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Supplement of

Assessing the value of biogeochemical Argo profiles versus ocean color observations for biogeochemical model optimization in the Gulf of Mexico

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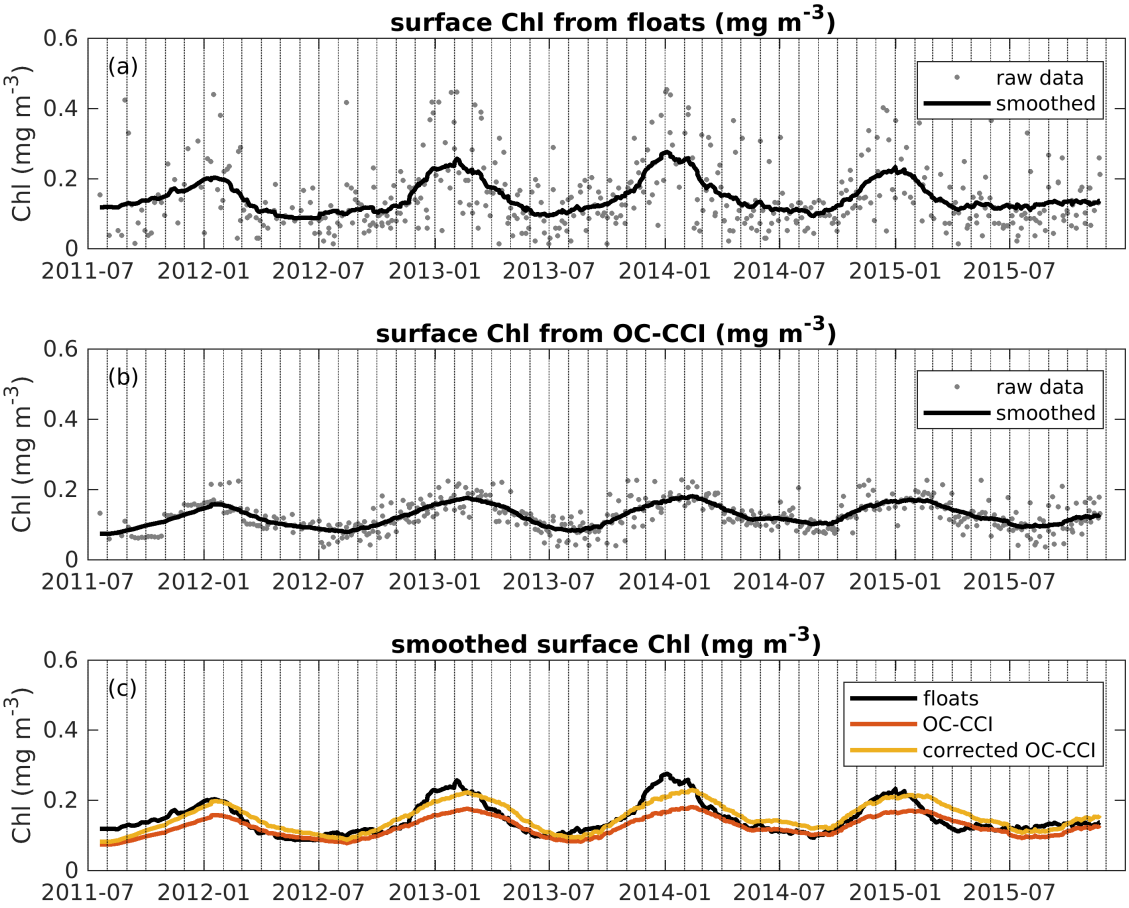

Figure S1. Time series of surface chlorophyll measurements from floats (a) and corresponding satellite match-ups from OC-CCI (b). (c) Comparisons of 30-points smoothed surface chlorophyll between floats, OC-CCI, and corrected satellite estimates from OC-CCI.

