

## CURRICULUM VITAE - CHRISTOPHER LEE SABINE

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### Research Interests

My research addresses the role of the ocean in the global carbon cycle. In particular, my work centers on interpreting ocean inorganic carbon measurements and understanding ocean acidification. This includes understanding the air-sea exchange of CO<sub>2</sub> at the ocean surface, examining the basin-scale distributions of both natural and anthropogenic carbon in the ocean's interior, understanding multiple tracer relationships (e.g. anthropogenic CO<sub>2</sub> and dissolved oxygen), evaluating ocean carbon cycle GCMs with data-based global carbon distributions, and examining carbonate and organic matter re-mineralization within the open ocean and in coastal environments.

### Education

1992 Ph.D. in Oceanography, University of Hawaii at Manoa, Honolulu, HI 96822 (Fred T. Mackenzie, Advisor).  
1986 B.S. in Marine Science, Texas A&M University at Galveston, Galveston, TX 77553.

### Professional History

2011-Present Director, NOAA Pacific Marine Environmental Laboratory  
2007-Present Affiliate Full Professor, Department of Oceanography, University of Washington  
2004-Present Senior Fellow, University of Washington Joint Institute for the Study of the Atmosphere and Ocean  
2008-2011 Supervisory Oceanographer, NOAA Pacific Marine Environmental Laboratory  
2002-2008 Oceanographer, NOAA Pacific Marine Environmental Laboratory  
1999-2007 Affiliate Associate Professor, Department of Oceanography, University of Washington  
1999-2002 Research Scientist, Joint Institute for the Study of the Atmosphere and the Ocean, University of Washington/NOAA Pacific Marine Environmental Laboratory.  
1994-1999 Research Staff, Program in Atmospheric and Ocean Sciences, Department of Geosciences, Princeton University.  
1992-1994 Research Associate, Program in Atmospheric and Ocean Sciences, Department of Geological and Geophysical Sciences, Princeton University.  
1987-1992 Graduate Research Assistant, Hawaii Institute of Geophysics, University of Hawaii at Manoa.  
1986-1987 Research Technician, University of Texas Medical Branch, Department of Microbiology  
1985 Summer Intern, Harbor Branch Foundation Inc., Marine Geology Department, Ft. Pierce, FL (C. Hoskin, Advisor)

### Scholarships and Awards

2011 NOAA Technology Transfer Award  
2010 Seattle Federal Executive Board's 2010 Public Service Award for Space Needle CO<sub>2</sub> sensor outreach project with the Pacific Science Center  
2009 NOAA Research Employee of the Year (leadership)  
2009 NASA Group Achievement Award for outstanding accomplishments and interagency collaboration in the Southern Ocean Gas Exchange Experiment 2008.  
2009 American Geophysical Union Editor's Citation for Excellence in Refereeing from Geophysical Research Letters  
2009 OAR Outstanding Scientific Paper Award "Feely, R.A., C.L. Sabine, J.M. Hernandez-Ayon, D. Ianson, and B. Hales (2008): Evidence for upwelling of corrosive "acidified" water onto the Continental Shelf. *Science*, 320(5882), doi: 10.1126/science.1155676, 1490–1492."

