Wei-Jun Cai

The University of Delaware
School of Marine Science and Policy
Newark, DE 19716

TEL: (302) 831-2839
FAX: (302) 831-4389
E-mail: wcai@udel.edu

Education

1987-1992 Ph.D., Oceanography, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, CA. (Dissertation title: In situ microelectrode studies of the early diagenesis of organic carbon and $CaCO_3$ in hemipelagic sediments of the northeast Pacific Ocean)

1982-1985 M.S., Marine Chemistry, Shandong College of Oceanography (now: Ocean University of China), Qingdao, China.

1978-1982 B.S., Oceanography, Xiamen University, Xiamen, China.

Academic and professional positions held

2015- Mary A. S. Lighthipe Chair of Earth, Ocean and Environment, University of Delaware

2013- Professor, School of Marine Science and Policy, College of Earth, Ocean, and Environment, University of Delaware, Newark, DE.

1994-2012 Assistant (1994-2000), Associate (2000-2006), and Full Professor (2006-2012), Department of Marine Sciences, University of Georgia, Athens, GA.

1992-1994 Postdoctoral Fellow (92-93) and Postdoctoral Investigator (93-94), Woods Hole Oceanographic Institution. Woods Hole, MA.

1985-1987 Faculty member, Department of Chemistry, East China Normal University, Shanghai, China.

Honors and Awards

1) Fellow, the American Geophysical Union (AGU), Class 2017
2) Fellow, the Association for the Sciences of Limnology and Oceanography (ASLO), Class 2017
3) Chinese Ministry of Education Changjiang Scholar (part-time at Xiamen University) (2010--2012).
4) Creative Research Medal (2008), University of Georgia.
5) Outstanding (oversea) Young Scientist Award, the National Natural Science Foundation of China (2002). Part-time at Xiamen University.
6) Outstanding L&O Reviewer (2002), Limnology and Oceanography, American Society of Limnology and Oceanography.
7) 1999-2013. Guest Professor. Xiamen University, Xiamen, China.
8) 1998-2006. Guest Professor. Ocean University of China. Qingdao, China.
9) Marine Biological Laboratory (Woods Hole, MA), Summer Fellow (1998, 1996).
10) Selected for National Science Foundation's DISCO (Dissertation Symposium in Chemical Oceanography) Meeting (1993).
11) Woods Hole Oceanographic Institution Postdoctoral Fellowship (1992).
12) Best paper of the year, *Acta Oceanologica, Sinica (English Edition)* (1987).

Professional Societies

American Geophysical Union, AGU (1988-lifetime); Association for the Sciences of Limnology and Oceanography, ASLO (1994-, continuous since 2011); American Association for the Advancement of Science, AAAS (2010-2012, 2017-lifetime); American Chemical Society (1998-2003, 2012-2013); Geological Society of America (2002-2003), Geochemical Society (2017- lifetime)

Publications

Summary: Total of 185 publications, over 170 in peer-reviewed scientific journals. H index is 57 and total citation number over 10900 based on *Google Scholar* (https://scholar.google.com/citations?user=7i0r93YAAAAJ&hl=en). Or H index = 45 and total citation number is over 6300 based on *Web of Science* (http://www.researcherid.com/rid/C-1361-2013).

Journal articles (**indicates work under Cai's advisement or Cai is the lead/communication author)*

1. Li, D. et al. Hypoxic bottom waters as a carbon source to atmosphere during a typhoon passage over the East China Sea. Geophysical Research Letter. doi.org/10.1029/2019GL083933.
2. Huang, W.-J., W.-J. Cai, X. Xie, and M. Li. 2019. Wind-driven lateral variations of partial pressure of carbon dioxide in a large estuary. J. Mar. Syst. **195**: 67–73. doi:https://doi.org/10.1016/j.jmarsys.2019.03.002.
3. Shen et al. 2019. Ecosystem metabolism and carbon balance in Chesapeake Bay: A 30-year analysis using a coupled hydrodynamic-biogeochemical model. Journal of Geophysical Research: Oceans. 124, doi.org/10.1029/2019JC015296.
4. *Jiang, Z.-P., W.-J. Cai, B. Chen, K. Wang, C. Han, B. J. Roberts, N. Hussain, and Q. Li. 2019. Physical and Biogeochemical Controls on pH Dynamics in the Northern Gulf of Mexico During Summer Hypoxia. J. Geophys. Res. Ocean. **0**. doi:10.1029/2019JC015140
5. *Jiang, Z.-P., Cai, W.-J., Lehrter, J., Chen, B., Ouyang, Z., Le, C., and Roberts, B. J.: Spring net community production and its coupling with the CO_2 dynamics in the surface water of the northern Gulf of Mexico, Biogeosciences Discuss., https://doi.org/10.5194/bg-2019-88, in review, 2019.
6. *Su, J., W.-J. Cai, N. Hussain, J. Brodeur, B. Chen, and K. Huang. 2019. Simultaneous determination of dissolved inorganic carbon (DIC) concentration and stable isotope (δ13C-DIC) by Cavity Ring-Down Spectroscopy: Application to study carbonate dynamics in the Chesapeake Bay. Mar. Chem. **215**: 103689. doi:https://doi.org/10.1016/j.marchem.2019.103689
7. Chen, S., C. Hu, B. B. Barnes, R. Wanninkhof, W.-J. Cai, L. Barbero, and D. Pierrot. 2019. A machine learning approach to estimate surface ocean pCO2 from satellite measurements. Remote Sens. Environ. **228**: 203–226. doi:https://doi.org/10.1016/j.rse.2019.04.019
8. Le, Chengfeng, Yiyang Gao, Wei-Jun Cai, John C. Lehrter, Yan Bai, Zong-Pei Jiang (2019). Estimating summer sea surface pCO2 on a river-dominated continental shelf using a satellite-based semi-mechanistic model, Remote Sensing of Environment, 225, 115-126, https://doi.org/10.1016/j.rse.2019.02.023
9. Turk, D., H. Wang, X. Hu, D. K. Gledhill, Z. A. Wang, L. Jiang, and W.-J. Cai. 2019. Time of Emergence of Surface Ocean Carbon Dioxide Trends in the North American Coastal Margins in Support of Ocean Acidification Observing System Design . Front. Mar. Sci. **6**: 91.
10. *Brodeur, J. R., B. Chen, J. Su, and others. 2019. Chesapeake Bay Inorganic Carbon: Spatial Distribution and Seasonal Variability. Front. Mar. Sci. **6**: 99.
11. Yuan, X., Y. Guo, W. Cai, H. Huang, W. Zhou, and S. Liu. 2019. Coral responses to ocean warming and acidification: Implications for future distribution of coral reefs in the South China Sea. Mar. Pollut. Bull. **138**: 241–248. doi:https://doi.org/10.1016/j.marpolbul.2018.11.053
12. Shen, C., J. M. Testa, M. Li, W.-J. Cai, G. G. Waldbusser, W. Ni, W. M. Kemp, J. Cornwell, B. Chen, J. Brodeur and J. Su, 2019. Controls on carbonate system dynamics in a coastal plain estuary: a modelling study. *Journal of Geophysical Research-Biogeosciences*, 124. https://doi.org/10.1029/2018JG004802.
13. *Zhang Y.F., Y.H. Gao, D. Kirchman, M .T. Cottrell, R. Chen, K. Wang, Z.X. Ouyang, Y.Y. Xu, B. Chen, K.D. Yin and W-J Cai, 2019. Biological regulation of pH during intensive growth of phytoplankton in two eutrophic estuarine waters. *Marine Ecology Progress Series*, 609: 87-99.

14. Li, D., J. Chen, X. Ni, Wang, K., Zeng, D. Wang, B. Jin, H., Huang, D., and Cai, W-J. 2018. Effects of Biological Production and Vertical Mixing on Sea Surface pCO2 Variations in the Changjiang River Plume During Early Autumn: A Buoy-Based Time Series Study. J. Geophys. Res. Ocean. **123**: 6156–6173. doi:10.1029/2017JC013740
15. Najjar, R. G., M. Herrmann, R. Alexander, and others. 2018. Carbon Budget of Tidal Wetlands, Estuaries, and Shelf Waters of Eastern North America. Global Biogeochem. Cycles **32**: 389–416. doi:10.1002/2017GB005790
16. Robbins, L., K. Daly, L. Barbero, and others. 2018. Spatial and Temporal Variability of pCO2, Carbon Fluxes, and Saturation State on the West Florida Shelf, Journal of Geophysical Research: Oceans, 123.
17. *Xue, L., W.-J. Cai, T. Takahashi, and others. 2018. Climatic modulation of surface acidification rates through summertime wind forcing in the Southern Ocean. *Nature Communications* **9**: 3240. doi:10.1038/s41467-018-05443-7.
18. Saba, G.K., Wright-Fairbanks, E., Chen, B., Cai, W.-J., Barnard, A.H., Jones, C.P., Branham, C.W., Wang, K., Miles, T. 2018. Developing a profiling glider pH sensor for high resolution coastal ocean acidification monitoring. *Oceans* 2018.
19. *Yuan, X., W.-J. Cai, C. Meile, and others. 2018. Quantitative interpretation of vertical profiles of calcium and pH in the coral coelenteron. *Marine Chemistry* doi:https://doi.org/10.1016/j.marchem.2018.06.001.
20. *Yang, X., L. Xue, Y. Li, P. Han, X. Liu, L. Zhang, and W.-J. Cai. 2018. Treated Wastewater Changes the Export of Dissolved Inorganic Carbon and Its Isotopic Composition and Leads to Acidification in Coastal Oceans. *Environ. Sci. Technol.* **52**: 5590–5599. doi:10.1021/acs.est.8b00273
21. Ouyang, Z., R. Chen, Q. Liu, L. He, W.-J. Cai, and K. Yin. 2018. Biological regulation of carbonate chemistry during diatom growth under different concentrations of Ca2+ and Mg2+. Mar. Chem. doi:https://doi.org/10.1016/j.marchem.2018.04.002
22. Lohrenz, S. E., Cai, W.-J., Chakraborty, S., Huang, W.-J., Guo, X., He, R., Tian, H. (2018). Satellite estimation of coastal pCO_2 and air-sea flux of carbon dioxide in the northern Gulf of Mexico. *Remote Sensing of Environment*. https://doi.org/https://doi.org/10.1016/j.rse.2017.12.039
23. Laruelle, G. G., Cai, W.-J., Hu, X., Gruber, N., Mackenzie, F. T., & Regnier, P. (2018). Continental shelves as a variable but increasing global sink for atmospheric carbon dioxide. *Nature Communications*, *9*(1), 454. https://doi.org/10.1038/s41467-017-02738-z.
24. Grottoli AG, Dalcin Martins P, Wilkins MJ, Johnston MD, Warner ME, Cai W-J, et al. (2018) Coral physiology and microbiome dynamics under combined warming and ocean acidification. PLoS ONE 13(1): e0191156. https://doi.org/10.1371/journal.pone.0191156
25. Chen, S., Hu, C., Cai, W.-J., & Yang, B. (2017). Estimating surface pCO_2 in the northern Gulf of Mexico: Which remote sensing model to use? *Continental Shelf Research*, *151*, 94–110. https://doi.org/https://doi.org/10.1016/j.csr.2017.10.013
26. *Joesoef, A., Kirchman, D. L., Sommerfield, C. K., & Cai, W.-J. (2017). Seasonal variability of the inorganic carbon system in a large coastal plain estuary. *Biogeosciences*, *14*(21), 4949–4963. https://doi.org/10.5194/bg-14-4949-2017
27. *Gonski, S. F., Cai, W.-J., Ullman, W. J., Joesoef, A., Main, C. R., Pettay, D. T., & Martz, T. R. (2018). Assessment of the suitability of Durafet-based sensors for pH measurement in dynamic estuarine environments. *Estuarine, Coastal and Shelf Science*, *200*, 152–168. https://doi.org/https://doi.org/10.1016/j.ecss.2017.10.020
28. * Cai, W.-J., Huang, W.-J. Luther, G. W. , Pierrot, D, Li M, Testa, J, Xue M, Joesoef, A, Mann, R, Brodeur, J, Xu, YY, Chen, B, Hussain, N, Waldbusser, GG, Cornwell, J, Kemp, WM. 2017. Redox reactions and weak buffering capacity lead to acidification in the Chesapeake Bay. *Nature Communications* **8**: s41467-17. doi:10.1038/s41467-017-00417-7.
29. *Reimer, J. J., Cai, W.-J., Xue, L., Vargas, R., Noakes, S., Hu, X., … Wanninkhof, R. (2017). Time series pCO2 at a coastal mooring: Internal consistency, seasonal cycles, and interannual variability.

