Supplement

Table S1. Regional Estimates of Net Air-Sea Carbon Dioxide Exchange from Observations and Regional Models[a,b]					
Region	**Area (km²)**	**Air-Sea Exchange**		**Observation-Based Estimate or Model**	**Reference**
		g C per m² per year[a,b]	**Tg C per year[a,b]**		
North American Atlantic Coast (NAAC)					
Scotian Shelf	2.2×10^5	8.3 ± 6.6	1.8	Combination of *in situ* and satellite observations (10-year average, 1999–2008)	Shadwick et al. (2010)
	1.28×10^5	-14 ± 3.2	-1.9	Observation-based estimate (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
		-5.0 ± 4.3	-0.64	Combination of *in situ* and satellite observations (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
	1.2×10^5	-28 ± 0.72	-3.3	Model (2-year average, 2004–2005)	Fennel and Wilkin (2009)
Gulf of Maine (without Georges Bank and Nantucket Shoals)	1.28×10^5	0.48 ± 2.6	0.061	Observation-based estimate (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
		0.12 ± 0.96	0.015	Combination of *in situ* and satellite observations (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
		4.6 ± 3.1	0.58	Observation-based estimate (5-year mean, 2004-2008)	Vandemark et al. (2011)
Georges Bank and Nantucket Shoals	0.58×10^5	-8.5 ± 2.6	-0.49	Observation-based estimate (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
		-16 ± 2.9	-0.95	Combination of *in situ* and satellite observations (reference year,	Signorini et al. (2013); using Ho et al. (2011) gas

Region	Area			Method	Reference
				2004)	transfer param.
Gulf of Maine (with Georges Bank and Nantucket Shoals)	1.7×10^5	-20 ± 4.9	-3.4	Model (2-year average, 2004–2005)	Fennel and Wilkin (2009)
	0.87×10^5	-27 ± 8.4	-1.9	Model (4-year average, 2004–2007)	Cahill et al. (2016)
Mid-Atlantic Bight (MAB)	1.25×10^5	-13 ± 8.3	-1.6	Observation-based estimate	DeGrandpre et al. (2002)
		-14	-1.8	Model (2004)	Fennel et al. (2008)
	0.93×10^5	-13 ± 3.2	-1.2	Observation-based estimate (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
		-21 ± 2.3	-2.0	Combination of *in situ* and satellite observations (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
	0.86×10^5	-11 ± 2.6	-0.92	Model (2-year average, 2004–2005)	Fennel and Wilkin (2009)
	1.15×10^5	-14 ± 2.4	-1.7	Model (4-year average, 2004-2007)	Cahill et al. (2016)
South Atlantic Bight (SAB)	1.02×10^5	-5.8 ± 2.5	-0.59	Observation-based estimate	Jiang et al. (2008)
		-8.2 ± 2.9	-0.83	Observation-based estimate (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
		-8.0 ± 1.9	-0.82	Combination of *in situ* and satellite observations (reference year, 2004)	Signorini et al. (2013); using Ho et al. (2011) gas transfer param.
	0.92×10^5	-6 ± 2.4	-0.55	Model (4-year average, 2004-2007)	Cahill et al., (2016)
Gulf of Mexico (GMx)					
Whole Gulf of Mexico	15.6×10^5	-2.3 ± 0.96	-3.6	Observation-based estimate	Robbins et al. (2014)
		-8.5 ± 6.5	-13	Model (7-year average, 2005–2010)	Xue et al. (2016)

Open Gulf of Mexico	10.1×10^5	−5.8 ± 0.84	−5.8	Observation-based estimate	Robbins et al. (2014)
		−12 ± 5.5	−13	Model (7-year average, 2005–2010)	Xue et al. (2016)
West Florida Shelf	1.5×10^5	4.4 ± 1.3	0.67	Observation-based estimate	Robbins et al. (2014)
		4.6 ± 0.58	0.68	Model (7-year average, 2005–2010)	Xue et al. (2016)
Northern Gulf of Mexico	1.5×10^5	−5.3 ± 4.4	−0.79	Observation-based estimate	Robbins et al. (2014)
		−3.8 ± 8.9	−0.58	Model (7-year average, 2005–2010)	Xue et al. (2016)
	unknown	−11 ± 44		Observation-based estimate	Huang et al. (2015)
	unknown	−13 ± 3.6		Combination of *in situ* and satellite observations	Lohrenz et al. (2018)
Western Gulf of Mexico	0.8×10^5	2.2 ± 0.6	0.17	Observation-based estimate	Robbins et al. (2014)
		4.1 ± 3.8	0.33	Model (7-year average, 2005–2010)	Xue et al. (2016)
Mexico Shelf	1.8×10^5	−1.1 ± 0.6	−0.19	Observation-based estimate	Robbins et al. (2014)
		−2.3 ± 4.2	−0.41	Model (7-year average, 2005–2010)	Xue et al. (2016)
North America Pacific Coast (NAPC)					
Gulf of Alaska	3×10^6	−11	−36	Observations, climatology of 1991–2011, 0 to 400 km offshore	Evans and Mathis (2013)
British Columbia coastal ocean		−35		Observations, 1995–2001	Evans et al. (2012)
British Columbia Vancouver Island shelf		−6		Model, annual average	Ianson and Allen (2002)

				Observations inshore of 200-m isobath	Evans et al. (2011)
Oregon Shelf		-3.6 ± 82		Observations inshore of 200-m isobath	Evans et al. (2011)
Oregon Shelf		-88		Observations	Hales et al. (2005)
50° to 22°N	1.76×10^6	-7.9	-14	Satellite-based prediction of pCO$_2$ and satellite-based wind speed, within 370 km of coast	Hales et al. (2012)
35° to 40°N			0.6	Model, 0 to 100 km from coast, 1999–2005	Fiechter et al. (2014)
40° to 45°N			-0.4	Model, 0 to 100 km from the coast, 1999–2005	Fiechter et al. (2014)
30° to 46°N	1.49×10^6	0.6 ± 2.4	0.9 ± 3.6	Model, 0 to 800 km from the coast, 12-year simulation with climatological forcing	Turi et al. (2014)
North American Arctic (NAA)					
Chukchi Sea	2.9×10^5	-15	-4.4	Observations	Evans et al. (2015b)
	5.95×10^5	-175 ± 44	-38 ± 7	Observations	Bates et al. (2006)
	5.95×10^5	-35	-12.1	Observations	Gao et al. (2012)
		-17 ± 17		Satellite-based prediction of pCO$_2$ and satellite-based wind speed	Yasunaka et al. (2016)
Beaufort Sea (Amundsen Gulf)		-14		Observations	Shadwick et al. (2011)
Beaufort Sea (Cape Bathurst Polynya)		-44 ± 28		Observations	Else et al. (2013)
Beaufort Sea	9.2×10^5	-4.4	-4.0	Observations	Evans et al. (2015b)
Beaufort Sea		-10 ± 15		Observations	Mucci et al. (2010)
Western Arctic Coastal Ocean	1.2×10^6	-8.8 ± 4.8	-11 ± 5.7	Observations	Evans et al. (2015b)

Hudson Bay	7.32×10^5	−3.2 ± 1.8	−0.58 ± 0.3	Observations	Else et al. (2008)
Bering Sea	6.94×10^5	−9.6	−6.7	Observations	Cross et al. (2014a)
		−5.3	−3.7	Observations	Takahashi et al. (2009)

[a]Positive fluxes indicate a source to the atmosphere.

[b] C, carbon; CO_2, carbon dioxide; Tg, teragrams; g, grams; 1 Tg = 10^{12} g.