- 2008 PMEL Outstanding Scientific Paper Award “Sabine, C.L., and R.A. Feely (2007): The oceanic sink for carbon dioxide. In *Greenhouse Gas Sinks*, D. Reay, N. Hewitt, J. Grace, and K. Smith (eds.), CABI Publishing, Oxfordshire, UK, 31–49.”
- 2008 NOAA/OAR Special Act Award
- 2007 Special recognition from IPCC for contributing to the 2007 Nobel Peace Prize.
- 2007 NOAA employee of the month for October 2007.
- 2006 Department of Commerce Gold Medal Award for pioneering research leading to the discovery of increased acidification in the world’s oceans due to the absorption of carbon dioxide.
- 2005 PMEL Outstanding Scientific Paper Award “Sabine, C.L., R.A. Feely, N. Gruber, R.M. Key, K. Lee, J.L. Bullister, R. Wanninkhof, C.S. Wong, D.W.R. Wallace, B. Tilbrook, F.J. Millero, T.-H. Peng, A. Kozyr, T. Ono, and A.F. Rios (2004): The oceanic sink for anthropogenic CO<sub>2</sub>. *Science*, 305(5682), 367-371.”
- 2005 NOAA Outstanding Scientific Paper Award “Feely, R.A., C.L. Sabine, K. Lee, W. Berelson, J. Kleypas, V.J. Fabry, and F.J. Millero (2004): Impact of anthropogenic CO<sub>2</sub> on the CaCO<sub>3</sub> system in the oceans. *Science*, 305(5682), 362-366.”
- 2005 NOAA/OAR Significant Achievement Award
- 2004 NOAA/OAR Significant Achievement Award
- 2004 NOAA/OAR Special Act Award
- 2003 NOAA/OAR Significant Achievement Award
- 2002 NOAA Outstanding Scientific Paper Award “Feely, R.A., C.L. Sabine, T. Takahashi, and R. Wanninkhof (2001): Uptake and storage of carbon dioxide in the oceans: The global CO<sub>2</sub> survey. *Oceanography*, 14(4), 18–32.”
- 1999 Technical Communications Merit Award, Society for Technical Communication, for technical report "Surface water and atmospheric underway carbon data obtained during the World Ocean Circulation Experiment Indian Ocean cruises (R/V Knorr, December 1994-January 1996), NDP64."
- 1989 ARCS Scholarship Award, Achievement Rewards for College Scientists Foundation Inc.
- 1986 C. D. Mickey Award for excellence in marine chemistry, Texas A&M University at Galveston.
- 1986 Full scholarship to attend summer course in Sediment-Organism Relationships, Bermuda Biological Station (F. T. Mackenzie, Professor).
- 1985, 1986 Troy Sweatnam Memorial Scholarship, Texas A&M University at Galveston.

### Professional Societies

American Geophysical Union  
The Oceanography Society

### Synergistic Activities

- 2010-present Coordinating Lead Author for IPCC Working Group 1 Chapter 6
- 2010-present member of Interagency Working Group on Ocean Acidification chartered under JSOST
- 2009-present co-chair of the Global Ocean Ship-based Hydrographic Investigations Panel (GO-SHIP)
- 2010-2011 ex-officio SSC member for U.S. Ocean Carbon and Biogeochemistry Program
- 2006-2011 member of Ocean Carbon and Biogeochemistry Time-Series Advisory Committee
- 2005-2011 member of PICES section on Carbon and Climate
- 2003-2011 Member of the US CLIVAR/CO<sub>2</sub> Repeat Hydrography Oversight Committee
- 2008-2011 co-chair of the Carbon Cycle Science Working Group (develop a new US CCS Plan)
- 2004-2011 Chair of IOC/SCOR International Ocean Carbon Coordination Project (IOCCP)
- 2007-2010 member of International Repeat Hydrography Advisory Group
- 2008-2010 advisory group for the *Ronald H. Brown*
- 2005-2009 Scientific Steering Committee member for U.S. Ocean Carbon and Climate Change Program
- 2005-2009 Scientific Steering Committee member for U.S. Ocean Carbon and Biogeochemistry Program
- 2004-2008 Scientific Steering Committee member for U.S. North American Carbon Program
- 2004-2006 Contributing author to IPCC Fourth Assessment Report
- 2001-2006 Scientific Steering Committee member for IGBP/IHDP/WCRP Global Carbon Project
- 2003-2005 Lead author for IPCC Special Report on carbon dioxide capture and storage

2002-2005 Member of PICES Working Group 17: Biogeochemical Data Integration and Synthesis  
 2001-2005 Member of International CLIVAR/CLIC Southern Ocean panel  
 2001-2004 Working Group for the Implementation of the North American Carbon Program (NACP)  
 2002-2004 Working Group for the Implementation of Ocean Carbon and Climate Change (OCCC) Program  
 2001-2004 Member of US CLIVAR Southern Ocean panel  
 2000-2003 Member of IGBP Integrated Global Carbon Observing (IGCO) theme team  
 1998-2003 Member of CARbon dioxide IN the Atlantic (CARINA)

