**Supplement material**

![Diagram](image.png)

**Figure S1.** a) Vertical profiles of a location inside the Great Australian Bight of: a) gradient over depth of the annual mean of phytoplankton concentration, and b) annual mean and standard deviation of phytoplankton concentrations.
**Figure S2.** Time series (June 1993-June 2005) of daily increase in phytoplankton associated with extreme phytoplankton blooms; binned every 10 days and coloured by: a) longitude where the episodes occur, b) nitrate source, and c) depth at which the water entered the GAB.

**Figure S3.** Monthly mean and standard deviation of the daily increase in phytoplankton associated with 1993-2005 extreme phytoplankton blooms grouped by: a-c) longitude where the extreme phytoplankton blooms occur (east, middle and west), d-g) nitrate source, and h-i) depth at which the water entered the GAB.
Figure S4. Wavelet power spectrums of time series (1993-2005) of daily increase in phytoplankton concentration associated with extreme phytoplankton blooms for each nitrate source. Significant periodicities are shown by black contours.