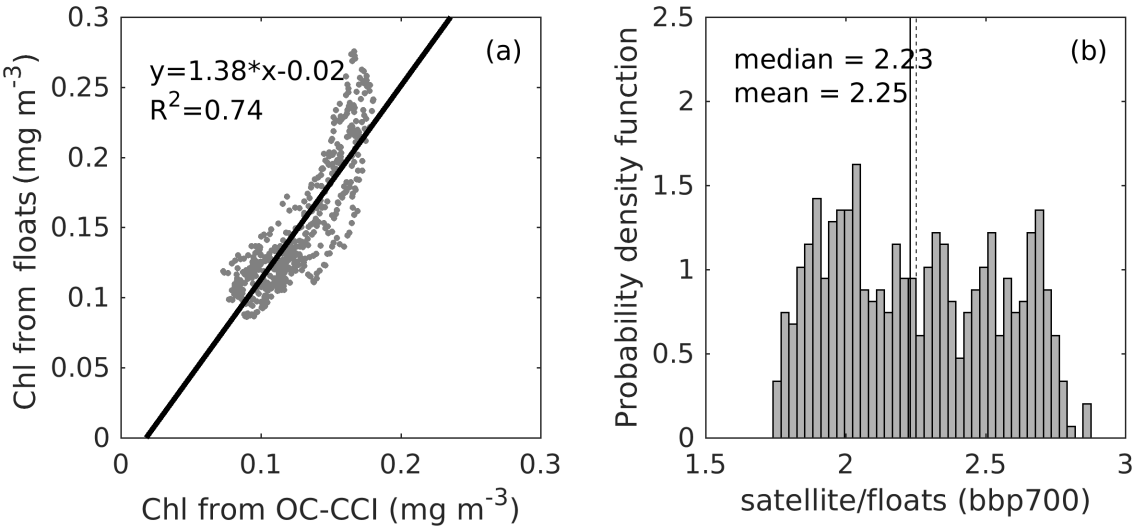

Figure S2. (a) Regression analysis of 30-point smoothed surface chlorophyll between OC-CCI and floats; (b) histogram of ratio of 30-point smoothed surface bbp700 between OC-CCI and floats.

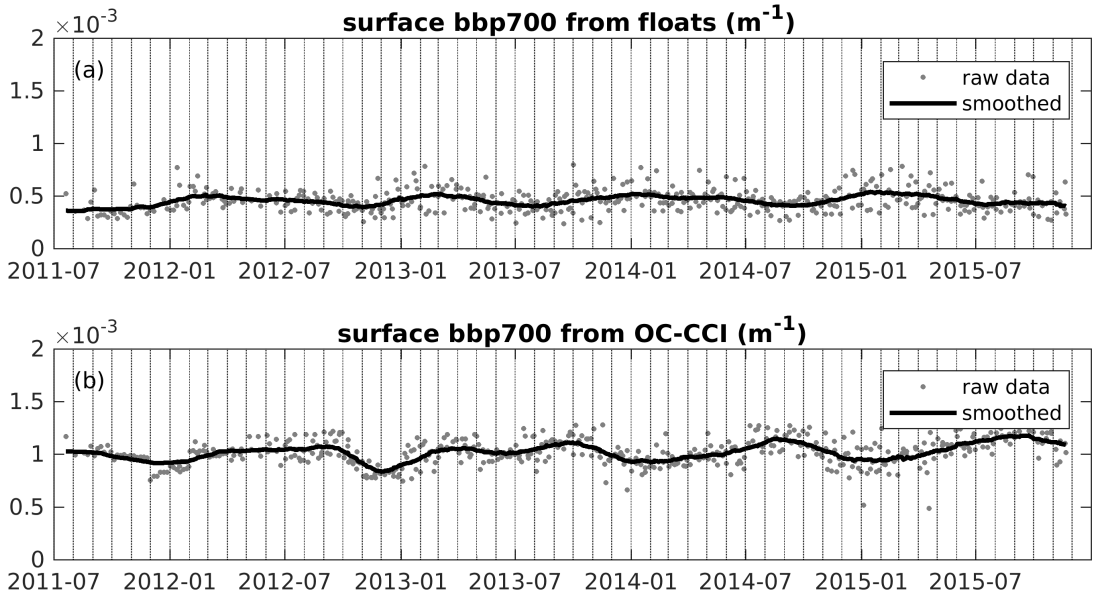

Figure S3 Time series of matching-up surface bbp700 from floats (a) and OC-CCI (b).