### **Cruise Experience**

2/29/08-4/12/08 Ronald H. Brown Southern Ocean Gasex sponsored by NOAA (chief scientist)

5/11/07-6/14/07 R/V Wecoma NACP West Coast Cruise sponsored by NOAA (chief scientist)

2/13/06-3/3/06 R/V Thomas G. Thompson Carbon/CLIVAR P16N sponsored by NSF&NOAA (chief scientist)

1/9/05-2/20/05 R/V Revelle Carbon/CLIVAR P16S sponsored by NSF&NOAA COSP

10/23/03-11/14/03 R/V Knorr Carbon/CLIVAR A22 sponsored by NSF&NOAA COSP

2/2/01-3/8/01 Ronald H. Brown GASEX – 2001 sponsored by NOAA/OGP

7/16/97-8/11/97 R/V Knorr, WOCE leg A20 sponsored by WOCE/DOE

11/1/95-11/28/95 R/V Knorr; WOCE leg I10 sponsored by WOCE/DOE

1/24/95-3/5/95 R/V Knorr; WOCE leg I9N sponsored by WOCE/DOE

10/5/93-11/10/93 R/V Thomas G. Thompson; WOCE leg P10 sponsored by WOCE/DOE

10/6/92-11/26/92 R/V Knorr; WOCE legs P16S/P17A sponsored by WOCE/DOE

4/1/90-5/1/90 R/V Endeavor; to: Bermuda Atlantic Time-series Station; sponsored by University of South Florida

1/89-9/91 13 cruises to: Hawaii Ocean Time-series Station ALOHA; sponsored by JGOFS/WOCE

12/6/88-12/12/88 R/V Townsend Cromwell; to: Penguin Bank, Hawaii; sponsored by NMFS/University of Hawaii (co-chief scientist)

5/26/88-6/26/88 R/V Townsend Cromwell; to Northwestern Hawaiian Islands; sponsored by NMFS/University of Hawaii (co-chief scientist)

11/12/87- R/V Townsend Cromwell; to: Penguin Bank, Hawaii;  
11/20/87 sponsored by NMFS/University of Hawaii

### Collaborators

N. Bates (BBSR); M. Behrenfeld (Oregon State Univ.); J. Bullister (PMEL); R.H. Byrne (USF); K. Cadeira (Lawrence Livermore Nat'l. Lab.); CARBOCEAN; F. Chavez (MBARI); M. Cronin (PMEL); T. Dickey (UCSB); A. Dickson (UCSD-Scripps); S. Doney (WHOI); R.A. Feely (PMEL); N. Gruber (UCLA); M. Hood (IOC-France); M. Ishii (MRI-Japan); G. Johnson (PMEL); D. Karl (Univ. of Hawaii); R. Key (Princeton); K. Lee (Pohang Univ.-South Korea); F. Mackenzie (Univ. of Hawaii); M. McPhaden (PMEL); F. Millero (Univ. of Miami); R. Najjar (Penn State U.); T. Ono (NRI-Japan); J. Orr (IPSL – France); T.-H. Peng (AOML); J. Sarmiento (Princeton); U. Send (IfM-Kiel); T. Takahashi (LDEO); B. Tilbrook (CSIRO-Australia); D. Wallace (IFM-Kiel, Germany); R. Wanninkhof (AOML); Y. Watanabe (Hokkaido Univ.-Japan); C.S. Wong (IOS-Canada)

