*Paleoceanography and Paleoclimatology*

Supporting Information for

**Astronomical calibration of the Ocean Anoxic Event 1b and its implications for the cause of mid-Cretaceous events: a multiproxy record**

J. M. F. Ramos1,2, J. F. Savian1,3, D. R. Franco4, M. F. Figueiredo5, F. Frontalini6, R. Coccioni7, C. G. Leandro1,4, M. Giorgioni8, P. H. P. C. Vidal8, G. Fazio4,8, L. Jovane9, N. Sabatino10, R. I. F. Trindade11, L. R. Tedeschi12

1 Programa de Pós-Graduação em Geociências, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil.

2 Petrobras, Exploration - Basin Analysis, Rio de Janeiro, Brazil.

3 Instituto de Geociências, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil.

4 Coordenação de Geofísica, Observatório Nacional, Rio de Janeiro, Brazil.

5 Petrobras, Research Center (CENPES), Rio de Janeiro, Brazil.

6 Dipartimento di Scienze Pure e Applicate (DiSPeA), Università degli Studi di Urbino “Carlo Bo”, Urbino, Italy.

7 Università degli Studi di Urbino “Carlo Bo”, Urbino, Italy.

8 Universidade de Brasília, Instituto de Geociências, Programa de Pós-graduação em Geologia

9 Instituto Oceanográfico, Universidade de São Paulo, São Paulo, Brazil.

10 Istituto per lo studio degli Impatti Antropici e Sostenibilità in ambiente marino (IAS-CNR), Palermo, Italy

11 Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, São Paulo, Brasil.

12 Petrobras, LIBRA, Rio de Janeiro, Brazil.

**Contents of this file**

Figures S1 to S2

**Introduction**

This supplementary document contains the following information:

Supplementary Figs. 1 and 2

A screenshot of a graph

Description automatically generated

Figure S1. Detrend analysis for Log magnetic susceptibility (MS) depth-domain data for the PLG core: a) Lithology of the PLG section (Coccioni et al., 2014). Grey bands represent the OAE 1b sub-events; b) Log MS (black line) record together with Linear trend (orange line) showing that linear detrending behaves like a DC; c) Log MS (black line) record together with LOESS trend (green line); d) LOESS detrend curve of Log MS data series (black line) together with 405 kyr filtered signal (red line); e) 2π MTM power spectrum associated with the first-order autoregressive (AR1) confidence levels showing the normal high power of Myr cycles compared to others cycles peaks. f) 2π MTM power spectrum after Linear detrending, almost identical to the previous power spectrum, showing that there is no practical difference in applying linear detrending in this interval. g) 2π MTM power spectrum after LOESS detrend. The colors at power spectrums are: pale green = MSB (million-year scale band); pale red = E405; light blue = short eccentricity.

A graph of different colored lines

Description automatically generated

Figure S2. Comparison between the power spectrum of magnetic susceptibility (MS) from the PLG core using 2π MTM power spectrum associated with the first-order autoregressive (AR1) confidence levels (a) and Lomb-Scargle power spectrum of the same data (b), displaying that all the combinations of secular frequencies are identifiable through both methodologies, allowing to perform the analysis of unevenly spaced time series (Schulz and Stattegger, 1997). The values of the respective cycle wavelengths (in centimeters) were extracted at the locations indicated by the black circles. The colors at power spectrums are: pale red = E405; light blue = short eccentricity; Orange = Obliquity peaks (dark-orange, mean obliquity cycle); Pale Pink = Precession index peaks.