SUPPLEMENT

Mechanisms of northern North Atlantic biomass variability

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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 ($p < 0.05$).

SOUTHEAST	large biomass	phosphate limitation, small phytoplankton	phosphate limitation, large phytoplankton	silicate limitation, large phytoplankton	light limitation, small phytoplankton
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	phosphate limitation, small phytoplankton	phosphate limitation, large phytoplankton	silicate limitation, large phytoplankton	light limitation, small phytoplankton
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	phosphate limitation, small phytoplankton	phosphate limitation, large phytoplankton	silicate limitation, large phytoplankton	light limitation, small phytoplankton
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**

Figure S1: 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 S2: 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.

Figure S1

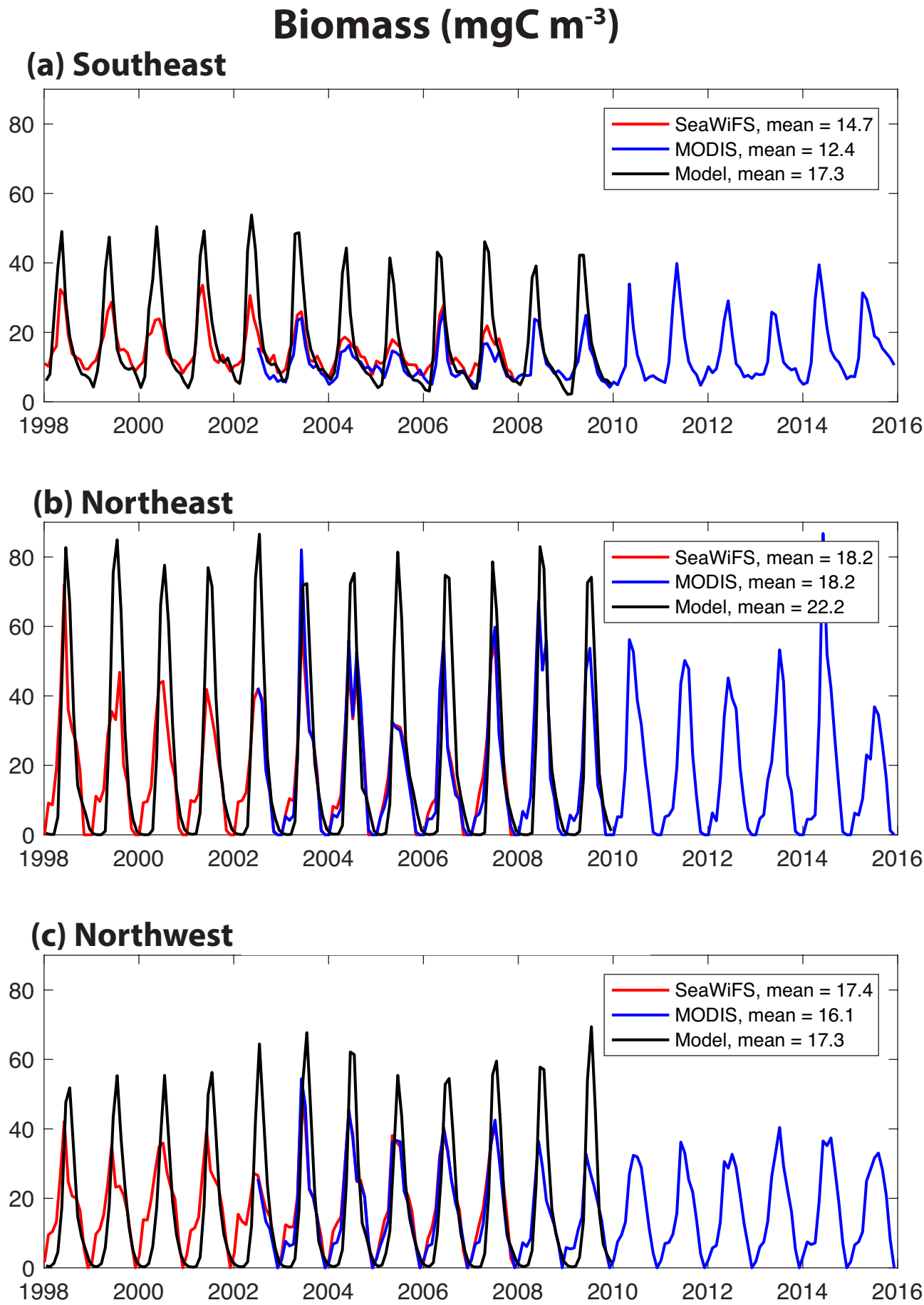
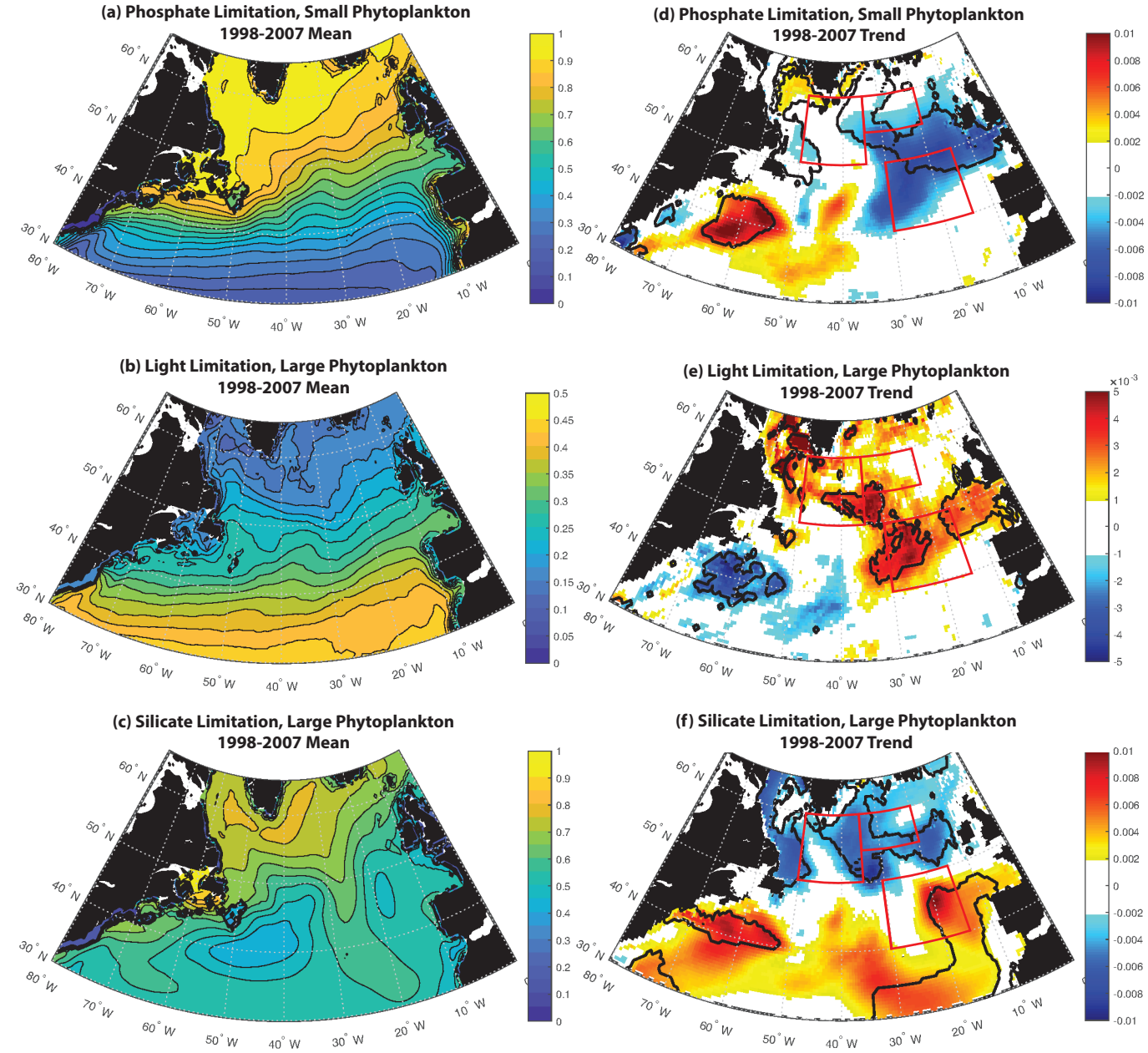

Biomass (mgC m-3)
(a) Southeast
SeaWiFS, mean = 14.7
MODIS, mean = 12.4
Model, mean = 17.3
(b) Northeast
SeaWiFS, mean = 18.2
MODIS, mean = 18.2
Model, mean = 22.2
(c) Northwest
SeaWiFS, mean = 17.4
MODIS, mean = 16.1
Model, mean = 17.3
0
20
40
60
80
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016

Figure S2


(a) Phosphate Limitation, Small Phytoplankton
1998-2007 Mean
(d) Phosphate Limitation, Small Phytoplankton
1998-2007 Trend
(b) Light Limitation, Large Phytoplankton
1998-2007 Mean
(e) Light Limitation, Large Phytoplankton
1998-2007 Trend
(c) Silicate Limitation, Large Phytoplankton
1998-2007 Mean
(f) Silicate Limitation, Large Phytoplankton
1998-2007 Trend
60° N
50° N
40° N
30° N
80° W
70° W
60° W
50° W
40° W
30° W
20° W
10° W
×10-3