Continental Shelf Research, *145*(Supplement C), 95–108. https://doi.org/https://doi.org/10.1016/j.csr.2017.06.022
30. *Reimer, J. J., Wang, H., Vargas, R., & Cai, W.-J. (2017). Multidecadal fCO2 Increase Along the United States Southeast Coastal Margin. *Journal of Geophysical Research: Oceans*, n/a-n/a. https://doi.org/10.1002/2017JC013170
31. Feely, R.A., Remy R. Okazaki, Wei-Jun Cai, Nina Bednaršek, Simone R. Alin, Robert H. Byrne, Andrea Fassbender (2018): The combined effects of acidification and hypoxia on pH and aragonite saturation in the coastal waters of the California current ecosystem and the northern Gulf of Mexico, Continental Shelf Research, 152, 50-60, doi.org/10.1016/j.csr.2017.11.002.
32. Kim, K. H., Heiss, J. W., Michael, H. A., Cai, W.-J., Laattoe, T., Post, V. E. A., & Ullman, W. J. (2017). Spatial Patterns of Groundwater Biogeochemical Reactivity in an Intertidal Beach Aquifer. *Journal of Geophysical Research: Biogeosciences*, *122*(10), 2017JG003943. https://doi.org/10.1002/2017JG003943
33. *Xu, Y.-Y., W.-J. Cai, Y. Gao, R. Wanninkhof, J. Salisbury, B. Chen, J. J. Reimer, S. Gonski, and N. Hussain (2017), Short-term variability of aragonite saturation state in the central Mid-Atlantic Bight, J. Geophys. Res. Oceans, 122, doi:10.1002/2017JC012901.
34. *Xu, Y.-Y., Pierrot, D., & Cai, W.-J. (2017). Ocean carbonate system computation for anoxic waters using an updated CO2SYS program. *Marine Chemistry*. https://doi.org/10.1016/j.marchem.2017.07.002
35. Hu, X., Li, Q., Huang, W.-J., Chen, B., Cai, W.-J., Rabalais, N. N., & Eugene Turner, R. (2017). Effects of eutrophication and benthic respiration on water column carbonate chemistry in a traditional hypoxic zone in the Northern Gulf of Mexico. *Marine Chemistry*, (November 2016), 0–1. https://doi.org/10.1016/j.marchem.2017.04.004
36. *Xue, L., Cai, W. J., Sutton, A. J., & Sabine, C. (2017). Sea surface aragonite saturation state variations and control mechanisms at the Gray's Reef time-series site off Georgia, USA (2006-2007). *Marine Chemistry*. https://doi.org/10.1016/j.marchem.2017.05.009.
37. Wang, H., Hu, X., Cai, W. J., & Sterba-Boatwright, B. (2017). Decadal fCO2 trends in global ocean margins and adjacent boundary current-influenced areas. *Geophysical Research Letters*, *44*(17), 8962–8970. https://doi.org/10.1002/2017GL074724
38. *Wang S., Di Iorio, D., Hopkinson, C., and Cai, W-J. Inorganic carbon and oxygen dynamics in a marsh-dominated estuary. *Limnology and Oceanography, 2017 (doi: 10.1002/lno.10614).*
39. *Qi, D., Chen, L., Chen, B., Gao, Z., Zhong, W., Feely, R.A., Anderson, L.G., Sun, H., Chen, J., Chen, M., Zhan, L., Zhang, Y. and Cai, W.-J., 2017. Increase in acidifying water in the western Arctic Ocean. *Nature Climate Change*, 7(3): 195-199.
40. Laruelle, G. G., Goossens, N., Arndt, S., Cai, W.-J., and Regnier, P.: Air–water CO_2 evasion from US East Coast estuaries, *Biogeosciences*, 14, 2441-2468, doi:10.5194/bg-14-2441-2017, 2017.
41. Laurent, A., Fennel, K., Cai, W. J., Huang, W. J., Barbero, L., & Wanninkhof, R. (2017). Eutrophication-induced acidification of coastal waters in the northern Gulf of Mexico: Insights into origin and processes from a coupled physical-biogeochemical model. *Geophysical Research Letters*, *44*(2), 946–956. https://doi.org/10.1002/2016GL071881
42. Wang, B., Chen, J., Jin, H., Li, H., and **Cai, W.-J.** 2017. Diatom bloom–derived bottom water hypoxia off the Changjiang estuary: with and without typhoon influence. *Limnology and Oceanography 62(4): 1552-1569.*
43. Xue, Z., He, R., Fennel, K., Cai, W. J., Lohrenz, S., Huang, W. J., … Zang, Z. (2016). Modeling pCO_2 variability in the Gulf of Mexico. *Biogeosciences*, *13*(15), 4359–4377. https://doi.org/10.5194/bg-13-4359-2016
44. Takagi, K. K., K. S. Hunter, W.-J. Cai, and S. B. Joye. 2016. Agents of change and temporal nutrient dynamics in the Altamaha River Watershed. Ecosphere 00(00):e01519. 10.1002/ecs2.1519
45. *Cai, W.-J., Ma, Y., Hopkinson, B.M., Grottoli, A.G., Warner, M.E., Ding, Q., Hu, X., Yuan, X., Schoepf, V., Xu, H., Han, C., Melman, T.F., Hoadley, K.D., Pettay, D.T., Matsui, Y., Baumann, J.H.,

Levas, S., Ying, Y. and Wang, Y., 2016. Microelectrode characterization of coral daytime interior pH and carbonate chemistry. Nat Commun, 7.

46. Schoepf, V.; Hu, X.; Holcomb, M.; Cai, W.-J.; Li, Q.; Wang, Y.; Xu, H.; Warner, M. E.; Melman, T. F.; Hoadley, K. D.; Pettay, D. T.; Matsui, Y.; Baumann, J. H.; Grottoli, A. G., Coral calcification under environmental change: a direct comparison of the alkalinity anomaly and buoyant weight techniques. *Coral Reefs* **2016**, 1-13.
47. Sutton, A.J., Sabine, C.L., Feely, R.A., Cai, W.J., Cronin, M.F., McPhaden, M.J., Morell, J.M., Newton, J.A., Noh, J.H., Ólafsdóttir, S.R., Salisbury, J.E., Send, U., Vandemark, D.C. and Weller, R.A., 2016. Using present-day observations to detect when anthropogenic change forces surface ocean carbonate chemistry outside preindustrial bounds. Biogeosciences, 13(17): 5065-5083.
48. Osborne, E.B., Thunell, R.C., Marshall, B.J., Holm, J.A., Tappa, E.J., Benitez-Nelson, C., **Cai, W.-J.** and Chen, B., 2016. Calcification of the planktonic foraminifera Globigerina bulloides and carbonate ion concentration: Results from the Santa Barbara Basin. Paleoceanography: 2016PA002933.
49. *Xue, L., **Cai, W.-J.**, Hu, X., Sabine, C., Jones, S., Sutton, A.J., Jiang, L.-Q. and Reimer, J.J., 2016. Sea surface carbon dioxide at the Georgia time series site (2006–2007): Air–sea flux and controlling processes. Progress in Oceanography, 140: 14-26.
50. Hoadley, K. D.; Pettay, D. T.; Grottoli, A. G.; **Cai, W.-J.**; Melman, T. F.; Levas, S.; Schoepf, V.; Ding, Q.; Yuan, X.; Wang, Y.; Matsui, Y.; Baumann, J. H.; Warner, M. E., High-temperature acclimation strategies within the thermally tolerant endosymbiont Symbiodinium trenchii and its coral host, Turbinaria reniformis, differ with changing pCO_2 and nutrients. *Marine Biology* **2016,** *163*, (6), 134.
51. Bakker, D.C.E., Pfeil, B., Landa, C.S., Metzl, N., O'Brien, K.M., Olsen, A., Smith, K., Cosca, C., Harasawa, S., Jones, S.D., Nakaoka, S.I., Nojiri, Y., Schuster, U., Steinhoff, T., Sweeney, C., Takahashi, T., Tilbrook, B., Wada, C., Wanninkhof, R., Alin, S.R., Balestrini, C.F., Barbero, L., Bates, N.R., Bianchi, A.A., Bonou, F., Boutin, J., Bozec, Y., Burger, E.F., Cai, W.J., Castle, R.D., Chen, L., Chierici, M., Currie, K., Evans, W., Featherstone, C., Feely, R.A., Fransson, A., Goyet, C., Greenwood, N., Gregor, L., Hankin, S., Hardman-Mountford, N.J., Harlay, J., Hauck, J., Hoppema, M., Humphreys, M.P., Hunt, C.W., Huss, B., Ibánhez, J.S.P., Johannessen, T., Keeling, R., Kitidis, V., Körtzinger, A., Kozyr, A., Krasakopoulou, E., Kuwata, A., Landschützer, P., Lauvset, S.K., Lefèvre, N., Lo Monaco, C., Manke, A., Mathis, J.T., Merlivat, L., Millero, F.J., Monteiro, P.M.S., Munro, D.R., Murata, A., Newberger, T., Omar, A.M., Ono, T., Paterson, K., Pearce, D., Pierrot, D., Robbins, L.L., Saito, S., Salisbury, J., Schlitzer, R., Schneider, B., Schweitzer, R., Sieger, R., Skjelvan, I., Sullivan, K.F., Sutherland, S.C., Sutton, A.J., Tadokoro, K., Telszewski, M., Tuma, M., van Heuven, S.M.A.C., Vandemark, D., Ward, B., Watson, A.J. and Xu, S., 2016. A multi-decade record of high-quality fCO2 data in version 3 of the Surface Ocean CO2 Atlas (SOCAT). Earth Syst. Sci. Data, 8(2): 383-413.
52. Bai, Y., **Cai, W.-J.**, He, X., Zhai, W., Pan, D., Dai, M. and Yu, P., 2015. A mechanistic semi-analytical method for remotely sensing sea surface pCO_2 in river-dominated coastal oceans: A case study from the East China Sea, *Journal of Geophysical Research-Ocean*, 120, doi:10.1002/ 2014JC010632.
53. Breitburg, D.L., J. Salisbury, J.M. Bernhard, **W.-J. Cai**, S. Dupont, S.C. Doney, K.J. Kroeker, L.A. Levin, W.C. Long, L.M. Milke, S.H. Miller, B. Phelan, U. Passow, B.A. Seibel, A.E. Todgham, and A.M. Tarrant. 2015. And on top of all that… Coping with ocean acidification in the midst of many stressors. Oceanography 28(2):48–61, http://dx.doi.org/10.5670/oceanog.2015.31.
54. Evans, W., Mathis, J.T., Cross, J.N., Bates, N.R., Frey, K.E., Else, B.G.T., Papkyriakou, T.N., DeGrandpre, M.D., Islam, F., **Cai, W.-J.**, Chen, B., Yamamoto-Kawai, M., Carmack, E., Williams, W.J. and Takahashi, T., 2015. Sea-air CO2 exchange in the western Arctic coastal ocean. Global Biogeochemical Cycles, 29(8): 2015GB005153.
55. Levas, S.; Grottoli, A. G.; Warner, M. E.; Cai, W. J.; Bauer, J.; Schoepf, V.; Baumann, J. H.; Matsui, Y.; Gearing, C.; Melman, T. F.; Hoadley, K. D.; Pettay, D. T.; Hu, X.; Li, Q.; Xu, H.; Wang, Y., Organic carbon fluxes mediated by corals at elevated pCO2 and temperature. *Marine Ecology Progress Series* **2015,** *519*, 153-164.
56. Hoadley, K. D.; Pettay, D. T.; Grottoli, A. G.; Cai, W.-J.; Melman, T. F.; Schoepf, V.; Hu, X.; Li, Q.; Xu, H.; Wang, Y.; Matsui, Y.; Baumann, J. H.; Warner, M. E., Physiological response to elevated temperature and pCO2 varies across four Pacific coral species: Understanding the unique host+symbiont response. *Scientific Reports* **2015,** *5*, 18371.