### Recent Significant Presentations and Workshop Activities

- Sabine, C. L.** (2011) Ocean Uptake of Atmospheric CO<sub>2</sub> and its Impact on Marine Ecosystems. *ASLO 2011 Aquatic Sciences Meeting*, Invited Plenary Lecture.
- Shamberger, K.E.F., R. A. Feely, **C. L. Sabine**, M.J. Atkinson, E. H. DeCarlo, F. T. Mackenzie, P. S. Drupp, D. A. Butterfield (2011) Ocean-Atmosphere Exchange Of CO<sub>2</sub> on Coral Reefs of Oahu, Hawaii. *ASLO 2011 Aquatic Sciences Meeting*, Oral Session S16.
- De Carlo, E.H. P. S. Drupp, F. T. Mackenzie, K. Shamberger, S. Maenner-Jones, S. Muscielowicz, **C.L. Sabine** and R. A. Feely (2011) Ocean-Atmosphere Exchange Of CO<sub>2</sub> on Coral Reefs of Oahu, Hawaii. *ASLO 2011 Aquatic Sciences Meeting*, Oral Session S16.
- Sabine, C. L.** and K. Frank (2010) Controls on Ecosystem Structure: The Need for an Integrated Fisheries to Biogeochemistry Approach. *IMBER IMBIZO II Meeting*, Invited Plenary Speaker in Workshop 2.
- Shamberger, K.E.; R. A. Feely; **C. L. Sabine**; P. S. Drupp; E. H. De Carlo; F. T. Mackenzie; M. Atkinson; D. A. Butterfield (2010) Ocean Acidification and Calcification on a Hawaiian Coral Reef. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract BO15A-11.
- Sonnerup, R.; S. Mecking; J. L. Bullister; **C. L. Sabine** (2010) Sulfur Hexafluoride in the Eastern North Pacific Ocean. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract CO11A-03.
- Drupp, P.S.; D. P. Dumas; E. H. De Carlo; F. T. Mackenzie; S. Maenner-Jones; S. Musielewicz; **C. L. Sabine**; R. A. Feely (2010) Driving Factors in the Temporal Variability in Productivity and Ocean-Atmosphere CO<sub>2</sub> Exchange in Hawaiian Coastal Waters. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract CO15B-07.
- Fassbender, A.; **C. L. Sabine**; R. A. Feely; B. R. Hales; C. Langdon; C. W. Mordy; J. M. Hummon (2010) Mechanisms Controlling Inorganic Carbon Dynamics during Northern California Coastal Upwelling. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract CO54A-07.
- Hamme, R.C.; S. Batten; L. A. Coogan; W. R. Crawford; K. B. Dohan; S. R. Emerson; C. C. Eriksen; K. E. Giesbrecht; J. F. Gower; M. T. Kavanaugh; D. Lockwood; **C. L. Sabine**; P. Webley; F. Whitney (2010) Natural volcanic iron fertilization of the Subarctic North Pacific. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract IT23C-01 (*Invited*).
- Cronin, M.F.; **C. L. Sabine**; S. R. Emerson; M. Robert; M. H. Alford; J. A. Nystuen; E. A. D'Asaro; J. M. Thomson; R. R. Harcourt; C. C. Eriksen (2010) Ongoing Ocean Station P Time Series. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract IT24D-06.
- Stump, C.; S. R. Emerson; **C. L. Sabine**; M. F. Cronin; M. D. DeGrandpre; S. E. Cullison (2010) Determining Organic and Inorganic Carbon Fluxes from the upper ocean using in situ measurements of O<sub>2</sub>, N<sub>2</sub>, pH and pCO<sub>2</sub>. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract IT24D-08.
- Moore, T.S.; M. D. DeGrandpre; **C. L. Sabine**; R. A. Feely; C. J. Zappa; W. R. McGillis; R. C. Hamme (2010) Depth Integrated CO<sub>2</sub> and O<sub>2</sub> in the Southern Ocean During the Austral Fall, 2008. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract IT45L-12.
- McGillis, W.R.; J. B. Edson; C. J. Zappa; M. D. DeGrandpre; **C. L. Sabine**; A. Cifuentes-Lorenzen; P. Vlahos; C. W. Fairall; L. Bariteau (2010) Air-water CO<sub>2</sub> exchange processes in the Southern Ocean. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract IT54D-04.

**Sabine, C.L.**; R. A. Feely; G. C. Johnson; P. G. Strutton; V. P. Lance; M. D. DeGrandpre; L. W. Juranek (2010) A Carbon Mass Balance for the Southern Ocean GasEx Experiment. *AGU/ASLO Ocean Sci. Meet. Suppl.*, Abstract IT54D-07.

