraulic Engr.*, 118, 1, 38-58.
- Washburn, L., M. Swenson, J.L. Largier, P.M. Kosro, and S.R. Ramp, 1993, Cross-shelf sediment transport by an anti-cyclonic eddy off Northern California, *Science*, 261, 1560-1564.
- Jones, B.H., T.D. Dickey, L. Washburn, and D. Manov, 1993, "Physical and biological dynamics of sewage outfall plumes in the coastal region: an integrated observational approach", *Water Pollution II: Modeling, measuring and prediction*, L.C. Wrobel and C.A. Brebbia (eds.), Computational Mechanics Publications, Southampton, pp. 527-534.
- Wu, Y., L. Washburn, and B.H. Jones, 1994, Buoyant plume dispersion in a coastal environment: Observations of plume structure and dynamics, *J. Continental Shelf Res.*, 14,9, 1001-1023.
- Siegel, D.A., J.C. Ohlmann, L. Washburn, R.R. Bidigare, C.T. Nosse, and Y.Zhou, 1995, Solar radiation, phytoplankton pigments and the radiant heating of the equatorial Pacific Warm Pool, *J. Geophys. Res.*, 100, c3, 4885-4891.
- Washburn, L., T. Duda, D. Jacobs, 1996, Interpreting conductivity microstructure: estimation of the temperature variance dissipation, *J. Atmospheric and Oceanic Tech.*, 13, 6, 1166-1188.
- Washburn, L., and B.H. Jones, 1996, Field Observations and Modeling of Dispersion Processes around Ocean Outfalls, *Oceans 96 MTS/IEEE, Conf. Proc.*, (published on CD-ROM) 23-26 September, Fort Lauderdale, FL.
- Jones, B.H., L. Washburn, S. Bay, and K. Schiff, 1997, Stormwater runoff into Santa Monica Bay: Identification, impact, and dispersion, *Conf. Proc.*, California and the World Ocean '97, 24-27 March 1997, San Diego, CA.
- Pinkel, R., M. Merrifield, M. McPhaden, J. Picaut, S. Rutledge, D. Siegel, and L. Washburn, 1997, Solitary waves in the western Equatorial Pacific Ocean, *Geophys. Res. Lett.*, 24, 13, 1603-1606.
- Ohlmann, J.C., D.A. Siegel, and L. Washburn, 1998, Radiant heating of the western equatorial Pacific during TOGA-COARE, *J. Geophys. Res.*, 103, C3, 5379-5395.
- Washburn, L., B.M. Emery, B.H. Jones, and D.G. Ondercin, 1998, Eddy stirring and phytoplankton patchiness in the Subarctic North Atlantic in Late Summer, *Deep-Sea Res. I*, 45, 1411-1439.
- Washburn, L., S. Stone, and S. MacIntyre, 1999, Dispersion of a produced water plume in a shallow coastal environment: implications for biological effects, *J. Cont. Shelf. Res.*, 19, 57-78.
- Clark, J.F., L. Washburn, J.S. Hornafius, and B.P. Luyendyk, 2000, Dissolved hydrocarbon flux from natural marine seeps to the Southern California Bight, Santa Barbara, California, *J. Geophys. Res.*, 105, C5, 11,509-11,522.
- Washburn, L., B.M. Emery, and J.D. Paduan, 2000, The surface circulation of the Santa Barbara Channel as observed with high frequency radar, *Proceedings of the fifth California Islands Symposium*, 29 March – 1 April, 1999, Santa Barbara, CA, published on CD-ROM.
- Washburn L., C. Johnson, C.G. Gotschalk, and E.T. Eglund, A gas-capture buoy for measuring bubbling gas flux in oceans and lakes, 2001, *J. Atmos. and Oceanic Tech.*, 18, 1411 – 1420.