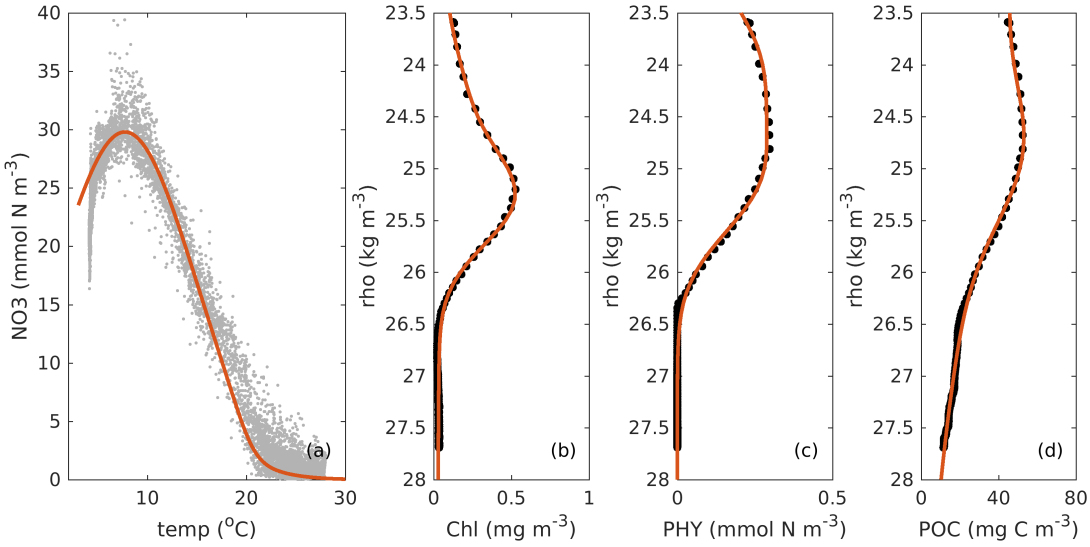

Figure S4. Empirical relations of temperature-NO_3 (a) derived from World Ocean Atlas, density-chlorophyll (b), density-phytoplankton (c), and density-POC (d) derived from the median vertical profile of floats

