Supporting Online Material for

Eddy/Wind Interactions Stimulate Extraordinary Mid-Ocean Plankton Blooms

Dennis J. McGillicuddy Jr.,* Laurence A. Anderson, Nicholas R. Bates, Thomas Bibby, Ken O. Buesseler, Craig Carlson, Cabell S. Davis, Courtney Ewart, Paul G. Falkowski, Sarah A. Goldthwait, Dennis A. Hansell, William J. Jenkins, Rodney Johnson, Valery K. Kosnyrev, James R. Ledwell, Qian P. Li, David A. Siegel, Deborah K. Steinberg

*To whom correspondence should be addressed. E-mail: dmcgillicuddy@whoi.edu

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Supporting Online Material

Materials and Methods

All hydrographic measurements were made in accordance with the BATS protocols (*S1*) to insure compatibility between the two data sets. Nutrients were measured with a standard autoanalyzer, chlorophyll *a* with Turner extraction, and accessory pigments with HPLC. Dawn-to-dusk ^{14}C primary production incubations took place on drifting *in situ* arrays, and export flux was measured at 150m with drifting sediment traps (PITS). Methods for ^{234}Thorium-based flux estimates are described in (*S2*).

Bacterial production was measured using the incorporation of 3H-TdR by the microcentrifuge method (*S3*). Rates were converted to carbon using 1.63 x 10^{18} cells mol TdR^{-1} and 10 fg C $cell^{-1}$. Heterotrophic bacterial biomass was determined by counting DAPI-stained cells on a blackened 0.2μm PC filter via epifluorescence microscopy.

Zooplankton samples were collected with a 1 m^2 MOCNESS (EDDIES) and a standard 1 m^2 frame (BATS). The MOCNESS nets were 150 μm mesh compared with 200 μm mesh nets for the BATS time-series. The smallest size fraction was excluded from our samples and the BATS samples due to discrepancy in the net mesh size. Thus, the values reported here represent zooplankton >500 μm integrated from 0-150 m. We include nighttime tows only.

The tracer release consisted of 1.6 kg of sulfur hexafluoride (SF_6) injected on the 1026.26 kg m^{-3} potential density surface within 20km of eddy center, where the highest chlorophyll *a* was found. Injection took place on July 23, 2005, and the tracer was

tracked through September 11, 2005. Distribution of the tracer was measured with a vertical array of samplers (*S4*). The center of the array was held on a fixed isopycnal surface, while the array was towed at a speed of approximately 0.75 m s^{-1} for ten hours at a time. Fifty syringes at the center of the array filled sequentially along the tracks, 12 minutes being required to fill each syringe. Samples were analyzed on board ship with a gas chromatograph and electron capture detector by the head space technique (*S5*).