### Refereed Publications

- Shamberger, K.E.F., R.A. Feely, **C.L. Sabine**, M.J. Atkinson, E.H. DeCarlo, F.T. Mackenzie, P.S. Drupp, and D.A. Butterfield (2011): Calcification and organic production on a Hawaiian coral reef. *Mar. Chem.*, 127(1–4), doi: 10.1016/j.marchem.2011.08.003, 64–75.
- Sabine, C.L.**, R.A. Feely, R. Wanninkhof, T. Takahashi, S. Khatiwala, and G.-H. Park (2011): The global ocean carbon cycle. In *State of the Climate in 2010*, 3. Global Oceans. Bull. Am. Meteorol. Soc., 92(6), S100–S108, doi:10.1175/1520-0477-92.6.S1.
- Michalak, A.M., R.B. Jackson, G. Marland, **C. Sabine**, and the Carbon Cycle Science Working Group (2011): *A U.S. Carbon Cycle Science Plan*. A Report for The U.S. Climate Change Science Program, Washington D.C., <http://www.carboncyclescience.gov/USCarbonCycleSciencePlan-August2011.pdf>, 94 pp.
- Ho, D.T., **C.L. Sabine**, D. Hebert, D.S. Ullman, R. Wanninkhof, R.C. Hamme, P.G. Strutton, B. Hales, J.B. Edson, and B.R. Hargreaves (2011): Southern Ocean gas exchange experiment: Setting the stage. *J. Geophys. Res.*, 116, C00F08, doi: 10.1029/2010JC006852.
- Emerson, S., **C. Sabine**, M.F. Cronin, R. Feely, S. Cullison, and M. DeGrandpre (2011): Quantifying the flux of CaCO<sub>3</sub> and organic carbon from the surface ocean using in situ measurements of O<sub>2</sub>, N<sub>2</sub>, pCO<sub>2</sub> and pH. *Global Biogeochem. Cycles*, doi: 10.1029/2010GB003924, 12pp.
- Drupp, P., E. Heinen De Carlo, F.T. Mackenzie, P. Bienfang, and **C.L. Sabine** (2011): Nutrient inputs, phytoplankton response and CO<sub>2</sub> variations in a semi-enclosed subtropical embayment, Kaneohe Bay, Hawaii. *Aquat. Geochem.*, doi: 10.1007/s10498-010-9115-y, 473–498.
- Fassbender, A.J., **C.L. Sabine**, R.A. Feely, C. Langdon, and C.W. Mordy (2011): Inorganic carbon dynamics during northern California coastal upwelling. *Cont. Shelf Res.*, doi: 10.1016/j.csr.2011.04.006, 1180–1192.
- Lee, K., **C.L. Sabine**, T. Tanhua, T.-W. Kim, R.A. Feely, and H.-C. Kim (2011): Roles of marginal seas in absorbing and storing fossil fuel CO<sub>2</sub>. *Energy Environ. Sci.*, 4, doi: 10.1039/C0EE00663G, 1133–1146.
- Bond, N.A., M.F. Cronin, **C. Sabine**, Y. Kawai, H. Ichikawa, P. Freitag, and K. Ronnholm (2011): Upper-ocean response to Typhoon Choi-Wan as measured by the Kuroshio Extension Observatory (KEO) mooring. *J. Geophys. Res.*, 116, C02031, doi: 10.1029/2010JC006548, 8 pp.
- Canadell, J., P. Ciais, K. Gurney, C. Le Quere, S. Piao, M. Raupach, and **C. Sabine** (2011): An international effort to quantify regional carbon fluxes. *Eos. Trans. AGU*, 92(10), 81–82.
- Vandemark, D., J.E. Salisbury, C.W. Hunt, S.M. Shellito, J.D. Irish, W.R. McGillis, **C.L. Sabine**, and S.M. Maenner (2011): Temporal and spatial dynamics of CO<sub>2</sub> air-sea flux in the Gulf of Maine. *J. Geophys. Res.*, 116, C01012, doi: 10.1029/2010JC006408.
- Trenberth, K.E., M. Balmaseda, N.L. Bindoff, J. Church, H.J. Freeland, G. Lagerloef, R.S. Nerem, M. Palmer, S. Rintoul, D. Roemmich, **C.L. Sabine**, D. Stammer, and P. Stott (2010): Intergovernmental Panel for Climate Change (IPCC) and attribution and prediction of climate: Progress since the Fourth Assessment. In *Proceedings of the "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 1)*, Venice, Italy, 21–25 September 2009, Hall, J., D.E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306, doi: 10.5270/OceanObs09.pp.39.
- Monteiro, P.M.S., U. Schuster, M. Hood, A. Lenton, N. Metzl, A. Olsen, K. Rogers, **C. Sabine**, T. Takahashi, B. Tilbrook, J. Yoder, R. Wanninkhof, and A.J. Watson (2010): A global sea surface carbon observing system: Assessment of changing sea surface CO<sub>2</sub> and air-sea CO<sub>2</sub> fluxes. In *Proceedings of the "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 2)*, Venice, Italy, 21–25 September 2009, Hall, J., D.E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306, doi: 10.5270/OceanObs09.cwp.64.
- Hood, M., M. Fukasawa, N. Gruber, G.C. Johnson, A. Körtzinger, **C. Sabine**, B. Sloyan, K. Stansfield, and T. Tanhua (2010): Ship-based repeat hydrography: A strategy for a sustained global program. In *Proceedings of the "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 2)*, Venice, Italy, 21–25 September 2009, Hall, J., D.E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306, doi: 10.5270/OceanObs09.cwp.44.