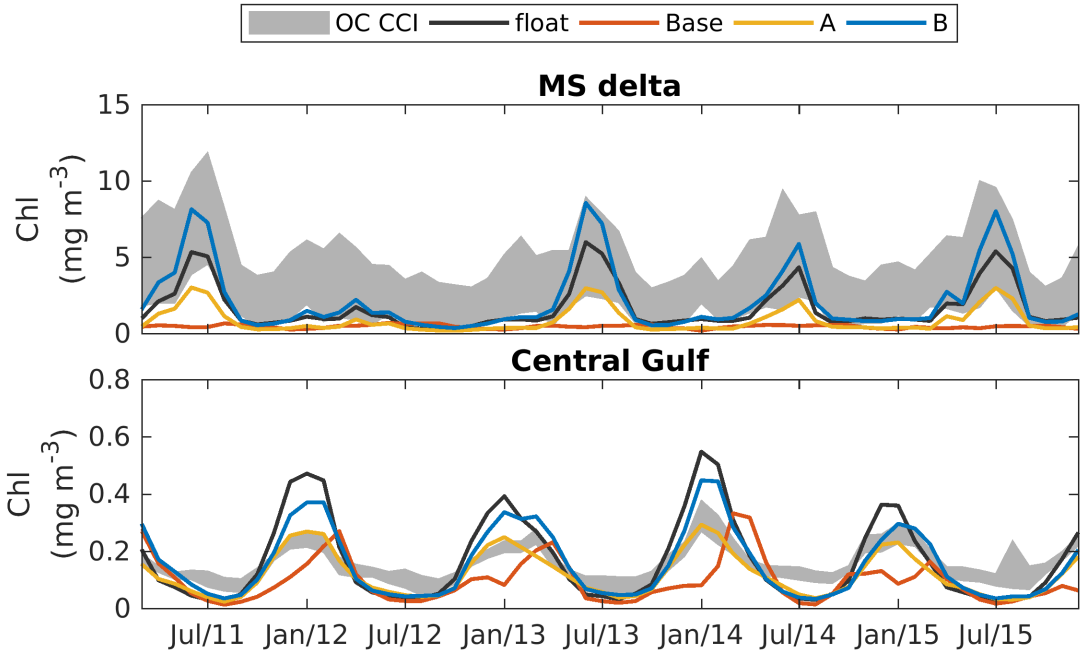

Figure S5. Observed and simulated seasonal cycles of surface chlorophyll from the Mississippi delta and the central gulf. Gray shades represent the interquartile ranges of satellite estimates. Positions of the Mississippi Delta and the central gulf are shown in Figure 1.

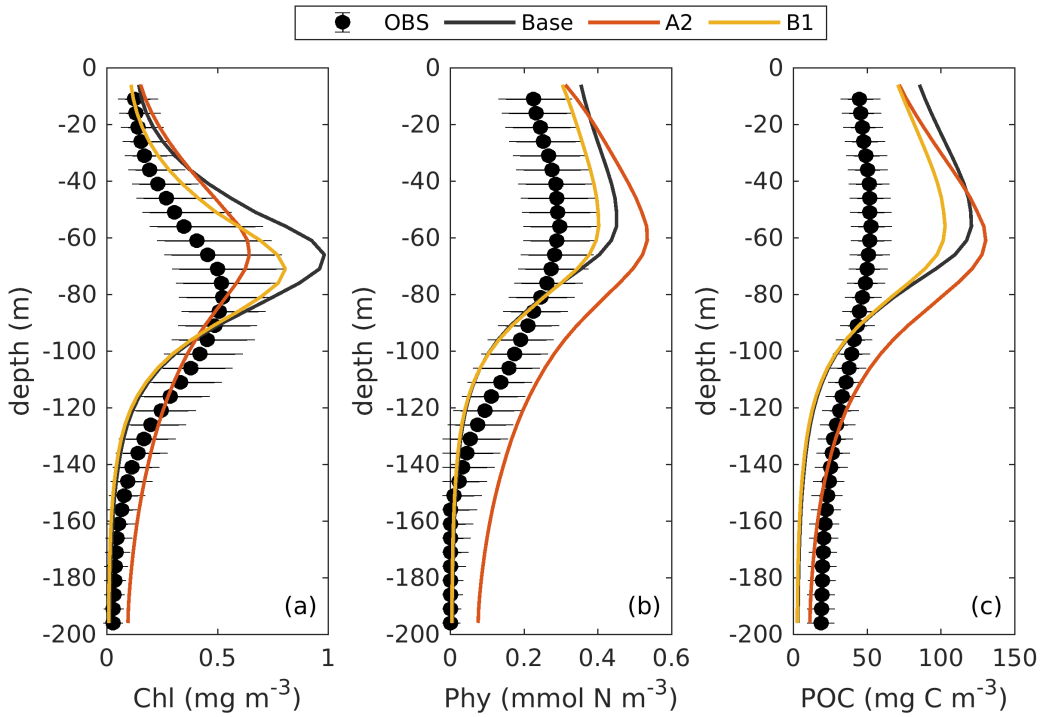

Figure S6. Observed (black error bars) and simulated (colored lines) vertical profiles of chlorophyll (a), phytoplankton (b), and POC (c).