57. *Chen, B., **Cai, W.-J.** and Chen, L., 2015. The marine carbonate system of the Arctic Ocean: Assessment of internal consistency and sampling considerations, summer 2010. Marine Chemistry, 176: 174-188.
58. *Huang, W.-J., **Cai, W.-J.**, Wang, Y., Hu, X., Chen, B., Lohrenz, S.E., Chakraborty, S., He, R., Brandes, J., Hopkinson, C.S., 2015. The response of inorganic carbon distributions and dynamics to upwelling-favorable winds on the northern Gulf of Mexico during summer. Cont. Shelf Res. 111, 211–222. doi:10.1016/j.csr.2015.08.020
59. *Huang, W-J., **Cai, W-J.**, Wang, Y., Lohrenz, S.E., and Murrell, M.C. 2015. The carbon dioxide (CO_2) system on the Mississippi River–dominated continental shelf in the northern Gulf of Mexico – I: Distribution and air-sea CO_2 flux, *Journal of Geophysical Research-Ocean.* 120, 1429–1445, doi:10.1002/2014JC010498.
60. *Joesoef, A., Huang, W.J., Gao, Y. and **Cai, W.J.**, 2015. Air–water fluxes and sources of carbon dioxide in the Delaware Estuary: spatial and seasonal variability. Biogeosciences, 12(20): 6085-6101.
61. *Xue, J., **Cai, W.-J.**, Hu, X., Huang, W.-J., Lohrenz, S.E. and Gundersen, K., 2015. Temporal variation and stoichiometric ratios of organic matter remineralization in bottom waters of the northern Gulf of Mexico during late spring and summer. Journal of Geophysical Research: Oceans: 120(12): 8304-8326.
62. Tian, H., W. Ren, J. Yang , B. Tao, **W. Cai** , S.E. Lohrenz, C.S. Hopkinson, M. Liu, Q. Yang, C. Lu , B. Zhang, K. Banger, S. Pan, R. He, and Z. Xue (2015), Climate extremes dominating seasonal and interannual variations in carbon export from the Mississippi River Basin, Global Biogeochem. Cycles, 29, doi:10.1002/ 2014GB005068.
63. Patsavas, M. C., R. H. Byrne, R. Wanninkhof, R. A. Feely, and W.-J. Cai. 2015. Internal consistency of marine carbonate system measurements and assessments of aragonite saturation state: Insights from two U.S. coastal cruises. Mar. Chem. **176**: 9–20. doi:http://dx.doi.org/10.1016/j.marchem.2015.06.022.
64. Wanninkhof, R., Barbero, L., Byrne, R., **Cai, W.-J.**, Huang, W.-J., Zhang, J.-Z., Baringer, M. and Langdon, C., 2015. Ocean acidification along the Gulf Coast and East Coast of the USA. Continental Shelf Research, 98(0): 54-71.
65. Xue, L., L. Gao, W.-J. Cai, W. Yu, *and* M. Wei. 2015. Response of sea surface fugacity of CO_2 to the SAM shift south of Tasmania: Regional differences, Geophys. Res. Lett., 42, *doi:*10.1002/2015GL063926.
66. Ren, W., Tian, H., Tao, B., Yang, J., Pan, S., **Cai, W.-J.** , Lohrenz,S., He, R., Hopkinson, C., 2015. Increase in dissolved inorganic carbon flux from the Mississippi River to Gulf of Mexico due to climatic and anthropogenic changes over the 21st century. *Journal of Geophysical Research-Biogeosciences*, 120, doi:10.1002/2014JG002761.
67. Herrmann, M.; Najjar, R. G.; Kemp, W. M.; Alexander, R. B.; Boyer, E. W.; Cai, W.-J.; Griffith, P. C.; Kroeger, K. D.; McCallister, S. L.; Smith, R. A. 2015. Net ecosystem production and organic carbon balance of U.S. East Coast estuaries: A synthesis approach. *Global Biogeochemical Cycles 29*, (1), 2013GB004736.
68. Liu, Z., Zhang, L., **Cai, W.-J.**, Wang, L., Xue, M. and Zhang, X., 2014. Removal of dissolved inorganic carbon in the Yellow River Estuary. *Limnology and Oceanography* 59(2): 413-426.
69. Zhang, L., Xue, M., Wang, M., **Cai, W.-J.**, Wang, L. and Yu, Z., 2014. The spatiotemporal distribution of dissolved inorganic and organic carbon in the main stem of the Changjiang (Yangtze) River and the effect of the Three Gorges Reservoir. *Journal of Geophysical Research: Biogeosciences*, 119(5): 2012JG002230.
70. Tao, B.; Tian, H.; Ren, W.; Yang, J.; Yang, Q.; He, R.; **Cai, W.**; Lohrenz, S., 2014. Increasing Mississippi river discharge throughout the 21st century influenced by changes in climate, land use, and atmospheric CO_2. *Geophysical Research Letters 41*, (14), 2014GL060361.

71. Liu, H.-C., You, C.-F., **Cai, W.-J.**, Chung, C.-H., Huang, K.-F., Chen, B.-S. and Li, Y., 2014. Precise determination of seawater calcium using isotope dilution inductively coupled plasma mass spectrometry. *Analyst*, 139(4): 734-741.
72. Xue Z, He R, Fennel K, **Cai W.-J.**, Lohrenz S, Huang W-J, Tian H., 2014. Modeling pCO_2 variability in the Gulf of Mexico. *Biogeosciences Discussions* 11:12673-12695.
73. Hu, X., **Cai, W.-J.**, Rabalais, N.N. and Xue, J., 2014. Coupled oxygen and dissolved inorganic carbon dynamics in coastal ocean and its use as a potential indicator for detecting water column oil degradation. *Deep Sea Research Part II: Topical Studies in Oceanography*(0).
74. Bai, Y.; He, X.; Pan, D.; Chen, C.-T. A.; Kang, Y.; Chen, X.; **Cai, W.-J.**, 2014. Summertime Changjiang River plume variation during 1998–2010. *Journal of Geophysical Research: Oceans 119*, (9), 6238-6257.
75. *Han, C., **Cai, W.-J.**, Wang, Y. and Ye, Y., 2014. Calibration and evaluation of a carbonate microsensor for studies of the marine inorganic carbon system. Journal of Oceanography, 70(5): 425-433.
76. Rabalais, N. N.; **Cai, W.-J.**; Carstensen, J.; Conley, D. L.; Fry, B.; Hu, X.; Quinones-Rivera, Z.; Rosenberg, R.; Slomp, C. P.; Turner, R. E.; Voss, M.; Wissel, B.; Zhang, J. 2014, Eutrophication-driven deoxygenation in the coastal ocean. *Oceanography 27*, (1), 172-183.
77. Bakker, D. C. E.; Pfeil, B.; Smith, K.; Hankin, S.; Olsen, A.; Alin, S. R.; Cosca, C.; Harasawa, S.; Kozyr, A.; Nojiri, Y.; O'Brien, K. M.; Schuster, U.; Telszewski, M.; Tilbrook, B.; Wada, C.; Akl, J.; Barbero, L.; Bates, N. R.; Boutin, J.; Bozec, Y.; Cai, W. J.; Castle, R. D.; Chavez, F. P.; Chen, L.; Chierici, M.; Currie, K.; de Baar, H. J. W.; Evans, W.; Feely, R. A.; Fransson, A.; Gao, Z.; Hales, B.; Hardman-Mountford, N. J.; Hoppema, M.; Huang, W. J.; Hunt, C. W.; Huss, B.; Ichikawa, T.; Johannessen, T.; Jones, E. M.; Jones, S. D.; Jutterström, S.; Kitidis, V.; Körtzinger, A.; Landschützer, P.; Lauvset, S. K.; Lefèvre, N.; Manke, A. B.; Mathis, J. T.; Merlivat, L.; Metzl, N.; Murata, A.; Newberger, T.; Omar, A. M.; Ono, T.; Park, G. H.; Paterson, K.; Pierrot, D.; Ríos, A. F.; Sabine, C. L.; Saito, S.; Salisbury, J.; Sarma, V. V. S. S.; Schlitzer, R.; Sieger, R.; Skjelvan, I.; Steinhoff, T.; Sullivan, K. F.; Sun, H.; Sutton, A. J.; Suzuki, T.; Sweeney, C.; Takahashi, T.; Tjiputra, J.; Tsurushima, N.; van Heuven, S. M. A. C.; Vandemark, D.; Vlahos, P.; Wallace, D. W. R.; Wanninkhof, R.; Watson, A. J., 2014. An update to the Surface Ocean CO_2 Atlas (SOCAT version 2). *Earth Syst. Sci. Data 6*, (1), 69-90.
78. Bauer, J.E., **Cai, W.-J.**, Raymond, P.A., Bianchi, T.S., Hopkinson, C.S., Regnier, P.A.G., 2013. The changing carbon cycle of the coastal ocean. *Nature* 504, 61-70.
79. Hu, X., **Cai, W.-J.**, 2013. Estuarine acidification and minimum buffer zone—A conceptual study. *Geophysical Research Letters* 40, 5176-5181.
80. Zhai, W.D., Dai, M.H., Chen, B.S., Guo, X.H., Li, Q., Shang, S.L., Zhang, C.Y., **Cai, W.-J.**, Wang, D.X., 2013. Seasonal variations of air-sea CO_2 fluxes in the largest tropical marginal sea (South China Sea) based on multiple-year underway measurements. *Biogeosciences* 10, 7031-7074.
81. Xue, Z., He, R., Fennel, K., **Cai, W.-J.**, Lohrenz, S., Hopkinson, C., 2013. Modeling ocean circulation and biogeochemical variability in the Gulf of Mexico. *Biogeosciences* 10, 7219-7234.
82. Liu, M., Tian, H., Yang, Q., Yang, J., Song, X., Lohrenz, S.E., **Cai, W.-J.**, 2013. Long-term trends in evapotranspiration and runoff over the drainage basins of the Gulf of Mexico during 1901–2008. *Water Resources Research* 49, 1988-2012.
83. Schoepf, V.; Grottoli, A. G.; Warner, M. E.; Cai, W.-J.; Melman, T. F.; Hoadley, K. D.; Pettay, D. T.; Hu, X.; Li, Q.; Xu, H.; Wang, Y.; Matsui, Y.; Baumann, J. H., Coral Energy Reserves and Calcification in a High-CO_2 World at Two Temperatures. *PLoS ONE* **2013,** *8*, (10), e75049.
84. Signorini, S.R., Mannino, A., Najjar, R.G., Friedrichs, M.A.M., **Cai, W.-J.**, Salisbury, J., Wang, Z.A., Thomas, H., Shadwick, E., 2013. Surface ocean pCO_2 seasonality and sea-air CO_2 flux estimates for the North American east coast. *Journal of Geophysical Research: Oceans* 118, 1–22.
85. Chou, W.-C., Gong, G.-C., **Cai, W.-J.**, and Tseng, C.-M.: Seasonality of CO_2 in coastal oceans altered by increasing anthropogenic nutrient delivery from large rivers: evidence from the Changjiang–East China Sea system, *Biogeosciences* 10, 3889-3899, doi:10.5194/bg-10-3889-2013, 2013.
86. Zhang, L.-J., Wang, L., **Cai, W.-J.**, Liu, D. M., and Yu, Z. G.: Impact of human activities on organic carbon transport in the Yellow River, *Biogeosciences* 10, 2513-2524, doi:10.5194/bg-10-2513-2013, 2013.