- Boles, J.R., J.F. Clark, I. Leifer, and L. Washburn, 2001, Temporal variations in natural hydrocarbon seep rate due to tides, Coal Oil Point area, California, *J. Geophys. Res.* Vol. 106 , No. C11 , p. 27,077-27,087.
- Gaylord B., D. Reed., P. Raimondi, L. Washburn, and S. McLean, 2002, A physically based model of macroalgal spore dispersal in the wave and current-dominated nearshore, *Ecology*, 83(5), 1239-1251.
- Nishimoto, M.M., and L. Washburn, 2002, Patterns of coastal eddy circulation and abundance of pelagic juvenile fish in the Santa Barbara Channel, California, USA, *Marine Ecology Progress Series*, 241, 183-199.
- Washburn, L., E. H. Beckenbach, B. M. Emery, and J.A. Harlan, 2003, HF radar observations of surface currents in the vicinity of Pt. Conception California, *Proceedings of the First International Radiowave Oceanography Workshop*, Timberline Lodge, OR, 9-12 April.
- Emery, B.M., L. Washburn, and J.A. Harlan, 2003, Evaluating radial component current measurements from CODAR high frequency radars and moored in situ current meters, *Proceedings of the First International Radiowave Oceanography Workshop*, Timberline Lodge, OR, 9-12 April.
- Washburn, L., K. A. McClure, B. H. Jones, and S. M. Bay, 2003, Spatial Scales and Evolution of Stormwater Plumes in Santa Monica Bay, *Marine Environmental Research*, 56, 103-125.
- Bay, S., B. H. Jones, K. Schiff, and L. Washburn, 2003, "Water Quality Impacts of Stormwater Discharges to Santa Monica Bay", *Marine Environmental Research*, 56, 202-223.
- Margaret McManus, M., J.L. Largier, E. Palomino, L. Wilkinson, and L. Washburn, 2003, Data Management Techniques for NEOCO: The Network for Environmental Observations of the Coastal Ocean, *Sea Technology*, August, 54-60
- Clark, J. F., I. Leifer, L. Washburn, and B. P. Luyendyk, 2003, Compositional changes in natural gas bubble plumes: Observations from the Coal Oil Point marine hydrocarbon seep field, *Geo-Marine Letters*, 23, 187-193.
- Warrick J.A., L.A.K. Mertes, L. Washburn, and D.A. Siegel, 2004, Dispersal forcing of southern California river plumes, based on field and remote sensing observations, *Geo-Marine Letters*, 24, 46-52, doi 10.1007/s00367-003-0163-9.
- Beckenbach, E.H., and L. Washburn 2004, "Low frequency waves in the Santa Barbara Channel observed by high frequency radar", *J. Geophys. Res.*, 109, doi:10.1029/2003JC00199.
- Warrick, J.A., Mertes, L.A.K., Washburn L., and Siegel, D.A, 2004, "A conceptual model for river plume dispersal and forcing in the Santa Barbara Channel, California, based on field and remote sensing observations", *Continental Shelf Research*, 24, 2029-2043.
- Emery B.M., L. Washburn, and J.A. Harlan, 2004, "Evaluating Radial Current Measurements from CODAR High-Frequency Radars with Moored Current Meters," *Journal of Atmospheric and Oceanic Technology*, 21, 8, 1259-1271.
- Raimondi, P.T., D.C. Reed, B. Gaylord, and L. Washburn. 2004. Effects of self-fertilization in the giant kelp, *Macrocystis pyrifera*. *Ecology* 85: 3267-3276.
- DiGiacomo, P.M., L. Washburn, B. Holt, and B.H. Jones, 2004, "Coastal pollution hazards in Southern California observed by SAR imagery: Stormwater plumes, wastewater plumes, and natural hydrocarbon seeps", *Marine Pollution Bulletin*, 49, 1013-1024.
- Gaylord, B., D.C. Reed, L. Washburn, and P.T. Raimondi. 2004. Physical-biological coupling in spore dispersal of kelp forest macroalgae. *Journal of Marine Systems* 49: 19-39.
- Warrick, J.A., L. Washburn, M.A. Brzezinski, D.A. Siegel, 2005, Nutrient contributions to the Santa Barbara Channel, California, from the ephemeral Santa Clara River, *Estuarine, Coastal, and Shelf Science*, 62, 559-574.
- Washburn, L., Jordan F. Clark, and P. Kyriakidis, 2005, The spatial scales, distribution, and intensity of natural marine hydrocarbon seeps near Coal Oil Point, California, *Marine and Petroleum Geology*, 22, 569-578.

