Supporting Information for “Mesoscale Eddies and Trichodesmium spp. Distributions in the Southwestern North Atlantic”

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Introduction

Four figures are included. The first shows a comparison between abundance estimates based on the VPR and nearby results of microscopic enumeration. The next two relate to the numerical model presented in Section 3.3. The first (Figure S2) displays the temperature and salinity profiles used to create the initial conditions. The second (Figure S3) presents the rate of decay of kinetic energy over time for various model runs. The fourth figure demonstrates regional patterns in integrated *Trichodesmium* colony abundance from the database compiled by Luo et al. [2012]. These data were used to compute one estimate of background colony abundance for the estimation of the observed increase in abundance associated with fall cruise Eddy C3.
References

Figure S1. Comparison between estimates of Trichodesmium colony abundance based on the VPR and microscopic enumeration for nearest available measurements. Exact correspondence is not expected due to spatial and temporal offsets between paired samples. Inset shows enlargement of the lower right corner of the plot, showing abundances less than 2 colonies L⁻¹.
Figure S2. Potential temperature and salinity profiles used to initialize eddy models, as described in Section 3.3.1.
Figure S3. Relative decay of total kinetic energy over time. Kinetic energy time series were smoothed with a three-day running average to remove the effects of waves, which were not fully resolved by the daily average model output. The fractional rates of decay for the basic and amplified eddies with eddy–wind interaction (“$\tau(U_w - u_s)$” and “strong”) were roughly equivalent throughout the six month model runs. Between days 1 and 50, maximum azimuthal geostrophic velocities decreased from roughly 0.23 to 0.17 m s$^{-1}$ in the basic case with eddy–wind interaction (“$\tau(U_w - u_s)$”). Over the same period, in the absence of eddy–wind interaction (“$\tau(U_w)$”), decay was much slower, with maximum eddy velocities remaining roughly constant at 0.241 m s$^{-1}$. A 30-day simulation without wind forcing (“no wind”) had the slowest relative rate of decay of kinetic energy over the first month of simulation.
Figure S4. Gridded integrated *Trichodesmium* colony abundance from the months of August through December from a database compiled by *Luo et al.* [2012]. The boxed region was used to compute mean integrated *Trichodesmium* colony abundance (Table 4) representative of the region and time of year eddies C3 and A3 were sampled. Positions of C3 and A3 at the time of sampling are marked with + signs. The region was chosen to extend farther north based on patterns of *Trichodesmium* abundance and influence of riverine input just to the south of C3 and A3.