87. Bai, Y., Pan, D., **Cai, W.-J.**, He, X., Wang, D., Tao, B., Zhu, Q., 2013. Remote sensing of salinity from satellite-derived CDOM in the Changjiang River dominated East China Sea. *Journal of Geophysical Research: Oceans* 118, 227-243.
88. *Huang, W.-J.; **Cai, W.-J.**, Castelao, R. M.; Wang, Y., Lohrenz, S. E., Impacts of a wind-driven cross-shelf large river plume on biological production and CO_2 uptake in the Gulf of Mexico during spring. *Limnology and Oceanography* **2013,** *58*, (5), 1727-1735.
89. *Jiang, L.Q., **Cai, W.-J.**, Wang, Y., Bauer, J.E., 2013. Influence of terrestrial inputs on continental shelf carbon dioxide. *Biogeosciences* 10, 839-849.
90. Wang, Z. A**.,** Wanninkhof, R., **Cai, W.-J.**, Byrne, R.H., Hu, X., Peng, T.-H., Huang, W.J. The marine inorganic carbon system along the Gulf of Mexico and Atlantic coasts of the United States: Insights from a transregional coastal carbon study. 2013. *Limnology and Oceanography* 58 (1): 325-342.
91. Pfeil, B., Olsen, A., Bakker, D. C. E., Hankin, S., Koyuk, H., Kozyr, A., Malczyk, J., Manke, A., Metzl, N., Sabine, C. L., Akl, J., Alin, S. R., Bates, N., Bellerby, R. G. J., Borges, A., Boutin, J., Brown, P. J., **Cai, W.-J.,** Chavez, F. P., Chen, A., Cosca, C., Fassbender, A. J., Feely, R. A., González-Dávila, M., Goyet, C., Hales, B., Hardman-Mountford, N., Heinze, C., Hood, M., Hoppema, M., Hunt, C. W., Hydes, D., Ishii, M., Johannessen, T., Jones, S. D., Key, R. M., Körtzinger, A., Landschützer, P., Lauvset, S. K., Lefèvre, N., Lenton, A., Lourantou, A., Merlivat, L., Midorikawa, T., Mintrop, L., Miyazaki, C., Murata, A., Nakadate, A., Nakano, Y., Nakaoka, S., Nojiri, Y., Omar, A. M., Padin, X. A., Park, G.-H., Paterson, K., Perez, F. F., Pierrot, D., Poisson, A., Ríos, A. F., Santana-Casiano, J. M., Salisbury, J., Sarma, V. V. S. S., Schlitzer, R., Schneider, B., Schuster, U., Sieger, R., Skjelvan, I., Steinhoff, T., Suzuki, T., Takahashi, T., Tedesco, K., Telszewski, M., Thomas, H., Tilbrook, B., Tjiputra, J., Vandemark, D., Veness, T., Wanninkhof, R., Watson, A. J., Weiss, R., Wong, C. S., and Yoshikawa-Inoue, H.: A uniform, quality controlled Surface Ocean CO_2 Atlas (SOCAT), Earth Syst. Sci. Data, 5, 125-143, doi:10.5194/essd-5-125-2013, 2013.
92. Sabine, C. L., Hankin, S., Koyuk, H., Bakker, D. C. E., Pfeil, B., Olsen, A., Metzl, N., Kozyr, A., Fassbender, A., Manke, A., Malczyk, J., Akl, J., Alin, S. R., Bellerby, R. G. J., Borges, A., Boutin, J., Brown, P. J., **Cai, W.-J.**, Chavez, F. P., Chen, A., Cosca, C., Feely, R. A., González-Dávila, M., Goyet, C., Hardman-Mountford, N., Heinze, C., Hoppema, M., Hunt, C. W., Hydes, D., Ishii, M., Johannessen, T., Key, R. M., Körtzinger, A., Landschützer, P., Lauvset, S. K., Lefèvre, N., Lenton, A., Lourantou, A., Merlivat, L., Midorikawa, T., Mintrop, L., Miyazaki, C., Murata, A., Nakadate, A., Nakano, Y., Nakaoka, S., Nojiri, Y., Omar, A. M., Padin, X. A., Park, G.-H., Paterson, K., Perez, F. F., Pierrot, D., Poisson, A., Ríos, A. F., Salisbury, J., Santana-Casiano, J. M., Sarma, V. V. S. S., Schlitzer, R., Schneider, B., Schuster, U., Sieger, R., Skjelvan, I., Steinhoff, T., Suzuki, T., Takahashi, T., Tedesco, K., Telszewski, M., Thomas, H., Tilbrook, B., Vandemark, D., Veness, T., Watson, A. J., Weiss, R., Wong, C. S., and Yoshikawa-Inoue, H.: Surface Ocean CO_2 Atlas (SOCAT) gridded data products, Earth Syst. Sci. Data, 5, 145-153, doi:10.5194/essd-5-145-2013, 2013.
93. Sunda, W. G., and **Cai, W.-J.**, 2012. Eutrophication Induced CO_2-acidification of subsurface coastal waters: interactive effects of temperature, salinity, and atmospheric P_{CO2}. *Environmental Science & Technology* **DOI:** 10.1021/es300626f.
94. *Huang, W.-J., **Cai, W.-J.**, Powell, R. T., Lohrenz, S. E., Wang, Y., Jiang, L.-Q. and Hopkinson, C. S., 2012. The stoichiometry of inorganic carbon and nutrient removal in the Mississippi River plume and adjacent continental shelf. *Biogeosciences*, 9, 1–12, 2012, doi:10.5194/bg-9-1-2012.
95. *Huang, W.-J., Wang, Y., and **Cai, W.-J.**, 2012. Assessment of sample storage techniques for total alkalinity and dissolved inorganic carbon in seawater. *Limnology and Oceanography-Methods*:10, 711-717, DOI 10.4319/lom.2012.10.711.
96. Dai M, Yin Z, Meng F, Liu Q, **Cai W-J**, 2012. Spatial distribution of riverine DOC inputs to the ocean: an updated global synthesis. Current Opinion in Environmental Sustainability, **4**: 170-178.
97. Hopkinson, C. S.; **Cai, W.-J.**; Hu, X. 2012., Carbon sequestration in wetland dominated coastal systems—a global sink of rapidly diminishing magnitude. *Current Opinion in Environmental Sustainability 4*, (2), 186-194.
98. *Guo, X., **Cai, W.-J.**, Huang, W-J., Wang, Y., Chen, F., Murrell, M.C., Lohrenz, S. Dai, M., Jiang, L-Q. and Culp, R., 2012. CO_2 dynamics and community metabolism in the Mississippi River plume. *Limnology and Oceanography* 57(1):1-17.

99. Tseng, C.-M.; Liu, K. K.; Gong, G. C.; Shen, P. Y.; **Cai, W.-J.**, 2011. CO_2 uptake in the East China Sea relying on Changjiang runoff is prone to change. *Geophys. Res. Lett. 38*, (24), L24609.
100. *Cai, W.-J.; Hu, X.; Huang, W.-J.; Murrell, M. C.; Lehrter, J. C.; Lohrenz, S. E.; Chou, W.-C.; Zhai, W.; Hollibaugh, J. T.; Wang, Y.; Zhao, P.; Guo, X.; Gundersen, K.; Dai, M.; Gong, G.-C., Acidification of subsurface coastal waters enhanced by eutrophication. *Nature Geosci* **2011,** *4*, (11), 766-770.
101. *Cai, W.-J. 2011. Estuarine and coastal ocean carbon paradox: CO_2 sinks or sites of terrestrial carbon incineration? *Annual Review of Marine Science* 3:123-45, doi:10.1146/annurev-marine-120709-142723.
102. *Hu, X. and **Cai, W.-J.**, 2011. The impact of denitrification on the atmospheric CO_2 uptake potential of seawater. *Marine Chemistry* 127:192-198, doi:10.1016/j.marchem.2011.09.008 (2011).
103. *Hu, X. and **Cai, W.-J.**, 2011. An assessment of ocean margin anaerobic processes on oceanic alkalinity budget. *Global Biogeochemical Cycles* 25, GB3003, doi: 10.1029/2010GB003859.
104. *Hu, X., **Cai, W.-J.**, Wang, Y., Guo, X. and Luo, S., 2011. Geochemical environments of continental shelf-upper slope sediments in the northern Gulf of Mexico. *Palaeogeography, Palaeoclimatology, Palaeoecology*, DOI: 10.1016/j.palaeo.2011.04.010.
105. Chou, W.-C.; Gong, G.-C.; **Cai, W.-J.**; Sheu, D. D.; Hung, C.-C.; Chen, H.-Y.; Chung, C.-C., CO_2 system in the oligotrophic northwest Pacific Ocean during the Asian dust storm season. *Marine Chemistry* **2011,** *127*, (1–4), 210-222.
106. Bates, N., **Cai, W.-J.** & Mathis, J. 2011. The Ocean Carbon Cycle in the Western Arctic Ocean: Distributions and Air-Sea Fluxes of Carbon Dioxide. *Oceanography* 24 (3): 186-201.
107. Li, C., and **Cai, W.-J.**, 2011. On the calculation of eddy diffusivity in the shelf water from radium isotopes: High sensitivity to advection. *Journal of Marine Systems* **86:** 28-33.
108. *Xue, L., Zhang, L., **Cai, W.-J.** & Jiang, L.-Q., 2011. Air–sea CO_2 fluxes in the southern Yellow Sea: An examination of the continental shelf pump hypothesis. *Continental Shelf Research* 31: 1904-1914. doi:10.1016/j.csr.2011.09.002.
109. Yuan, X.-C., Yin, K., **Cai, W.-J.**, Ho, A. Y., Xu, J., and Harrison, P. J., 2011. Influence of seasonal monsoons on net community production and CO_2 in subtropical Hong Kong coastal waters, *Biogeosciences*, 8, 289-300, doi:10.5194/bg-8-289-2011.
110. *Cai, W-J., Chen, L., Chen, B., Gao, Z. Lee, S.H., Chen, J., Pierrot, D., Sullivan, K., Wang, Y., Hu, X., Huang, W.-J., Zhang, Y., Xu, X., Murata, A., Grebmeier, J.M., Jones, E.P., and Zhang, H., 2010. Decrease in the CO_2 uptake capacity in an ice-free Arctic Ocean basin. *Science* 329(5991):556-9. doi:10.1126/science.1189338.
111. *Cai, W.-J.; Hu, X.; Huang, W.-J.; Jiang, L.-Q.; Wang, Y.; Peng, T.-H.; Zhang, X., 2010. Alkalinity distribution in the western North Atlantic Ocean margins, *Journal of Geophysical Research*, 115, C08014, doi:10.1029/2009JC005482.
112. *Cai, W-J., Luther, George W. III, Cornwell, Giblin, Anne E., 2010. Carbon cycling and the coupling between proton and electron transfer reactions in aquatic sediments in Lake Champlain. *Aquatic Geochemistry*. 16:421-446, DOI 10.1007/s10498-010-9097-9.
113. *Jiang, L.-Q., **Cai, W.-J.**, Feely, R., Wang, A. Y., X. Guo, Gledhill, D. K., Hu, X., Arzayus, F., Chen, F., Hartmann, J., and Zhang, L. 2010. Carbonate mineral saturation states along the U.S. east coast. *Limnology and Oceanography* 55(6), 2010, 2424-2432, DOI: 10.4319/lo.2010.55.6.2424.
114. Lohrenz, S.E., **Cai, W.**, Chen, F., Chen, X. and Tuel, M. 2010. Seasonal variability in air-sea fluxes of CO_2 in a river-influenced coastal margin. *Journal of Geophysical Research*,115, C10034, doi:10.1029/2009JC005608.
115. *Hu X., **Cai, W-J.**, Wang, Y., Luo, S., and Guo, X. 2010. Carbon cycling in two brine water-charged seep sediments in northern Gulf of Mexico continental slope. *Marine Chemistry* 118(3-4), 99-107.
116. *Jiang, L.-Q., Cai, W.-J., Wang, Y., Diaz, J., Yager, P. and Hu, X. 2010. Pelagic community respiration on the continental shelf off Georgia, USA. *Biogeochemistry* 98:101–113, DOI 10.1007/s10533-009-9379-8.