- Bassin, C.J., L. Washburn, M.A. Brzezinski, and E.E. McPhee-Shaw, 2005, Sub-mesoscale coastal eddies observed by high frequency radar: A new mechanism for delivering nutrients to kelp forests in the Southern California Bight, *Geophys. Res. Lett.*, 32, L12604, doi:10.1029/2005GL023017.
- Cudaback, C., L. Washburn, and E.P. Dever, 2005, Inner-shelf circulation near Pt. Conception California, 110, C10007, doi:10.1029/2004JC002608.
- Reed, D.C., B.P. Kinlan, P.T. Raimondi, L. Washburn, B. Gaylord, and P.T. Drake, 2006, "A metapopulation perspective on the patch dynamics of giant kelp in Southern California", *Marine Metapopulations*, J.P. Kritzer and P.F. Sale, eds., 353-386, 2006.
- Emery, B.M., L. Washburn, M. Love, M. M. Nishimoto, J.C. Ohlmann, 2006, Do oil and gas platforms off California reduce recruitment of bocaccio (*Sebastes paucispinis*) to natural habitat? An analysis based on trajectories derived from high frequency radar, *Fish. Bull.*, 104, 391-400.
- Anderson, C.R., M.A. Brzezinski, L. Washburn, and R. Kudela, 2006, Circulation and environmental conditions during a toxigenic *Pseudo-nitzschia australis* bloom in the Santa Barbara Channel, California, *Marine Ecology Progress Series*, 327, 119-133.
- Ohlmann, C., P. White, L. Washburn, E. Terrill, B.M. Emery, and M. Otero, 2007, Interpretation of coastal HF radar derived surface currents with high resolution drifter data, *J. of Atmospheric and Oceanic Tech.*, 24, 4, 666–680.
- Barth, J.A., B.A. Menge, J. Lubchenco, F. Chan, J. M. Bane, A. R. Kirincich, M.A. McManus, K.J. Nielsen, S. D. Pierce, and L. Washburn, 2007, Delayed upwelling alters nearshore coastal ocean ecosystems in the northern California current, *Proc. Nat. Acad. Sci.*, 104, 10, 3719–3724, doi:10.1073/pnas.0700462104.
- McPhee-Shaw, E.E., D.A. Siegel, L. Washburn, M.A. Brzezinski, J.L. Jones, A. Leydecker, and J. Melack, 2007, Mechanisms for nutrient delivery to the inner shelf: Observations from the Santa Barbara Channel, 52(5), 1748–1766
- Mau, S., D. L. Valentine, J. F. Clark, J. Reed, R. Camilli, and L. Washburn, 2007, Dissolved methane distributions and air-sea flux in the plume of a massive seep field, Coal Oil Point, California, *Geophys. Res. Lett.*, 34, L22603, doi:10.1029/2007GL031344.
- Warrick, J.A., J.A., P.M. DiGiacomo, S.B. Weisberg, N.P. Nezlin, M. Mengeld, B.H. Jones, J.C. Ohlmann, L. Washburn, E.J. Terrill, K.L. Farnsworth, 2007, River plume patterns and dynamics within the Southern California Bight, *Continental Shelf Research*, 27, 2427–2448, doi:10.1016/j.csr.2007.06.015.
- Washburn, L., 2007, Coastal Currents, In Encyclopedia of Tide Pools and Rocky Shores, M. Denny and S. Gaines, Eds.
- Woodson, C.B., D.I. Eerkes-Medrano, A. Flores-Morales, M.M. Foley, S.K. Henkel, M. Hessing-Lewis, D. Jacinto, L. Needles, M.T. Nishizaki, J. O’Leary, C.E. Ostrander, M. Pespeni, K.B. Schwager, J.A. Tyburczy, K.A. Weersing, A.R. Kirincich, J.A. Barth, M.A. McManus, L. Washburn, 2007, Local diurnal upwelling driven by sea breezes in northern Monterey Bay, *Continental Shelf Research* 27 (2007) 2289–2302, doi:10.1016/j.csr.2007.05.014.

Other Publications:

- Washburn, L., 1991, "Mixing and finestructure processes in a coastal jet during OPTOMA21" Office of Naval Research, under contract no. N00014-89-J-1573.
- Miller, C.B. and L. Washburn, 1992, "Importance of mesoscale physical features to ecological processes in the California Current System", Eastern Boundary Current Program, US Global Ocean Ecosystems Dynamics, Report No. 7, September, 37-43.
- Washburn, L., 1995, Weather Monitoring in the Channel Islands National Park Prototype Monitoring Program, Program Review Report, National Biological Service, Office of Inventory and Monitoring.
- Jones, B.H., L. Washburn, S. Bay, K. Schiff, Study of the impact of stormwater discharge on the beneficial uses of Santa Monica Bay, Annual Report, 22 October 1996.
- Nishimoto M.M., and L. Washburn, , 2001, Midwater trawling and oceanographic surveys in the Santa Barbara Channel and adjacent coastal areas: Preliminary results from two contrasting years, 1998 and 1999, in "The ecological role of natural reefs and oil and gas production platforms on rocky reef fishes in Southern California, 1998-1999 Survey Report", Love, M.S., M.M. Nishimoto, and D. Schroeder, OCS Study MMS 2001-028, 115 p.
- Dayton P., L. Washburn, and R. Zimmerman, 2000, Coastal Ocean Research in Looking Ahead, California Sea Grant Strategic Plan 2001 – 2005, Report No. R-045, National Sea Grant Program, NOAA, US Dept. of Commerce.
- Surface Current Mapping Initiative (including L. Washburn), Surface Current Mapping in U.S. Coastal Waters, Implementation of a National System, Oceans.US Report No. 7, June 2004.

Recent Collaborators:

Burton H. Jones
Paul DiGiacomo
Benjamin Holt
Pete Raimondi
Ira Leifer

Jordan Clark
Steven Bay
Mark Brzezinski
David A. Siegel

Steven D. Gaines
Bruce Luyendyk
Daniel Reed
Leal Mertes

Graduate advisees:

Craig Nosse, UCSB
Shannon Stone, UCSB
Brad Jacobsen, UCSB
Edwin Beckenbach, UCSB
Eric DeWolf, UCSB

Kevin Galinsky, UCSB
Yicun Wu, USC
Brian Emery, UCSB
Mary Nishimoto, UCSB
Corinne Bassin, UCSB

Daniel Rydberg, UCSB
Jessica Walker, UCSB
Kurt McClure, UCSB
Christopher Melton, UCSB

Post-doctoral scholars:

Brian Gaylord (now Assistant Professor, UC Davis), Cynthia Cudaback (now Assistant Professor, U N Carolina)