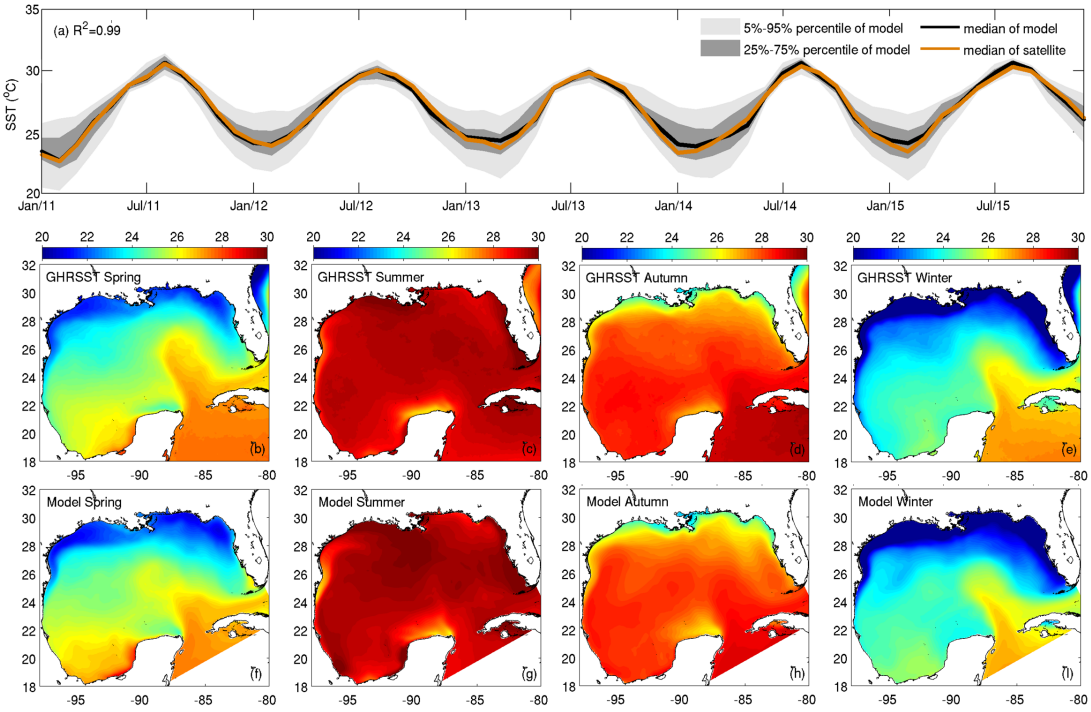

Figure S7. (a) Monthly time series of SST from model outputs and GHRSST for the deep ocean of GOM. (b-i) SST climatology derived from the GHRSST and model outputs during 2011-2015.