117. Yuan, X., Yin, K., Harrison, P., **Cai, W.**, He, L., Xu, J. 2010. Bacterial production and respiration in subtropical Hong Kong waters: influence of the Pearl River discharge and sewage effluent. *Aquatic Microbial Ecology*, 58:167-179.

118. Guo X, Dai M, Zhai W, **Cai W-J**, Chen B, 2009. CO_2 flux and seasonal variability in a large subtropical estuarine system, the Pearl River Estuary, China. *Journal of Geophysical Research*, 114, G03013, doi:10.1029/2008JG000905.

119. Zhai, W. D., Dai, M., and **Cai, W.-J.** 2009. Coupling of surface pCO_2 and dissolved oxygen in the northern South China Sea: impacts of contrasting coastal processes, *Biogeosciences*, 6, 2589-2598, 2009.

120. Dai, M., Lu, Z., Zhai, W., Chen, W., Cao, C., Zhou, Q., **Cai, W-J.** and Chen, C-T. A., 2009. Diurnal variations of surface seawater pCO_2 in contrasting coastal environmental settings. *Limnology and Oceanography*,54(3), 735-45.

121. Lohrenz, S.E., **Cai, W.-J.**, Chen, X. and Tuel, M. 2008. Satellite Assessment of Bio-Optical Properties of Northern Gulf of Mexico Coastal Waters Following Hurricanes Katrina and Rita. *Sensors*: 4135-4150. DOI: 10.3390/s8074135.

122. *Cai, W.-J., Guo, X., Chen, C.T. A., Dai, M., Zhang, L., Zhai, W., Lohrenz, S.E., Yin, K., Harrison, P. J. and Wang, Y. 2008. A comparative overview of weathering intensity and HCO_3^- flux of the world's major rivers with emphasis on the Changjiang, Huanghe, Zhujiang (Pearl) and Mississippi Rivers. *Continental Shelf Research* 28:1538-1549, doi:10.1016/j.csr.2007.10.014.

123. *Chen, F. and **Cai, W.-J.**, Wang, Y., Rii, Y.M., Bidigare, R.R., and Benitez-Nelson, C. 2008. Biogeochemical cycling of the carbon dioxide system and net community production estimation within a cold-core cyclonic eddy in the lee of Hawaii. *Deep-Sea Research II*. 55:1412-1425.

124. Dai, M., Zhai, W., **Cai, W.-J.**, Callahan, J., Huang, B, Shang, S., Huang, T., Li, X., Lu, Z., Chen, W., Chen, Z. 2008. Effects of an estuarine plume-associated bloom on the carbonate system in the lower reaches of the Pearl River Estuary, South China Sea. *Continental Shelf Research* 28:1416-1423.

125. *Guo, X., **Cai, W.-J.**, Zhai, W., Dai, M., Wang, Y. Chen, B. 2008. Seasonal Variations in the Inorganic Carbon System in the Pearl River (Zhujiang) Estuary. *Continental Shelf Research* 28:1424-1434.

126. *Jiang, L.-Q., Cai, W.-J., Wang, Y., Wanninkhof, R., and Lüger, H. 2008. Air-sea CO_2 fluxes on the U.S. South Atlantic Bight: Spatial and seasonal variability, *Journal of Geophysical Research*, 113, C07019, doi:10.1029/2007JC004366.

127. * Jiang, L.-Q., Cai, W.-J., and Wang, Y. 2008. A comparative study of carbon dioxide degassing in river- and marine-dominated estuaries. *Limnology and Oceanography*, 53: 2603-2615.

128. Lohrenz, S.E., Redalje, D.G., **Cai, W.-J.**, Acker, J., Dagg, M. 2008. A retrospective analysis of nutrients and phytoplankton productivity in the Mississippi River plume. *Continental Shelf Research*, 28:1466-1475, doi:10.1016/j.csr.2007.06.019.

129. Rabouille C, Conley DJ, Dai MH, Cai WJ, Chen CTA, Lansard B, Green R, Yin K, Harrison PJ, Dagg M. McKee, B. 2008. Comparison of hypoxia among four river-dominated ocean margins: The Changjiang (Yangtze), Mississippi, Pearl, and Rhône rivers. *Continental Shelf Research* 28:1527–1537.

130. Benitez-Nelson, C. R., et al. 2007, Mesoscale eddies drive increased silica export in the subtropical North Pacific Ocean, *Science*, 316:1017-1021. (W.-J. Cai and F. Chen are two of the 24 co-authors)

131. *Chen, F. and **Cai, W.-J.**, Benitez-Nelson, C., Wang, Y. 2007. Sea surface pCO_2-SST relationships across a cold-core cyclonic eddy: Implications for understanding regional variability and air-sea gas exchange. *Geophysical Research Letters*, 34, L10603, doi:10.1029/2006GL028058.

132. Zhang, X. and **Cai, W.-J.** 2007. On some biases of estimating the global distribution of air-sea CO_2 flux by bulk parameterizations, *Geophysical Research Letters*, 34, L01608, doi:10.1029/2006GL027337.

133. *Cai, W.-J., M. Dai, and Y. Wang. 2006. Air-sea exchange of carbon dioxide in ocean margins: A province-based synthesis, *Geophysical Research Letters*, 33, L12603, doi:10.1029/2006GL026219.
134. *Cai, W.-J. , F. Chen, E. Powell, S. Walker, K., M. Parsons-Hubbard, G. Staff, Y. Wang, K, Ashton-Alcox, W. R. Callender, C. Brett. 2006. Preferential dissolution of carbonate shells driven by petroleum seep activity in the Gulf of Mexico. *Earth and Planetary Science Letters*, 248:227-243.
135. Dai, M. Guo, X., Zhai, W., Yuan, L., Wang, B., Cai, P., Tang, T. and **Cai, W-J.** 2006, Oxygen depletion in the upper reach of the Pearl River estuary during a very drought winter. *Marine Chemistry*, 102:159-169.
136. Lohrenz, S. E., and **Cai, W.-J.**, 2006. Satellite ocean color assessment of air-sea fluxes of CO_2 in a river-dominated coastal margin, *Geophysical Research Letters*, 33, L01601, doi:10.1029/2005GL023942.
137. Dagg, M.J. Bianchi, T.S., Breed, G.A., **Cai, W-J.**, Duan, S. Liu, H., McKee, B.A. Powell, R.T. and Stewart, C.M. 2005. Biogeochemical characteristics of the lower Mississippi River, USA, during June 2003. *Estuaries*, 28:664-674.
138. *Wang, Z., **Cai, W.-J.**, Wang, Y. and Ji, H. 2005. The southeastern continental shelf of the United States as an atmospheric CO_2 source and an exporter of inorganic carbon to the ocean. *Continental Shelf Research*, 25:1917-1941.
139. Zhai, W., Dai, M., **Cai, W.-J.**, Wang, Y., Hong, H. S. 2005. The partial pressure of carbon dioxide and air-sea fluxes in the northern South China Sea in spring, summer and autumn. *Marine Chemistry*, 96:87-97.
140. Zhai, W., Dai, M., **Cai, W.-J.**, Wang, Y., Wang, Z. 2005. High partial pressure of CO_2 and its maintaining mechanism in a subtropical estuary: the Pearl River estuary, China. *Marine Chemistry*, 93:21-32.
141. *Cai, W.-J. and Dai, M. 2004. A Comment on "Enhanced open ocean storage of CO_2 from shelf sea pumping." *Science*, 306, 1477c.
142. *Cai, W.-J., Dai M., Wang, Y., Zhai, W., Huang, T., Chen, S., Zhang, F., Chen, Z., Wang, Z. 2004. The biogeochemistry of inorganic carbon and nutrients in the Pearl River estuary and the adjacent northern South China Sea. *Continental Shelf Research*, 24:1301-1319.
143. Xie, H., Zafiriou, O.C., **Cai, W.-J.**, Zepp, R.G., and Wang, Y. 2004. Photooxidation and its effects on the carboxyl content of dissolved organic matter in two coastal rivers in the Southeastern United States. Environmental Science & Technology 38: 4113 – 4119.
144. *Wang, Z. and Cai, W.-J. 2004. Carbon dioxide degassing and inorganic carbon export from a marsh dominated estuary (the Duplin River): A marsh CO_2 pump. *Limnology & Oceanography*, 49:341-352.
145. *Cai, W.-J. 2003. Riverine inorganic carbon flux and rate of biological uptake in the Mississippi River plume. *Geophysical Research Letters*, 30, 1032.
146. *Cai, W.-J., Wang, Z., and Wang, Y. 2003. The role of marsh-dominated heterotrophic continental margins in transport of CO_2 between the atmosphere, the land-sea interface and the ocean. *Geophysical Research Letters*, 30, 1849.
147. *Cai, W.-J., Wang, Y., Krest, J. and Moore, W.S. 2003. The geochemistry of dissolved inorganic carbon in a surficial groundwater aquifer in North Inlet, South Carolina and the carbon fluxes to the coastal ocean. *Geochimica et Cosmochimica Acta*, 67:631-637.
148. *Wang, Z., Cai, W.-J., Wang, Y., and Upchurch B.L. 2003. Spectrophotometric pCO_2 measurements based on a long pathlength liquid-core waveguide in the South Atlantic Bight. *Marine Chemistry*, 84:73-84.
149. Zhang, Z.-B., **Cai, W.-J.**, Liu, L., Liu, C. & Chen, F. 2003. Direct determination of thickness of sea surface microlayer using a pH microelectrode at original location. *Science in China-Series B*, 46:339-351 (English version); & 33:201-210 (Chinese version, i.e.,《中国科学》B 辑).

150. Zhang, Z-B., Liu, L., Liu, C. and **Cai, W.-J.** 2003. Studies on the sea surface microlayer II. The layer of sudden change of physical and chemical properties. *J. Colloid and Interface Sciences*, 264:148-159.
151. Zhang, Z.-B., Xing, L., Jiang, L., Wang, Y., Ren, C., **Cai, W.-J.** 2003. The electrochemical determination of nitric oxide in seawater media with microelectrodes. *Sensors* 3: 304-313.
152. *Wang Z, Wang Y, **Cai W-J**, Liu S-Y. 2002. A Long pathlength spectrophotometric pCO_2 sensor using a gas-permeable liquid-core waveguide. *Talanta*, 57: 69-80.
153. Sun M-Y, **Cai W-J**, Joye SB, Ding H, Dai J, Hollibaugh JT 2002. Degradation of algal lipids in microcosm sediments with different mixing regimes. *Organic Geochemistry*, 33:445-459.
154. *Cai, W.-J., W. J. Wiebe, Y. Wang and J. E. Sheldon. 2000. Intertidal marsh as a source of dissolved inorganic carbon and a sink of nitrate in the Satilla River-estuarine complex in the southeastern U.S. *Limnology and Oceanography*, 45:1743-1752.
155. *Cai, W.-J. Zhao, P. and Wang, Y. 2000. pH and pCO_2 microelectrodes measurement and diffusive behavior of carbon dioxide species in coastal marine sediments. *Marine Chemistry*, 70:133-148.
156. *Zhao P and Cai, W.-J. 1999. pH polymeric membrane microelectrodes based on neutral carriers and their applications in aquatic environments. *Analytica Chimica Acta*, 395:285-291.
157. *Cai, W.-J., Pomeroy, L. R., Moran, M. A., and Wang, Y. 1999. Oxygen and carbon dioxide mass balance in the estuarine/intertidal marsh complex of five rivers in the Southeastern U.S. *Limnology and Oceanography*, 44:639-649.
158. *Cai W.-J. and Wang, Y. 1998. The chemistry, fluxes and sources of carbon dioxide in the estuarine waters of the Satilla and Altamaha Rivers, Georgia. *Limnology and Oceanography*, 43:657-668.
159. *Cai W.-J., Wang, Y. and Hodson, R.E., 1998. Acid-base properties of dissolved organic matter in the estuarine waters of Georgia. *Geochimica et Cosmochimica Acta*, 62:473-483.
160. *Zhao P and **Cai, W.-J.**, 1997. An improved potentiometric pCO_2 microelectrode. *Analytical Chemistry*, 69:5052-5058.
161. *Cai, W.-J. and Sayles, F.L. 1996. Oxygen penetration depths and fluxes in marine sediments. *Marine Chemistry*, 52:123-13.
162. *Cai, W.-J. and Reimers, C.E., 1995. Benthic oxygen flux, bottom water oxygen concentration and core top organic carbon content in the deep northeast Pacific Ocean. *Deep-Sea Research*, 42:1681-1699.
163. *Cai, W.-J., Reimers, C.E., and Shaw, T., 1995. Microelectrode studies of organic carbon degradation and calcite dissolution at a California continental rise site. *Geochimca et Cosmochimica Acta*, 59:497-511.
164. *Cai, W.-J. and Reimers, C.E., 1993. The development of pH and pCO_2 microelectrodes for studying the carbonate chemistry of pore waters near the sediment-water interface. *Limnology and Oceanography*, 38:1776-1787.
165. Liu, L., Zhang, Z., **Cai, W.-J.**, Pan, G. and Du, H., 1993. A plateau type kinetic curves on the interface between liquid and solid in seawater. I. The growth, decline and change of the plateau type kinetic curves. *Oceanologia et Limnologia, Sinica*, 24:177-182 (in Chinese).
166. Liu, L., Zhang, Z., **Cai, W.-J.**, Pan, G. and Du, H., 1993. A plateau type kinetic curves on the interface between liquid and solid in seawater. II. A composite model of inherent liquid film diffusion-progressive layer diffusion-stepwise exchange reactions. *Oceanologia et Limnologia, Sinica*, 24:478-484 (in Chinese).
167. Liu, L., Zhang, Z., **Cai, W.-J.** , 1993. Kinetics of ion exchange-coordination of minor metals on sediments. I. Reaction order, reaction rate, and activation energy. pp.116-127. In: Z. Zhang (ed) *Estuarine and Marine Chemistry of Huanghe (Yellow River) Estuary*. China Ocean Press, Beijing (in English).

