



Supplement of

Mechanisms of northern North Atlantic biomass variability

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5 **Table S1: Correlations of phosphate limitation for small and large phytoplankton, silicate limitation for large phytoplankton, and light limitation to for small biomass in each of the three regions.** Just as phosphate limitation for small and large phytoplankton are perfectly correlated in all cases, light limitation for large biomass is perfectly correlated with light limitation for small biomass, and thus is not shown for conciseness. Bold indicates statistical significance ($p < 0.05$).

		phosphate limitation, small phytoplankton	phosphate limitation, large phytoplankton	silicate limitation, large phytoplankton	light limitation, small phytoplankton
SOUTHEAST	large biomass				
small biomass	0.52	0.68	0.67	0.42	-0.75
large biomass	-	0.74	0.75	0.04	-0.57
phosphate limitation, small		-	1.00	0.34	-0.87
phosphate limitation, large			-	0.35	-0.86
silicate limitation, large				-	-0.45
NORTHEAST	large biomass				
small biomass	0.36	-0.09	-0.12	-0.13	-0.08
large biomass	-	0.31	0.28	0.05	-0.17
phosphate limitation, small		-	1.00	0.88	-0.87
phosphate limitation, large			-	0.91	-0.86
silicate limitation, large				-	-0.80
NORTHWEST	large biomass				
small biomass	-0.34	-0.50	-0.52	-0.57	0.61
large biomass	-	0.83	0.83	0.60	-0.63
phosphate limitation, small		-	1.00	0.81	-0.71
phosphate limitation, large			-	0.83	-0.73
silicate limitation, large				-	-0.85

- 15 **Figure S1: Surface ocean net primary productivity (NPP) 1998-2007 mean and trends** (a) estimated from SeaWiFS using the CbPM model, (b) estimated from SeaWiFS using the VGPM model, (c) 0-100m modeled NPP, (d) SeaWiFS NPP trend from CbPM, (e) SeaWiFS NPP trend from VGPM, and (f) 0-100m modeled biomass trend. In d, e and f, significant trends are marked with a black contour and the three focus regions are outlined in red. Note that NPP estimated from the older VGPM algorithm is considered to be less accurate by the developers of the algorithm [Behrenfeld et al., 2005; Westberry et al. 2008], and thus the CbPM estimate is the better point for model comparison.
- 20 **Figure S2: Monthly surface ocean biomass** for SeaWiFS (1998-2007, red), MODIS (2003-2015, blue) and model (1998-2009, 0-100m, black) (a) SE region, (b) NE region, and (c) NW region.
- Figure S3: Modeled Zooplankton biomass 1998-2007** (a) mean and (b) trend.
- Figure S4: Terms for limitation** by (a) phosphate, small phytoplankton (b) Light, large phytoplankton, (c) silicate, large phytoplankton, (d) 1998-2007 trend in phosphate limitation, small phytoplankton, (e) 1998-2007 trend in light limitation, large phytoplankton, and (f) 1998-2007 trend in silicate limitation, large phytoplankton. All are unitless. In d, e and f, significant trends are marked with a black contour and the three focus regions are outlined in red.
- 25 **Figure S5: Modeled Barotropic Streamfunction 1998-2007 trend.** See also Figure 6.