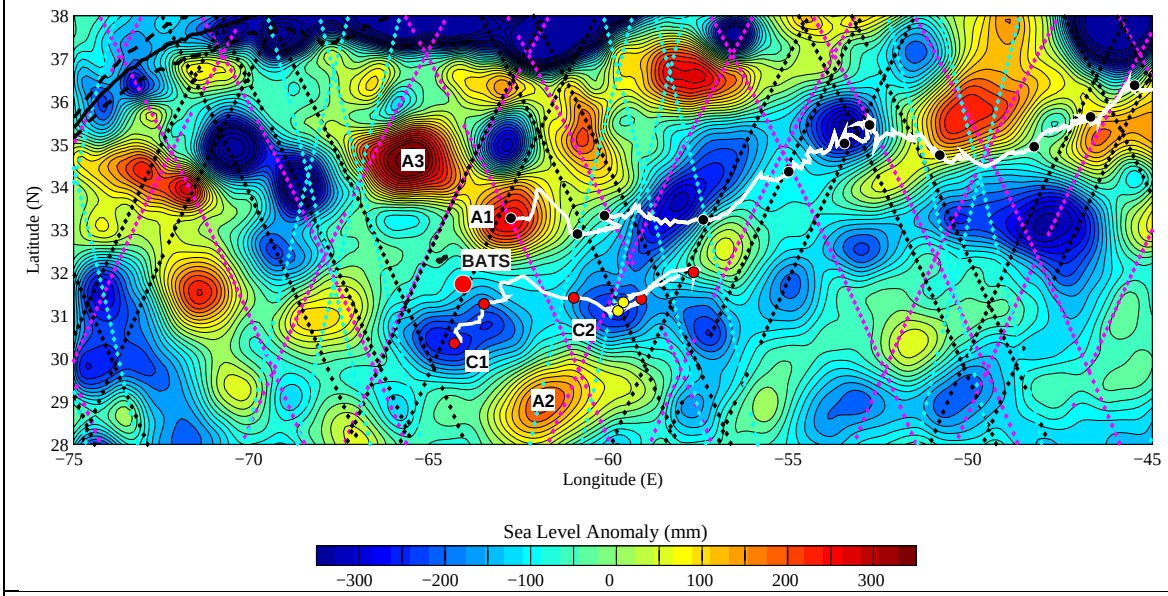

Fig. S1. Objective analysis of sea level anomaly for 5 June 2004, just prior to the first cruise of the 2004 field season. The Gulf Stream mean path and meander envelope (one standard deviation) are indicated as solid and dashed black lines, respectively. Prior trajectories of the features of interest are indicated by white lines emanating from eddy centers, with dots at thirty day intervals. Satellite ground tracks are shown for Jason (magenta), Topex 2 (green), Geosat Follow-on (black), and ERS/ENVISAT (light blue).

Eddy type	Feature	Occupations	Cruises
Cyclones	C1	4	OC404-1/WBIIX0409 (3), OC404-4/WBIIX0413 (1)
	C2	2	OC404-1, OC404-4
	Cold-core ring	1	OC404-4
	C3	1	OC415-1
	C5	2	OC415-1
Regular	A2	1	OC404-1 (XBT/ADCP/VPR only)
Anticyclones	A3	1	OC404-1 (XBT/ADCP/VPR only)
Mode-water eddies	A4 (18°)	6	OC415-1/WBII X0506 (2), OC415-2, OC415-3/WBIIX0508 (2), OC415-4
	A1 (16°)	1	OC404-1
	A5 (16°)	2	OC415-1, OC415-3

Table S1. EDDIES Observations. Cruise dates were: OC404-1, June 11-July 3, 2004; WBII X0409, June 24-July 3, 2004; OC404-4: July 25-August 12, 2004; WBII X0413: August 3-12, 2004; OC415-1: June 20-July 15, 2005; WBII X0506: July 6-15, 2005; OC415-2: July 18-August 5, 2005; OC415-3: August 7-26, 2005; WBII X0508: August 17-26, 2005; OC415-4: August 29-September 15, 2005.

Eddy type	Date	Reference
Cyclones	January1993	S6
	July 1993	S6
	November 1993	S6
	August 1994	S6
	June 1996	S7
	June 1996	S7
	July 1997	Unpublished
Regular	March 1994	S6
Anticyclones	September 1994	S6
	June 1996	S7
Mode-water	May 1993	S6
eddies	July 1995	S6,S8
	October 1995	S6
	June 1995	S7

Table S2. Observations of eddies in the vicinity of the Bermuda Atlantic Time-series Study.

		Primary Production mg C m^{-2} d^{-1}	Bacterial Production mg C m^{-2} d^{-1}	Bacterial Biomass mg C m^{-2}	Zooplankton Biomass mg dry wt m^{-2}	^{234}Th-based Carbon flux mg C m^{-2} d^{-1}	Sediment Trap Flux mg m^{-2} d^{-1}		
							Mass	Carbon	Nitrogen
Cyclone C1									
	June-July 2004	403±119	24.0±4.3	725±110	328±163 535[1]	48±17	65.3	19.3	2.7
	August 2004	594	21.4±5.1	783±83	378±14 503±40[1]	20±8	68.1	23.0	3.5
MWE A4									
	July 2005	273±63	15.7±3.1	671±76	550±124	15±5	71.1±14.3	15.9±1.8	2.4±.28
	August 2005	688±107	21.8±3.0	579±84	515±305	22±9	63.5±6.4	12.4±.14	2.1±.14
BATS Summer Climatology		426±207 (1988-2003)	37.5±25 (1999-2002)	714±131 (1993-2003)	398±215 (1994-2005) 190±46 (2004-2005)		107.8±39.0	27.2±8.0	4.3±1.5

Table S3. Vertically integrated primary production (^{14}C incubation, 0-140m), bacterial production and biomass (TdR, DAPI, 0-140m), zooplankton biomass (0-150m, net tows), thorium-based carbon flux estimates, and sediment trap fluxes (150m, PITS) measured in target features C1 and A4, as compared with climatological summertime conditions at BATS. Mean values are reported with ±1 standard deviation. See Knap et al. (1993) for details on methodology. Zooplankton biomass (>500μm, in dry weight) integrated in over the upper 0-150m (nighttime tows only) in order to compare with the BATS zooplankton time-series. The smallest size fraction was removed from both EDDIES and BATS samples to accommodate discrepancy in the net mesh size. Notes: (1) denotes stations at eddy periphery.

Supporting Online Material: References

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