168. Liu, L., Zhang, Z., **Cai, W.-J.** , 1993. Kinetics of ion exchange-coordination of minor metals on sediments. II. The Composite Model. pp.128-136. In Z. Zhang (ed) *Estuarine and Marine Chemistry of Huanghe (Yellow River) Estuary*. China Ocean Press, Beijing. <in English>
169. *Cai, W.-J., Chen, B.-L., Wu, B.-L. and Li, L., 1988. The effect of sewage discharge on the adsorption of heavy metal ions by small particles of Yangtse river estuarine. *Marine Science, Sinica*, 1:20-24 (in Chinese).
170. *Cai, W.-J. and Zhang, Z.-B., 1987. The kinetics of exchange reactions between heavy metals and solid particles in seawater. I. Reaction orders, rate constants and activation energy. *Acta Oceanologica, Sinica,* 9:321-329 (in Chinese).
171. Zhang, Z.-B. and **Cai, W.-J.**, 1987. Ion exchange-precipitation isotherm for the partition of heavy metal ions between seawater and clay minerals. *Acta Oceanologica (English Edition),* 6:205-214. Also in *Acta Oceanologica, Sinica,* 7:712-722 (in Chinese).
172. Wu, Y.-D. and Cai, W-J., 1983. Reduction of Cr(VI) by dissolved organics in estuarine water body. *Acta Scientiae Circumstantiae,* 3:176-182 (in Chinese).

Book chapters and published reports

173. Cai W-J, Bates NR, Guo L, Anderson LG, Mathis JT, Wanninkhof R, Hansell DA, Chen L, Igor Semiletov IP (2014) Carbon fluxes across boundaries in the Pacific Arctic Region in a changing environment. In: Grebmeier JM, Maslowski W (eds) The Pacific Arctic Region: ecosystem status and trends in a rapidly changing environment. Springer, Dordrecht, p 199-222
174. Mathis JT, Grebmeier JG, Hansell DA, Hopcroft RR, Kirchman DL, Lee SH, Moran SB, Bates NR, VanLaningham S, Cross JN, **Cai W-J** (2014) Carbon biogeochemistry of the western Arctic: primary production, carbon export and the controls on ocean acidification. In: Grebmeier JM, Maslowski W (eds) The Pacific Arctic Region: ecosystem status and trends in a rapidly changing environment. Springer, Dordrecht, p 223-268.
175. Bianchi, T., Allison, M.A., **Cai, W.-J.**, 2013. Biogeochemical Dynamics at Major River-Coastal Interfaces: Linkages with Global Chang. Cambridge University Press, New York.
176. Pennings, S. C., Alber, M., Alexander, C. R., Booth, M., Burd, A., Cai, W.-J., Craft, C., DePratter, C. B. Di Iorio, D., Hopkinson, C., Joye, S. B., Meile, C. D., Moore, W. S., Silliman, B., Thompson, V., and Wares, J. P. South Atlantic Tidal Wetlands. 2012. Pages 45-61 in A. Baldwin and D. Batzer (eds.), Wetland Habitats of North America: Ecology and Conservation Concerns. University of California Press.
177. Cai, W.-J., Chen, C.-T.A., Borges, A.V., 2013. Carbon Dioxide Dynamics and Fluxes in Coastal Waters Influenced by River Plumes. In: Bianchi, T. S., M. A. Allison, and W.-J. Cai (eds) *Biogeochemical Dynamics at Major River-Coastal Interfaces: Linkages with Global Change*. Cambridge University Press.
178. Lohrenz, S. E., **W.-J. Cai**, S. Chakraborty, K. Gundersen, and M. C. Murrell, Nutrient and carbon dynamics in a large river-dominated coastal ecosystem: the Mississippi-Atchafalaya River system. In: Bianchi, T. S., M. A. Allison, and W.-J. Cai (eds) *Biogeochemical Dynamics at Major River-Coastal Interfaces: Linkages with Global Change*. Cambridge University Press.
179. Cai, W.-J. and Lohrenz, S., 2010. Carbon, nitrogen, and phosphorus fluxes from the Mississippi River and the transformation and fate of biological elements in the river plume and the adjacent margin. In: K.-K. Liu, L. Atkinson, R. Quiñones and L. Talaue-McManus (eds). Carbon and Nutrient Fluxes in Continental Margins: A Global Synthesis. Springer-Verlag, New York.
180. Lohrenz, S. E., Chen, X., Tuel, M. and **Cai, W. J.** 2009. Hyperspectral remote sensing of water mass properties in a river-influenced coastal region. OCEANS 2009, MTS/IEEE Biloxi - Marine Technology for Our Future: Global and Local Challenges, ISBN: 978-1-4244-4960-6.
181. Hales, B., **Cai, W.-J.**, Mitchell, B.G., Sabine, C.L., Schofield, O. (Eds.), 2008. North American Continental Margins: A Synthesis and Planning Workshop. Report of the North American Continental Margins Working Group for the US Carbon Cycle Scientific Steering Group and Interagency Working Group. US Carbon Cycle Science Program, Washington, DC, 110 pp.

182. Chavez F, Takahashi T, **Cai W-J**, Friederich G, Hales B, Wanninkhof R, Feely RA (2007) Ch. 15. Coastal Oceans. In: King AW, Dilling L, Zimmerman GP, Fairman DM, Houghton RA, Marland G, Rose AZ, Wilbanks TJ (eds) The First State of the Carbon Cycle Report (SOCCR): The North American Carbon Budget and Implications for the Global Carbon Cycle. A Report by the US Climate Change Science Program and the Subcommittee on Global Change Research. National Oceanic and Atmospheric Administration, National Climatic Data Center, Asheville, NC, U.S.A.

183. Pomeroy, L. R. and **Cai, W.-J.**, 2006. Oxygen, carbon dioxide, and estuarine condition. *In*: Kleppel, G. S., DeVoe, M. R., and Rawson, M. V., Jr. (eds) *Changing Land Use Patterns in the Coastal Zone: Managing Environmental Quality in Rapidly Developing Regions*. Springer, New York.

184. Cai, W.-J., P. Zhao, S. M. Theberge, A. Witter, Y. Wang, G. Luther III. 2002. Porewater redox species, pH and pCO_2 in aquatic sediments—Electrochemical sensor studies in Lake Champlain and Sapelo Island. In: M. Taillefert and T. F. Rozan (eds). *Environmental Electrochemistry: Analyses of Trace Element Biogeochemistry*. American Chemical Society Symposium Series 811, ACS, Washington DC.

185. Cai, W.-J. and Reimers, C.E. 2000. Sensors for *in situ* pH and pCO_2 measurements in seawater and at the sediment-water interface. In: J. Buffle and G. Horvai (eds.) *In-situ Monitoring of Aquatic System: Chemical Analysis and Speciation*. IUPAC book series on Analytical and Physical Chemistry of Environmental Systems, vol 6. John Wiley & Sons Ltd.

Published data:

Lohrenz, S.E., W.J. Cai, S. Chakraborty, R. He, and H. Tian. 2019. Ocean Surface pCO2 and Air-Sea CO2 Flux in the Northern Gulf of Mexico, 2006-2010. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1668

Wei-Jun Cai, Yongchen Wang, and **Wei-Jen Huang** (2012) Sea Surface pCO_2 measurements in the Gulf of Mexico during the Ocean Survey Vessel Bold cruises in 2006. http://cdiac.ornl.gov/ftp/oceans/UG_GoM_UW_Data/2006.data. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, Oak Ridge, Tennessee. doi: 10.3334/CDIAC/OTG.UG_GOM_UW_2006

Wei-Jun Cai, Yongchen Wang, and **Wei-Jen Huang** (2012) Sea Surface pCO_2 measurements in the Gulf of Mexico during the Ocean Survey Vessel Bold cruises in 2007. http://cdiac.ornl.gov/ftp/oceans/UG_GoM_UW_Data/2007.data. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, Oak Ridge, Tennessee. doi: 10.3334/CDIAC/OTG.UG_GOM_UW_2007

Wei-Jun Cai, Yongchen Wang, and **Wei-Jen Huang** (2014) Sea surface pCO_2 survey in the Gulf of Mexico during the R/V Cape Hatteras cruises in 2009 and 2010. http://cdiac.esd.ornl.gov/ftp/oceans/Cape_Hatteras_GM/. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, Oak Ridge, Tennessee. doi: 10.3334/CDIAC/OTG.Cape_Hatteras_GM

1. Chen, Baoshan and Cai, Wei-Jun (2019). Partial pressure (or fugacity) of carbon dioxide, salinity and temperature collected from surface underway observations during the R/V Rachel Carson and other commercial boat cruises in the Chesapeake Bay from 2016-05-04 to 2019-02-22 (NCEI Accession 0191507).

2. Chen, Baoshan; Cai, Wei-Jun; Chen, Liqi (2018). Carbon dioxide, hydrographic and chemical data collected from the profile discrete samples during the R/V Xuelong CHINARE2012 cruise (EXPOCODE 76XL20120710) in the Arctic Ocean and Bering Sea from 2012-07-10 to 2012-09-12 (NCEI Accession 0171618). Version 1.1. NOAA National Centers for Environmental Information. Dataset.

3. Chen, Baoshan; Cai, Wei-Jun; Chen, Liqi (2018). Carbon dioxide, hydrographic and chemical data collected from the profile discrete samples during the R/V Xuelong CHINARE2010 cruise (EXPOCODE 76XL20100709) in the Arctic Ocean and Bering Sea from 2010-07-09 to 2010-08-29 (NCEI Accession 0171599). Version 1.1. NOAA National Centers for Environmental Information. Dataset.