Figure S1

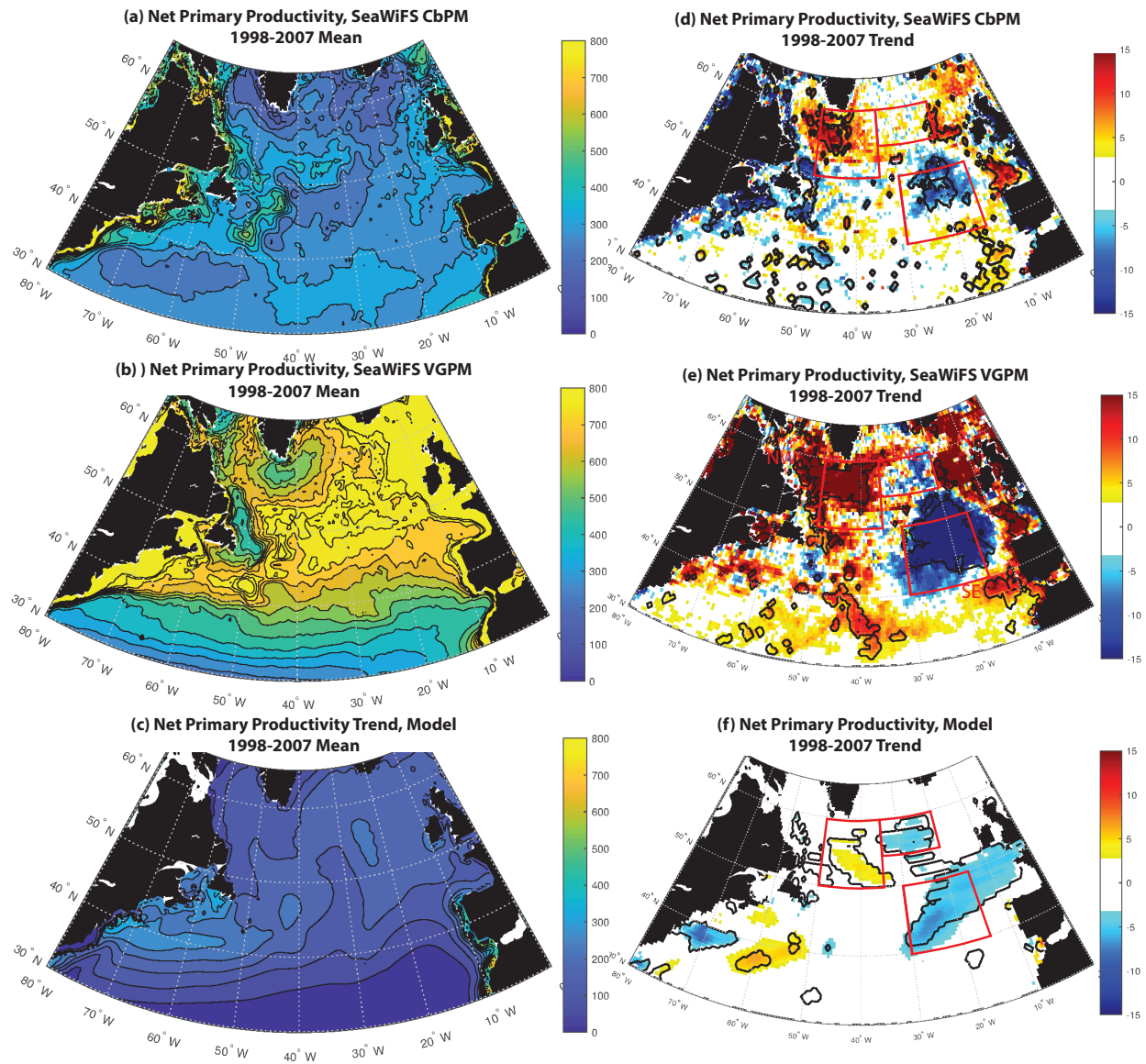


Figure S2