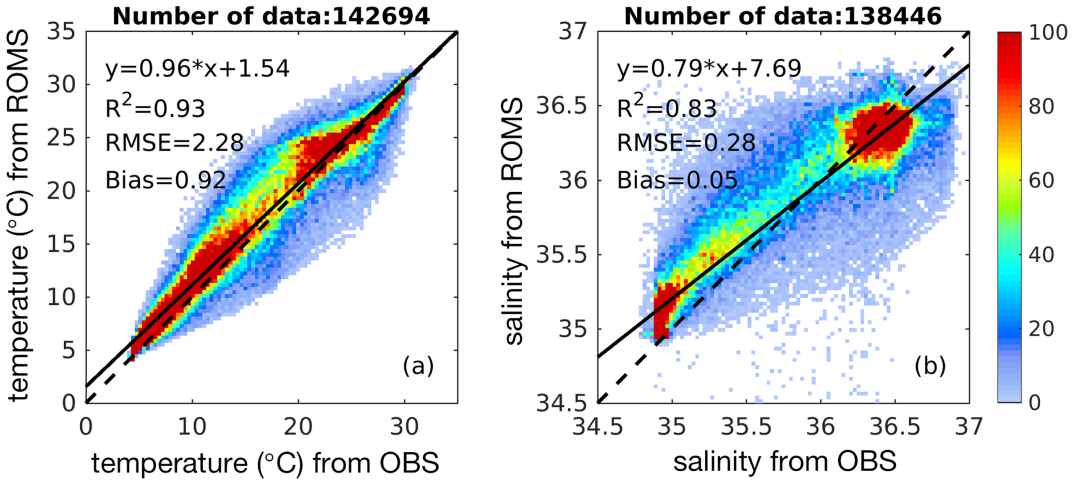

Figure S8. Point-by-point comparisons between measured and simulated temperature (a) and salinity (b) in the Gulf of Mexico during 2011-2015. In-situ observations are from the USGODAE Argo GDAC profiles (available at https://www.usgodae.org//cgi-bin/argo_select.pl) and the BGC floats from this study.

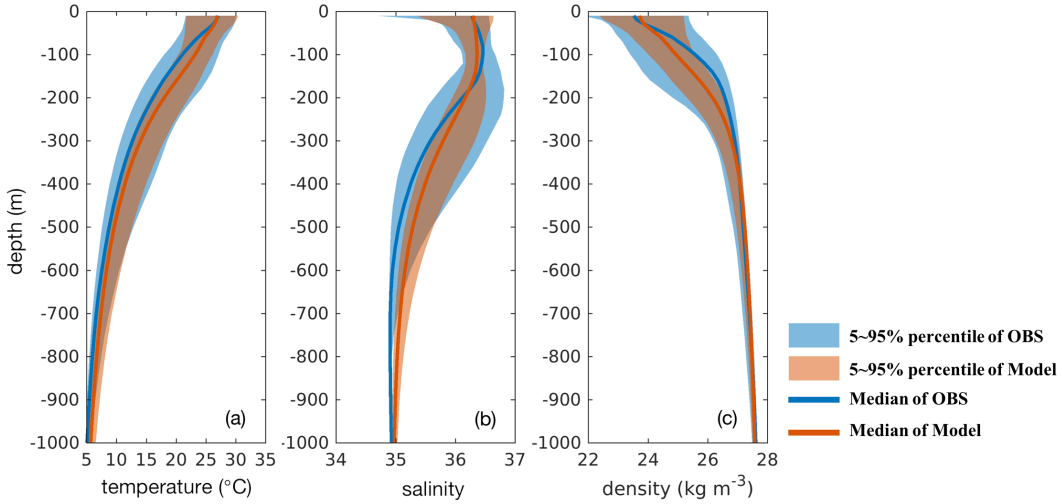

Figure S9 Point-by-point comparisons between the measured and simulated vertical profiles of temperature (a), salinity (b), and density (c) during 2011-2015. In-situ observations are from the USGODAE Argo GDAC profiles (available at https://www.usgodae.org//cgi-bin/argo_select.pl) and the BGC floats from this study.

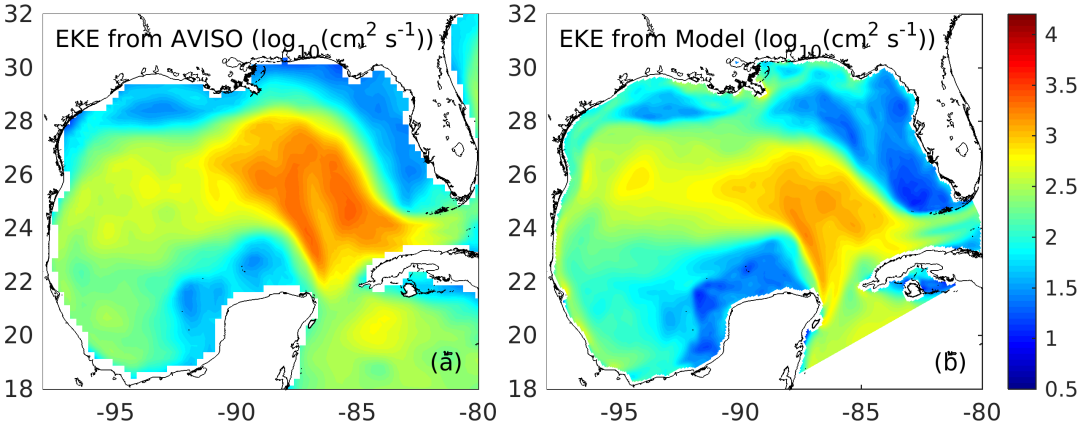

Figure S10 Comparisons of 5-year (2010-2015) mean eddy kinetic energy (EKE) based on AVISO sea level anomalies (available at http://marine.copernicus.eu) and model results.