4. Chen, Liqi; Sun, Hen; Chen, Baoshan; Ouyang, Zhangxian; Cai, Wei-Jun (2017). Underway pCO2 Measurements in Surface Waters and the Atmosphere During the R/V Xue Long CHINARE2012 Expedition in the west Arctic Ocean from 2012-07-17 to 2012-09-12 (NCEI Accession 0168338). Version 1.1. NOAA National Centers for

Environmental Information. Dataset. doi:10.7289/V5J964NM.
5. Wanninkhof, Rik; Chen, Liqi; Cai, Wei-Jun; Gao, Zhongyong (2017). Underway pCO2 Measurements in Surface Waters and the Atmosphere During the R/V Xue Long Arctic CHINARE2010 Expedition in the North Pacific Ocean, Bering Sea and Arctic Ocean from 2010-07-09 to 2010-09-06 (NCEI Accession 0164193). Version 1.1. NOAA National Centers for Environmental Information. Dataset. doi:10.3334/CDIAC/OTG.VOS_XUE_CHINARE2010.
6. Chen, L.; Z. Gao; R. Wanninkhof; J. Cai (2013). Partial pressure (or fugacity) of carbon dioxide, salinity and other variables collected from underway - surface observations using Carbon dioxide (CO2) gas analyzer, Shower head chamber equilibrator for autonomous carbon dioxide (CO2) measurement and other instruments from the XUE LONG in the Arctic Ocean, Beaufort Sea and Bering Sea from 2008-07-30 to 2008-09-11 (NODC Accession 0109932). Version 1.1. National Oceanographic Data Center, NOAA. Dataset. doi:10.3334/CDIAC/OTG. VOS_XUE_ARCTIC_08.

Research Grants Received

Summary: total grant # is ~50, total funding to Cai is ~$10M

2019 **NSF**-- Understand recent changes of the CO_2 system and ocean acidification in the western Arctic Ocean via field measurements from the summer 2020 CHINARE cruise. 9/1/2019-8/31/2022.

2018 **NOAA**'s National Ocean Service (NOS)—**OA2018** Interactions between ocean acidification and eutrophication in estuaries: Modeling opportunities and limitations for shellfish restoration. 9/1/2017-8/31/2019. Total budget is $1.8M, UD/Cai component is $350,036.

2018 **NSF**-- Collaborative Research: Sediment Geochemical Control on Ocean Acidification and Carbon Budget in a River Dominated Shelf System. OCE-1756815 (3/1/2018-2-28-2021). Total award xxx (with Kanchan, Maiti, Louisiana State University and Courtney K. Harris, Virginia Institute of Marine Science College of William and Mary) UD/Cai part is $143,709.

2017 **NOAA**'s Ocean Acidification Program (OAP)—on providing service to Chesapeake Bay mooring; on data synthesis etc. UD/Cai part is $35,000 per year.

2017 **NOAA**'s Ocean Acidification Program (OAP)— ECOA- The East Coast Ocean Acidification Cruise 2018. Total budget is $700,000. UD/Cai component is $300K.

2017 **NOAA**'s Ocean Acidification Program (OAP)—Service and maintenance of the Gray's Reef Ocean Acidification Mooring: In Support of NOAA Ocean Acidification Program FY18-20. 9/1/2018 - 6/30/2021. Total budget is $306K, UD/Cai component is ~$190K.

2016 **NSF**— Collaborative Research: pH Dynamics and Interactive Effects of Multiple Processes in a River-Dominated Eutrophic Coastal Ocean. OCE- 1559279 (16/07-19/08). Total Budget $914,057, UD/Cai component is $736,640.

2016 **NSF**-- Collaborative Research: Collaborative Research: Developing a profiling glider pH sensor for high resolution coastal ocean acidification monitoring. OCE-1634582 (10/16 – 9/19). Total award is xxx. UD/Cai component is $262,259.

2015 **NOAA**'s National Ocean Service (NOS)—**OA2015** Interactions between ocean acidification and eutrophication in estuaries: Modeling opportunities and limitations for shellfish restoration. 9/1/2015-8/31/2018. Total budget is $1.55M, UD/Cai component is $350,036.

2015 **NOAA**'s Ocean Acidification Program (OAP)— ECOA- The East Coast Ocean Acidification Cruise 2015. Total budget is $600,000. UD/Cai component is $257,268.

2015 **NOAA**'s Ocean Acidification Program (OAP)—Service and maintenance of the Gray's Reef Ocean Acidification Mooring: In Support of NOAA Ocean Acidification Program FY15-17. 9/1/2015 - 6/30/2018. Total budget is $306, 024, UD/Cai component is $190,492.

2014 **NASA**— The carbon budget of tidal wetlands and estuaries of the contiguous United States: a synthesis approach. 8/1/2014 to 7/31/2017, Total budget is $1.2M, UD/Cai component is $117,786, NNX14AM37G.

2014 **NASA**— An Integrated Terrestrial-Coastal Ocean Observation and Modeling Framework for Carbon Management Decision Support. 11/1/2014 to 10/31/2017, Total budget is $1.1M, UD/Cai component is $228,462.

2014 **NASA** - Air-sea CO_2 flux and carbon budget synthesis and modeling in the entire Gulf of Mexico, 9/30/2013 to 9/29/2016, Total budget is $544,307, UD/Cai component is $158,895.

2013 **NSF**— A better understanding of recent changes of the CO_2 system in the Western Arctic Ocean via field measurements from the summer 2014 CHINARE cruise. NSF Division of Polar Programs # PLR-1304337. $434,351. (10/1/2014 to 9/30/2016). Single PI, Cai commitment is 1 month per year. University of Delaware.

2013 **NSF**— Georgia Coastal Ecosystems Long Term Ecological Research (GCE LTER). 1/1/2013 to 11/30/2018. Total budget is $6M, UD/Cai component is $232,337 + $29,676 (supplement).

2013 **NSF**— Ocean Acidification: Coral inorganic carbon processing in response to ocean acidification. 9/1/2013 to 8/31/2016. Subcontract to B. Hopkinson of UGA, Cai component is $99,420. University of Delaware.

2012 **NASA**— Development of observational products and coupled models of land-ocean-atmospheric fluxes in the Mississippi River watershed and Gulf of Mexico in support of carbon monitoring. Cai component is $75,233 (1/1/2013 to 2/20/2014). University of Delaware.

2012 **Gulf of Mexico Research Initiative (GOMRI)— Dynamics of dissolved inorganic carbon and dissolved oxygen following natural or manmade petroleum carbon release into marine environments. (**July 1, 2012 – June 30, 2015) $443,377. Wei-Jun Cai and Xinping Hu. Cai commitment is 0.5 month per year. University of Delaware.

2012 **NASA**—Estimation of land-ocean-atmosphere carbon fluxes and exchanges in the Mississippi River watershed and northern Gulf of Mexico (through subcontract to the UMass-Dartmouth, PI: Steven Lohrenz) (05/12-12/12). UGA portion: $12,500. Cai commitment is 0.25 month per year. (transferred to University of Delaware.)

2011 **Gulf of Mexico Research Initiative (GoMRI)**— Collection of water column samples in the northern Gulf of Mexico hypoxic zone and areas near the Deepwater Horizon oil spill site (8/2011-2/2012). $106,000. University of Georgia.

2010 **NSF**— Collaborative Research - Ocean Acidification Category 1: Interactive Effects of Temperature, Nutrients, and Ocean Acidification on Coral Physiology and Calcification (9/10-9/13). UGA/Cai award: $ 333,823. Cai commitment is one month per year.

2010 **NASA**—NASA IDS (Interdisciplinary Science) funding: Assessing Impacts of Climate and Land Use Change on Terrestrial-Ocean Fluxes of Carbon and Nutrients and Their Cycling in Coastal Ecosystems (through subcontract to the University of Southern Mississippi, PI: Steven Lohrenz) (9/10-9/13). Total UGA/Cai award: $ 263,560. Cai commitment is one month per year.

2010 **NOAA**—Operation of the high resolution pCO_2, pH, DO sensors and ground-truthing of the mooring data at the Gray's Reef national marine sanctuary, GA, USA. Lead PI. Wei-Jun Cai (with X. Hu and S. Noakes). Total UGA funds are $438369 (FY10: 111,114, FY12, 13, 14 each $109,085). Cai commitment is 1/2 month per year. FY13 & 14 transferred to UD.

2009 **NSF**— Controls on Sea Surface pCO_2 Variability and CO_2 Uptake in the Western Arctic Ocean. Wei-Jun Cai (sole PI), (NSF-Arctic Natural Science, award # ARC-0909330, 9/1/09 to 8/31/12, $365,938).

2009 **NOAA**—Arctic Research Climate Program Office— Synthesis of Ocean Carbon and Biogeochemical Data Collected During the Chinese Arctic Program Cruises (09/09-08/11, $212,261).

2008 **NSF**— Collaborative Research: Satellite Assessment of CO_2 Distribution, Variability and Flux and Understanding of Control Mechanisms in a River Dominated Ocean Margin. Steve Lohrenz (University of Southern Mississippi) and Wei-Jun Cai. $757K (OCE-0752110, 4/08-4/11, Cai portion is $300,017)

2005 **NOAA**— Office of Global Programs — Measuring Surface Water pCO_2 in the Polar Oceans: Outfitting and Initial Operation of a pCO_2 System on the Chinese Icebreaker *Snow Dragon*. Rik Wanninkhof, NOAA-AOML (Atlantic Oceanographic and Meteorological Lab) and Wei-Jun Cai (07/05-07/08, Cai portion is $143,104)

2005 **NOAA**— Office of Global Programs —Coastal CO_2 Measurements and Databases for the North American Carbon Program. Group proposal, lead PI, R. Feely, NOAA-PMEL (Pacific Lab). (07/05-07/08, Cai's portion is $206,641).

2005 **NASA—**Satellite Assessments of Regional pCO_2 Distributions and Air-Sea Fluxes of Carbon Dioxide in a River-Dominated Margin. Steve Lohrenz (University of Southern Mississippi) and Wei-Jun Cai. (1/05-1/08, Cai portion is $216,696)

2004 **NSF—**Marsh-Dominated Ocean Margins as a Source of CO_2 to the Atmosphere and Open Oceans: A Field Study in the U.S. Southeastern Continental Shelf. Wei-Jun Cai (sole PI), (NSF-OCE-0425153, 8/04 to 8/08, $453,573).

2004 **NSF**—Mechanisms and Rates of Preservation of Biogenic Remains in Continental Shelf and Slope Environments. (NSF, 10/1/2004-9/30/2007, subcontract to Dr. Karla Parsons-Hubbard, Oberlin College, Oberlin, Cai portion is $30,000)

2001 **NSF**—GCE (Georgia Coastal Ecosystems)-LTER (Long Term Ecological Research) co-PI. (NSF-OCE 99-82133, 2001-**2005**, PD/PI. J.T. Hollibaugh, $6M; Cai's budget is ~$25K/yr.)

2001 **American Chemical Society's Petroleum Research Foundation**—Carbonate dissolution in coastal sediments off Texas and at the Bahamas Bank: Quantifying fine scale porewater saturation states and dissolution rates (9/1/2001-8/31/2003, no cost extension to 8/2004. $60,000).

2001 **NSF**—The effect of aquatic photochemistry on the proton and metal binding properties of dissolved organic matter in freshwater systems (NSF-EAR-0003680, 3/2001 to 3/2004, with O. Zafiriou, Cai's budget is $165,000).

2000 **NOAA/LU-CES** (Land Use and Coastal Ecosystem Study) **Program**—Gas fluxes (O_2 and CO_2) and alkalinity as integrated indicators of the functioning of intertidal marshes and the influence of land use (NOAA, Jul. 2000 to Jul. **2005**, ~$300,000).

2000 **National Science Foundation**—Field Evaluation of New pH and pCO_2 Microelectrodes and an In-situ Profiler. (NSF OCE9911786, 3/2000 to 3/2002, $80,000).

1999 **American Chemical Society's Petroleum Research Foundation**—Diffusion of Individual Species of Dissolved Inorganic Carbon Determined by pH and pCO_2 Microelectrodes in Coastal Marine Sediments (April 15, 1999-August 31, 2001, $60,000)

1998 **National Science Foundation**—Biogeochemical processing of bloom-derived organic matter as a function of sediment mixing regime. (Aug.1, 1998-July 31, 2001. $375,000 with M. Sun, S. Joye and J.T. Hollibaugh). (Cai's funding is ~$100K).