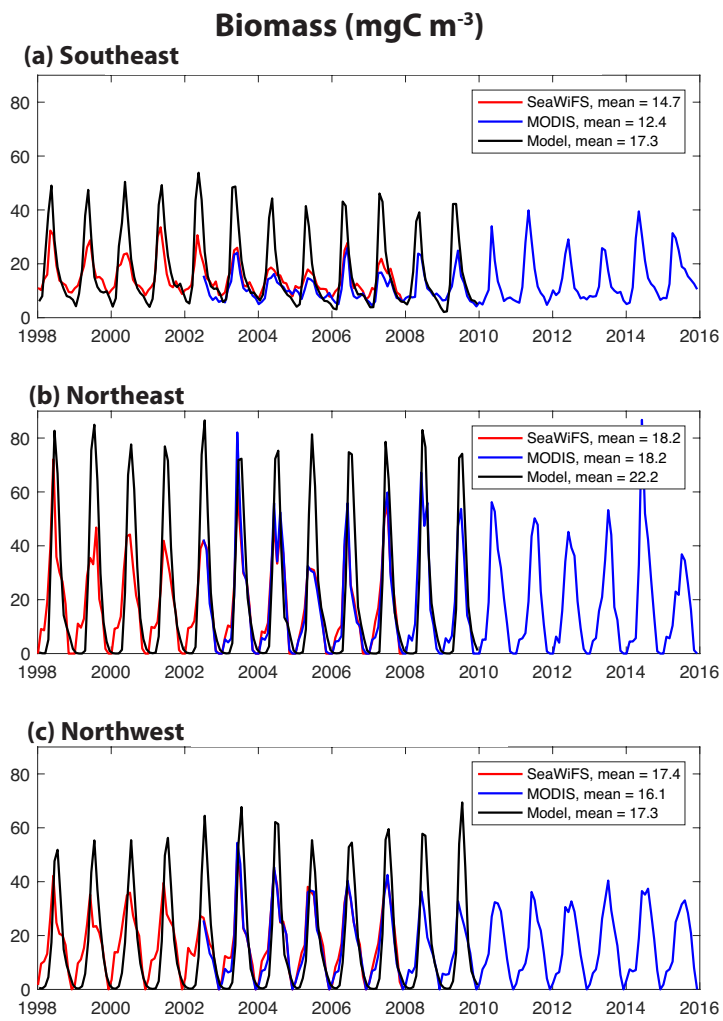


Figure S3

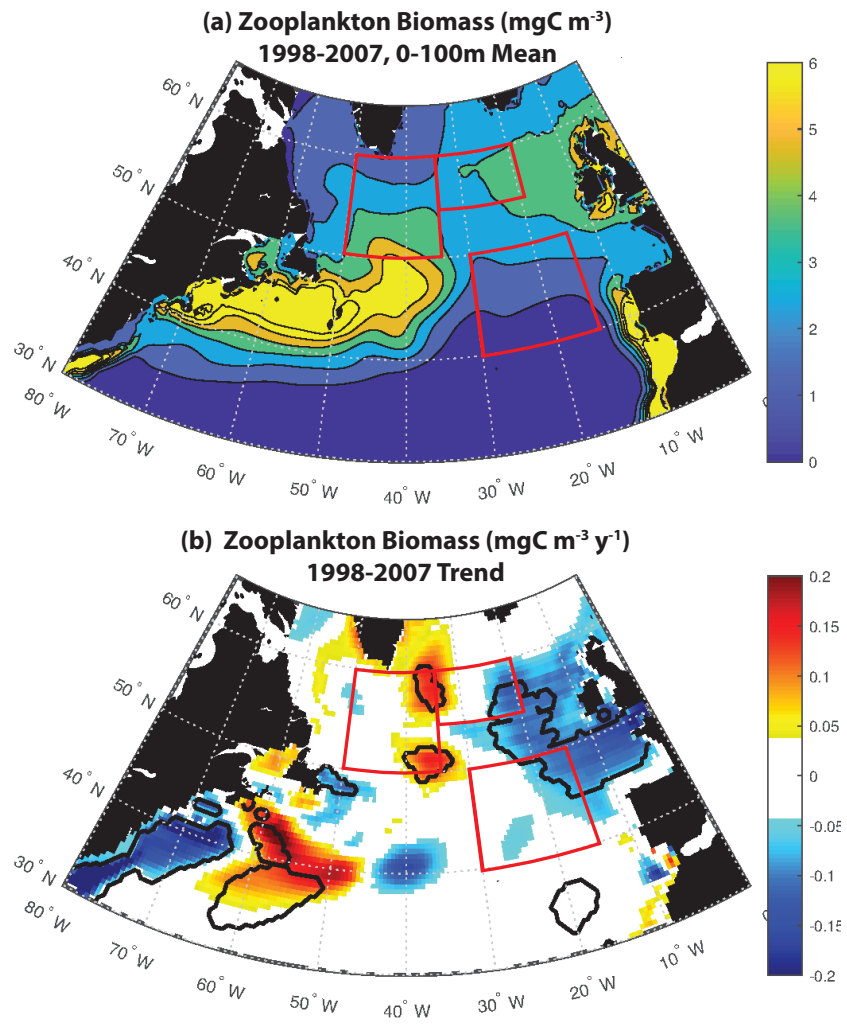