- Gruber, N., A. Körtzinger, **C.L. Sabine**, M. Hood, M. Ishii, P. Monteiro, R. Wanninkhof, R.A. Feely, Y. Nojiri, A. Kozyr, U. Schuster, D.W.R. Wallace, S.C. Doney, H. Claustre, and A. Borges (2010): Towards an integrated observing system for ocean carbon and biogeochemistry at a time of change. In *Proceedings of the "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 1)*, Venice, Italy, 21–25 September 2009, Hall, J., D.E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306, doi: 10.5270/OceanObs09.pp.18.
- Cronin, M.F., N. Bond, J. Booth, H. Ichikawa, T.M. Joyce, K. Kelly, M. Kubota, B. Qiu, C. Reason, M. Rouault, **C. Sabine**, T. Saino, J. Small, T. Suga, L.D. Talley, L. Thompson, and R.A. Weller (2010): Monitoring ocean-atmosphere interactions in western boundary current extensions. In *Proceedings of the "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 2)*, Venice, Italy, 21–25 September 2009, Hall, J., D.E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306, doi: 10.5270/OceanObs09.cwp.20.
- Borges, A.V., S.R. Alin, F.P. Chavez, P. Vlahos, K.S. Johnson, J.T. Holt, W.M. Balch, N. Bates, R. Brainard, W.-J. Cai, C.T.A. Chen, K. Currie, M. Dai, M. Degrandpre, B. Delille, A. Dickson, W. Evans, R.A. Feely, G.E. Friederich, G.-C. Gong, B. Hales, N. Hardman-Mountford, J. Hendee, J.M. Hernandez-Ayon, M. Hood, E. Huertas, D. Hydes, D. Ianson, E. Krasakopoulou, E. Litt, A. Luchetta, J. Mathis, W.R. McGillis, A. Murata, J. Newton, J. Olafsson, A. Omar, F.F. Perez, **C. Sabine**, J.E. Salisbury, R. Salm, V.V.S.S. Sarma, B. Schneider, M. Sigler, H. Thomas, D. Turk, D. Vandemark, R. Wanninkhof, and B. Ward (2010): A global sea surface carbon observing system: inorganic and organic carbon dynamics in coastal oceans. In *Proceedings of the "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 2)*, Venice, Italy, 21–25 September 2009, Hall, J., D.E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306, doi: 10.5270/OceanObs09.cwp.07.
- Tanhua, T., R.M. Key, M. Hoppema, A. Olsen, M. Ishii, and **C.L. Sabine** (2010): Expanding carbon data collection from the ocean's interior. *Eos. Trans. AGU*, 91(48), 457-458.
- Park, G.-H., R. Wanninkhof, S.C. Doney, T. Takahashi, K. Lee, R.A. Feely, **C. Sabine**, J. Triñanes, and I. Lima (2010): Variability of global net sea-air CO<sub>2</sub> fluxes over the last three decades using empirical relationships. *Tellus*, 62B(5), doi: 10.1111/j.1600-0889.2010.00498.x, 352–368.
