Supporting Information for

Changes in productivity and intermediate circulation in the northern Indian Ocean since the last deglaciation: new insights from benthic foraminiferal Cd/Ca records and benthic assemblage analyses

Ruifang Ma[1,2*], Sophie Spulcre[1], Laetitia Licari[3], Frédéric Haurine[1], Franck Bassinot[4], Zhaojie Yu[5], Christophe Colin[1]

[1]Université Paris-Saclay, CNRS, GEOPS, 91405, Orsay, France.
[2]State Key Laboratory of Cryospheric Science, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, 730000, Lanzhou, China.
[3]CEREGE, Aix-Marseille Université-Europole de l'Arbois-BP80, 13545, Aix-en-Provence, France.
[4]LSCE/IPSL, CEA CNRS UVSQ, UMR 8212, F-91190 Gif Sur Yvette, France.
[5]Key Laboratory of Marine Geology and Environment, Institute of Oceanology, Chinese Academy of Sciences, 266071, Qingdao, China.

Contents of this file

Additional Supporting Information (Files uploaded separately)

Introduction

Figure S1. a) – b) The Net primary productivity distribution in the Northern Indian Ocean during January and July, respectively. Maps based on MODIS chlorophyll-a, SST, PAR satellite data, using the standard vertically Generalized Production Model (VGPM) (Behrenfeld and Falkowski, 1997) as the standard algorithm.

Fig. S2. Down core variations of PC1 and 2 scores, together with the percentages of major species in: (a-c) benthic assemblages 1, 2 and 3, respectively. The color-shaded intervals and abbreviations are the same as in Figure 2.

Fig. S3. Compilation of benthic $\delta^{13}C$ records obtained from MD77-191 (1254 m) (Ma et al., 2020), MD77-176 (1325 m) (Ma et al., 2019), RC12-344 (2140 m, Naqvi et al., 1994),

MD97-2120 (1210 m, Pahnke and Zahn, 2005), and Core 905 (1580 m, Jung et al., 2009). The color-shaded intervals and abbreviations are the same as in Figure 2.

Fig. S4. Compilation of benthic $\delta^{13}C$, PC 1 scores and Cd_w obtained from core MD77-176 (BoB). The color-shaded intervals and abbreviations are the same as in Figure 2.

Table S1. Sub-bottom depth, Cd/Ca values (μmol/mol) of benthic foraminifera species from core MD77-191 (*Hoeglundina elegans*, *Cibicidoides pachyderma* and *Uvigerina peregrina*, *Globobulimina* spp.) and core MD77-176 (*Hoeglundina elegans*).

Table S2. Down-core depth and quantities of the major benthic foraminiferal species at core MD77-191.