Figure S4

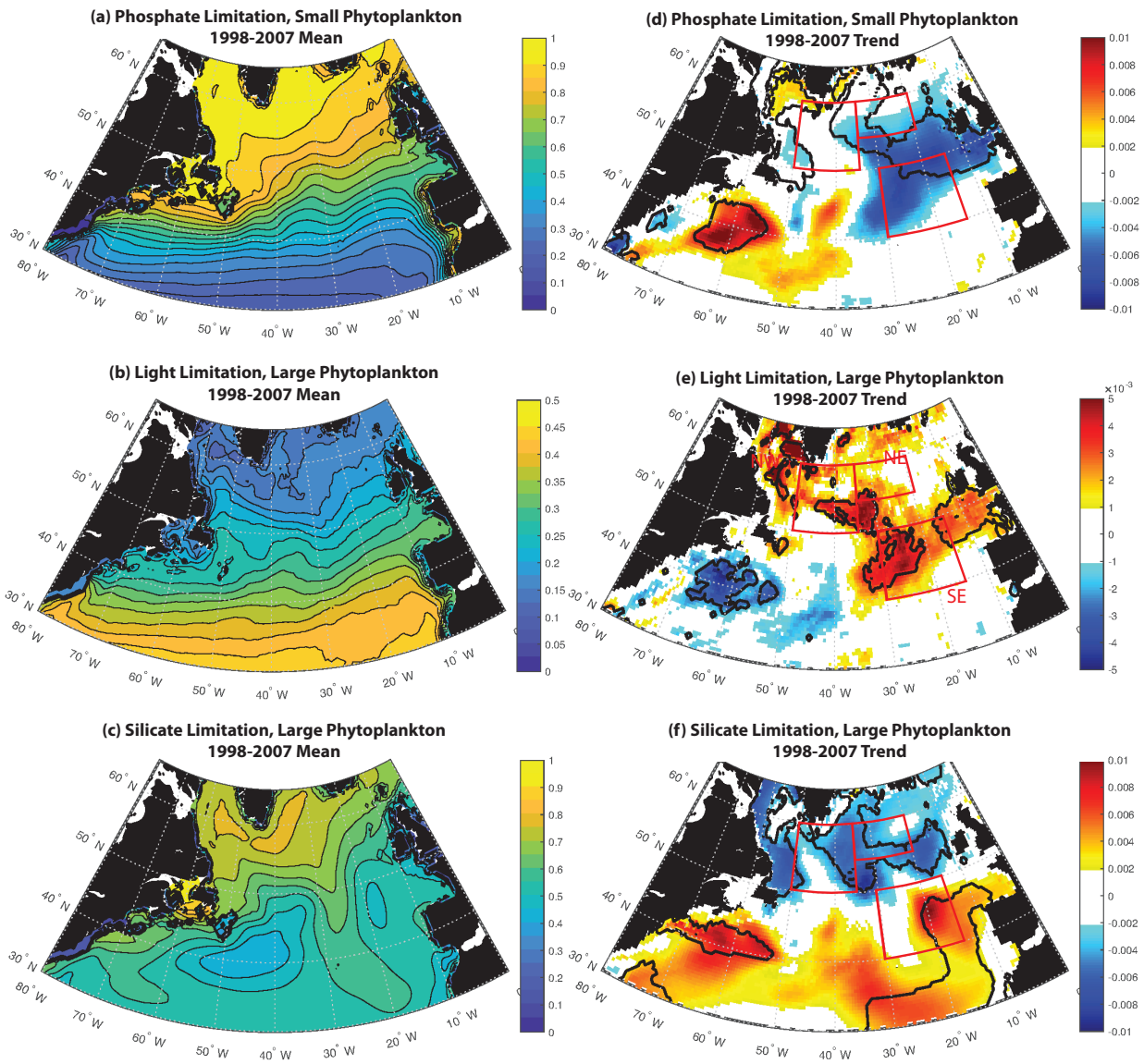


Figure S5