References for observations of carbon export fluxes in Figure 10

Hung, C.-C., Guo, L., Roberts, K. A. and Santschi, P. H.: Upper ocean carbon flux determined by the ^{234}Th approach and sediment traps using size-fractionated POC and ^{234}Th data from the Gulf of Mexico, GEOCHEMICAL JOURNAL, 38(6), 601–611, doi:10.2343/geochemj.38.601, 2004.

Hung, C.-C., Xu, C., Santschi, P. H., Zhang, S.-J., Schwehr, K. A., Quigg, A., Guo, L., Gong, G.-C., Pinckney, J. L., Long, R. A. and Wei, C.-L.: Comparative evaluation of sediment trap and 234Th-derived POC fluxes from the upper oligotrophic waters of the Gulf of Mexico and the subtropical northwestern Pacific Ocean, Marine Chemistry, 121(1), 132–144, doi:https://doi.org/10.1016/j.marchem.2010.03.011, 2010.

Passow, U.: Sediment trap (Kiel 21- trap, KUM) particle flux measurements, Gulf of Mexico, August 2010 to October 2011., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7MK69V2., 2016.

Passow, U.: Sediment Trap (raw data) - Green Canyon, Gulf of Mexico, 1260m, April 16, 2012 - September 4, 2012., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7PN93PS., 2017a.

Passow, U.: Sediment Trap (raw data) - Green Canyon, Gulf of Mexico, 1260m, September 10, 2012 - April 30, 2013., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7JW8BXM., 2017b.

Passow, U.: Sediment Trap (raw data) - Mississippi Canyon, Gulf of Mexico, 1040m, June 28, 2012 - September 8, 2012., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7F47M6M., 2017c.

Passow, U.: Sediment Trap (raw data) - Mississippi Canyon, Gulf of Mexico, 1540m, September 18, 2015

- September 12, 2016., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N71C1V8T., 2017d.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Atwater Valley, Gulf of Mexico, 1040m, April 16, 2012 - April 11, 2013., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. DOI: 10.7266/N7H993KF., 2017a.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Atwater Valley, Gulf of Mexico, 1040m, June 5, 2013 - April 15, 2014., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7CJ8BVQ., 2017b.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Atwater Valley, Gulf of Mexico, 1040m, May 6, 2014 - April 20, 2015., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7416VD0., 2017c.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Green Canyon, Gulf of Mexico, 1260m, April 23, 2015 - April 15, 2016., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7BR8QKF., 2017d.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Green Canyon, Gulf of Mexico, 1260m, June 8, 2013 - April 15, 2014., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7CR5RQT., 2017e.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Green Canyon, Gulf of Mexico, 1260m, May 4, 2014 - April 20, 2015., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7VT1QGS., 2017f.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Mississippi Canyon, Gulf of Mexico, 1040m, October 9, 2013 - September 15, 2014., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7XK8CZS., 2017g.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Mississippi Canyon, Gulf of Mexico, 1040m, September 12, 2012 - September 12, 2013., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N79C6VHB., 2017h.

Passow, U. and Giering, S.: Sediment Trap (raw data) - Mississippi Canyon, Gulf of Mexico, 1040m, September 22, 2014 - September 15, 2015., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N78W3BQJ., 2017i.

Passow, U. and Sweet, J.: Sediment Trap (raw data) - Mississippi Canyon, Gulf of Mexico, 1630m, September 12, 2012 - September 12, 2013., Distributed by: Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), Harte Research Institute, Texas A&M University-Corpus Christi. doi:10.7266/N7W66J7K., 2017.