1998 **State of Georgia,** Coastal Management Program Department of Natural Resources, Coastal Resources Division—Saltwater intrusion in the Upper Floridan Aquifer and the Surficial Aquifer Beneath/Around the Savannah Area. **P.I.** (ct.1, 1998-Sept.30, 2000; $100,000).

1998 **U.S. Environmental Protection Agency**—A sampling and monitoring system for laboratory column studies. **P.I.** (July 1, 1998-June 30, 1999; $24,890).

1998 **National Oceanic and Atmospheric Administration/LU-CES Program**— Analysis of the state of knowledge of respiratory processes and net productivity of intertidal salt marshes in the South Atlantic Bight, **P.I.** (March 1, 98 to Feb. 28, 99, $22,000 with L. Pomeroy). (Cai's funding is ~$18K).

1997 **National Oceanic and Atmospheric Administration/LU-CES Program**—The influence of land use on groundwater derived nutrient and organic inputs to the South Atlantic Bight. (NAOO/Lu-ces Program, Dec. 97-Jun. 98, $40,000, with S. Joye and D. Bronk). (Cai's funding is ~$13K).

1997 **National Oceanic and Atmospheric Administration/ Sea Grant**—The fluxes and sources of carbon dioxide in the estuarine waters of Georgia. **P.I.** (March 1 1997-Feb.28, 1998, $51,931).

1996 **National Science Foundation**—Collaborative Studies: Carbon and electron acceptor cycling in lake and estuarine sediments during early diagenesis. **P.I.** (Aug.15, 1996-Aug.14, 1999, $44,425).

1996 **National Oceanic and Atmospheric Administration/GA Sea Grant**—Measuring carbon dioxide in the estuarine waters of Georgia- New Project Development. **P.I.** (1996-97, $12,000).

1993 **National Science Foundation**—Development and evaluation of pH and pCO_2 microelectrodes for in situ determination of deep sea pore water carbonate chemistry and carbon recycling rates. **P.I.** (Nov. 1994 to April 30, 1998. $333,167).

Teaching

2013-present, *Chemical Oceanography* (MAST 646; 6-15 students; spring, 2014, 2015, 2018) (100% responsibility; two years on and two years off with Bill Ullman)
2014-present. *Oceanography seminar* (MAST 853; ~7 students, occasional) (100% responsibility).
2017 (Spring & Fall 2017), *Introduction of Ocean Sciences*, 25-30 students each semester.

Previously at UGA
1995-2012, *Chemical Oceanography* (MARS 8020; 5-12 students; every year) (75% responsibility)
1998- 2012, *Early Diagenesis* (MARS 8110; every other year when student are available) (30-40% responsibility)
Fall 2002, Marine Environments, MARS 1010. (66.6%, 260 students)
2002 – 2010, Freshman Seminar, FRES 1010 (12-14 students)
1997- 2000, *General Oceanography* (MARS 4100; every year) (15% responsibility)
1999-2001, Organic Geochemistry (MARS 8140) (10% responsibility)

Student Research and Advisement

I have devoted much of my energy to graduate student advising and I really enjoy this part of my academic life. My door is always open to students. I strike a good balance between demanding results timely with a high bar and giving room for their own interests and schedule. All my students did well in their research (each of my Ph.D. student, except the last one, received the UGA Marine Sciences department's Graduate Student Research Award). As English is not the first language for most of my early students, I worked tirelessly in discussing and revising their manuscripts, often 10-20 revisions for each of their first-author publication. Most students continued in academic career.

Through teaching the "Freshman Seminar" for several years at UGA, I have opened eyes for many freshman students. A UGA Class of 2013 graduates identified me as a person who has contributed greatly to their career development (per letter from Scott Williams, executive Director and Michelle Carter, Assistant Director, UGA, Career Center).

At UD, I have served as major professor for five Ph.D. students (Jean Brodeur, Yuanyuan Xu Michael Scaboo, Zhangxian Ouyang and Jianzhong Su) and four MS students (Yuening Ma, Andrew Joesoef, Andrew Collins, and Stephen Gonski; all MS students graduated in 2016 and 2017). In addition, I have/had several postdocs (past: Wei-Jen Huang, Yonghui Gao and Janet Reimer; now: Janet Reimer, Baoshan Chen, Qian Li, Hongjie Wang, and Maribel I. García-Ibáñez). I also serve on the committee of K. Kim of Geology (H. Michael) and Qiang Li of Soil and Plant Sciences (Deb Jaisis student).

At UGA, I have served as major professor for six doctoral students and four master students. Dr. P. Zhao published four papers (2 first-authored) from his Ph.D. work and went to industry after graduation. Dr. Z. Wang published 7 papers (4 first-authored) during his Ph.D. research and is now an Associate Scientist at the Woods Hole Oceanographic Institution. Dr. L. Jiang published four 1st-authored papers from his Ph.D. work and received a NOAA Knuass Fellow and a Yale University Postdoc Fellowship (he is now a NOAA employee). Dr. Wei-Jen Huang published a total of 11 papers (4 first-authored) (and 4 more under review) from his Ph.D. and will take a faculty position in Taiwan this summer. My last UGA Ph.D. student, Baoshan Chen defended in spring 2015. In addition, I have advised three Doctor of Science degree students in Xiamen University, China (two of them stayed a year in my lab here in UGA) with M. Dai. I have also advised three Postdocs in UGA. Dr. X. Hu is now an Associate

Professor at Texas A&M University-Corpus Christi. Dr. Hui Xu is an Assistant Professor at Zhejiang Sci-Tech University, China.

I also had advised undergraduate marine students via the Interdisciplinary Science & the Honors Program. One of them (Andrew Joesoef) became a UD graduate student.

Services

Academic Service

1. Associate editor, *Marine Chemistry* (2007—2013), *Global Biogeochemical Cycles* (2014-).
2. The U.S. Carbon Cycle Science Steering Group (2010—2016?)
3. Steering Committee, U.S. Coastal Carbon Synthesis Group (2008--?).
4. Steering Committee, NOAA's UCAR Climate and Global Change Postdoctoral Fellowship Program (2008--2010)
5. Scientific Advisory Committee, U.S. SOLAS (Surface Ocean— Lower Atmosphere Study) program, 2006—(inactive)
6. Steering Committee, Ocean Carbon and Biogeochemistry (OCB) Scoping Workshop on Terrestrial and Coastal Carbon Fluxes and Exchanges in the Gulf of Mexico, May 6-8, 2008, St. Petersburg, FL.
7. Steering committee and co-organizer, joint OCCC (Ocean Carbon and Climate Change program) / NACP (the North American Carbon Program) workshop on the coastal ocean carbon system (Sept. 2005). Boulder, CO.
8. The Scientific Committee of the 37th Liège Colloquium on Ocean Dynamics: Gas Transfer at Water Surfaces (May 2005), University of Liège. Liège, Belgium.
9. NSF Workshop, RioMar: A workshop dedicated to River-Dominated Ocean Margins—priority and science plan (Nov. 2004). Tulane University, New Orleans.
10. Frequent proposal reviewer for National Sciences Foundation (Chemical Oceanography Program; Environmental Geochemistry and Biogeochemistry Program; Analytical and Surface Chemistry Program; Hydrogeology; Major Research Instrumentation Program); also review for ACS-PRF, NOAA, NASA, and ?
11. Review for Germany's equivalent of NSF 2-3 times.
12. Review for Natural Sciences and Engineering Research Council (NSERC) of Canada (2008, 2009). Evaluation for the Canada Excellence Research Chair, CERC (Dec. 2009).
13. Reviewer for the National Science Foundation of China (NSFC).
14. Review for the highest awards by Taiwan's Ministry of Science & Technology, each year 2013.
15. Frequent paper reviewer for journals (Nature Geoscience, Nature Communications, Science Advances, Geophysical Research Letters; Geology; Limnology and Oceanography; Limnology and Oceanography Methods; Geochimica et Cosmochimica Acta; Deep Sea Research; Marine Chemistry; Earth and Planetary Science Letters; Journal of Geophysical Research (JGR)-Oceans; Estuarine Coastal and Shelf Science; Frontier in Ecology and Environment; CONTINENTAL SHELF RESEARCH; Sensors and Actuators; Analytical Chemistry, Analytical Chimica Acta; Scientia Marina (Spain); Science of the Total Environment) and book chapters. Review for Nature Geoscience, Nature Communications in 2017.
16. Panelist (Nov, 1998; May, 1999; XXX-date-not-recorded; May 2014), National Science Foundation (Chemical Oceanography Program).
17. NASA Review panel (2009).

University of Delaware Service

College tenure and promotion committee (fall 2013), CEOE; Review of the university's analytical facilities (2017); Named professor ad hov committee, College Agriculture, UD (2016); University Hygiene and Chemical Safety Committee (since 2014); Senate's Graduate Studies Program (2016-2019); chair 2017-2019).

University of Georgia Service

Advisory Committee, Center for Applied Isotope Study (CAIS), UGA (2009-)
Program Review Committee for the Department of Geology, UGA (2008)
Seminar coordinator, Dept. of Marine Sciences (2009-2010)
Space Committee, Dept. of Marine Sciences (2010--)
Graduate Coordinator, Dept. of Marine Sciences (May 2005-August 2008)
Member of the University Council (2002-2005)
Franklin College Faculty Senate (in the Academic Standards and the Professional Concerns committees, 2000-2002)
Executive Committee, Dept. of Marine Sciences (1997-2000)
Graduate Affairs Committee, Dept. of Marine Sciences (1995-2008)
Resources Committee, Dept. of Marine Sciences (1995-2003)
Faculty Search Committee, Dept. of Marine Sciences (1995, 1996, 2008)

Outreach Service

Serviced as an advisor for the Oconee County High School's National Ocean Science Bowl (NOSB) team (2002, 2003, 2004, 2005), Oconee, GA. Received 4th, 2nd, 1st and 1st places respectively in 2002, 2003, 2004 and 2005 in the South Carolina and Georgia regional competition. The team went to national competition in 2004 and 2005, and won 4th place in the 2005 national competition. Also served as judges for local school Science Fairs.

International Collaboration

I have broad research and education collaborations with several Chinese universities and research institutions. I have hosted more than 10 visiting scientists from China and Taiwan (1.5 months to 1.5 year duration). Throughout these collaborations, I have helped five universities and research institutions there set up CO_2 research laboratories (M. Dai's lab in Xiamen University, L. Zhang's lab in Ocean University of China, Qingdao, Y. Pan's lab in Zhejiang University, Hangzhou, L. Chen's lab in the Third Institution of Oceanography, Xiamen, and J.-F. Chen's lab in the Second Institution of Oceanography, Hangzhou, CHINA; W-C. Chou's lab in the Taiwan National Ocean University, TW). I have been benefited from accessing CO_2 data from East and South China Seas and the associated estuaries. These two marginal seas provide valuable comparison with my research in the US eastern and Gulf coasts. We had jointly published more than 12 journal publications with M. Dai's group, four with L. Zhang's group, three with L. Chen's group and three with J.-F. Chen's group.

In recent years, I have also had extensive collaboration with Drs. Bai and He of Prof. Pan's remote sensing lab on applications of remote sensing products to coastal ocean carbon cycle and biogeochemistry. So far, three JGR papers have been published and several more are on the pipeline.

I have also promoted collaborations between US NOAA and the State Ocean Administration of China on polar climate research (via Prof. L. Chen and Dr. JF Chen) which has been quite successful (leading to a paper in the high impact journal *Science* in July 2010 and two grants from NOAA and two grants from NSF).

The above collaborations, in my view, have also helped US in its goal of combating climate change issues together with China by making China a more confident and willing partner in working with the US.

This past few years, I have also started collaborations with European scientists. Together with Prof. Pierre Regnier, we have published a review paper on coastal ocean carbon cycle in the journal *Nature* (Bauer et al. 2013) and another one in *Nature Communications* (Laruelle et al. 2017). I have engaged Regnier's group in modeling biogeochemistry of the Delaware estuary and the US east coast.

Ph.D. student (recent 5 years). BS Chen, Brodeur, Scaboo, Xu, Ouyang, Su, Li.
MS student (recent 5 years). Ma, Joesoef, Collins, Gonski, Wang