- Hamme, R.C., P.W. Webley, W.R. Crawford, F.A. Whitney, M.D. DeGrandpre, S.R. Emerson, C.C. Eriksen, K.E. Giesbrecht, J.F.R. Gower, M.T. Kavanaugh, M.A. Peña, **C.L. Sabine**, S.D. Batten, L.A. Coogan, D.S. Grundle, and D. Lockwood (2010): Volcanic ash fuels anomalous plankton bloom in subarctic Northeast Pacific. *Geophys. Res. Lett.*, 37, L19604, doi: 10.1029/2010GL044629.
- Sabine, C.L.**, M. Hoppema, R.M. Key, B. Tilbrook, S. van Heuven, C. Lo Monaco, N. Metzl, M. Ishii, A. Murata, and S. Musielewicz (2010): Assessing the internal consistency of the CARINA data base in the Pacific sector of the Southern Ocean. *Earth Sys. Sci. Data*, 2(2), 195-204.
- Sabine, C.L.**, R.A. Feely, R. Wanninkhof, T. Takahashi, S. Khatiwala, and G.-H. Park (2010): i. The global ocean carbon cycle. In *State of the Climate in 2009*, 3. Global Oceans. Bull. Am. Meteorol. Soc., 91(7), doi: 10.1175/BAMS-91-7-State of the Climate, S71–S75.
- Sabine, C.L.**, H. Ducklow, and M. Hood (2010): International carbon coordination: Roger Revelle's legacy in the Intergovernmental Oceanographic Commission. *Oceanography*, 23(3), 48-61.
- Lo Monaco, C., M. Álvarez, R.M. Key, X. Lin, T. Tanhua, B. Tilbrook, D.C.E. Bakker, S. van Heuven, M. Hoppema, N. Metzl, A.F. Ríos, **C.L. Sabine**, and A. Velo (2010): Assessing the internal consistency of the CARINA database in the Indian sector of the Southern Ocean. *Earth Sys. Sci. Data*, 2(1), 51-70.
- Kim, T.-W., K. Lee, R.A. Feely, **C.L. Sabine**, C.-T.A. Chen, H.J. Jeong, and K.Y. Kim (2010): Prediction of Sea of Japan (East Sea) acidification over the past 40 years using a multiparameter regression model. *Global Biogeochem. Cycles*, 24, GB3005, doi: 10.1029/2009GB003637.
- Feely, R.A., S.R. Alin, J. Newton, **C.L. Sabine**, M. Warner, A. Devol, C. Krembs, and C. Maloy (2010): The combined effects of ocean acidification, mixing, and respiration on pH and carbonate saturation in an urbanized estuary. *Estuar. Coast. Shelf Sci.*, 88, 442–449.
- Egleston, E.S., **C.L. Sabine**, and F.M.M. Morel (2010): Revelle Revisited: Buffer factors that quantify the response of ocean chemistry to changes in DIC and alkalinity. *Global Biogeochem. Cycles*, 24, GB1002, doi: 10.1029/2008GB003407.
- Sabine, C.L.**, and T. Tanhua (2010): Estimation of anthropogenic CO<sub>2</sub> inventories in the ocean. *Annu. Rev. Mar. Sci.*, 2, 175–198.

- Juranek, L.W., R.A. Feely, W.T. Peterson, S.R. Alin, J. Peterson, K. Lee, **C.L. Sabine**, and B. Hales (2009): A novel method for determination of aragonite saturation state on the continental shelf of central Oregon using multi-parameter relationships with hydrographic data. *Geophys. Res. Lett.*, 36, L24601, doi: 10.1029/2009GL040778.
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