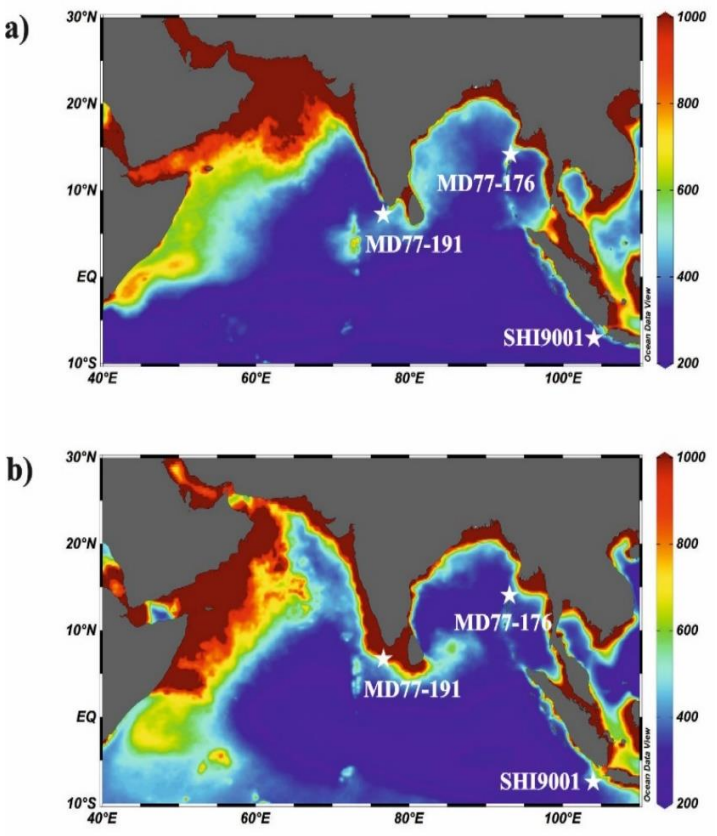

a)
30°N
20°N
10°N
EQ
10°S
40°E
60°E
80°E
100°E
MD77-176
MD77-191
SHI9001
1000
800
600
400
200
Ocean Data View
b)
30°N
20°N
10°N
EQ
10°S
40°E
60°E
80°E
100°E
MD77-176
MD77-191
SHI9001
1000
800
600
400
200
Ocean Data View

Fig. S1

a)

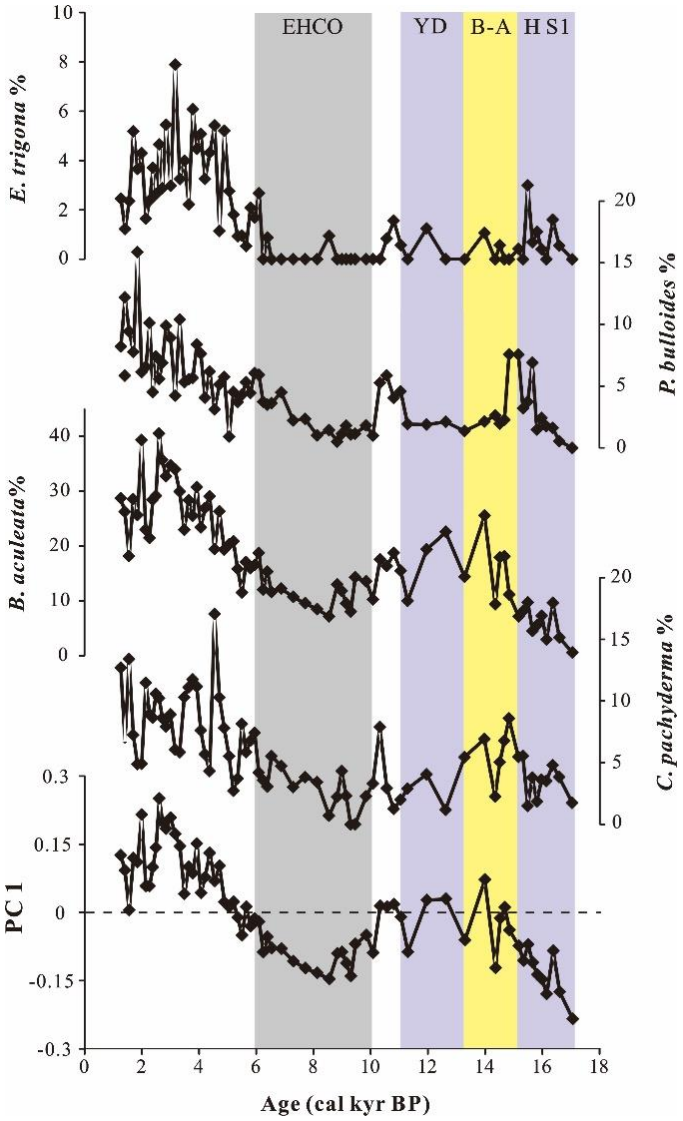

EHCO
YD
B-A
H S1
E. trigona %
P. bulloides %
B. aculeata %
C. pachyderma %
PC 1
Age (cal kyr BP)

Fig. S2

b)

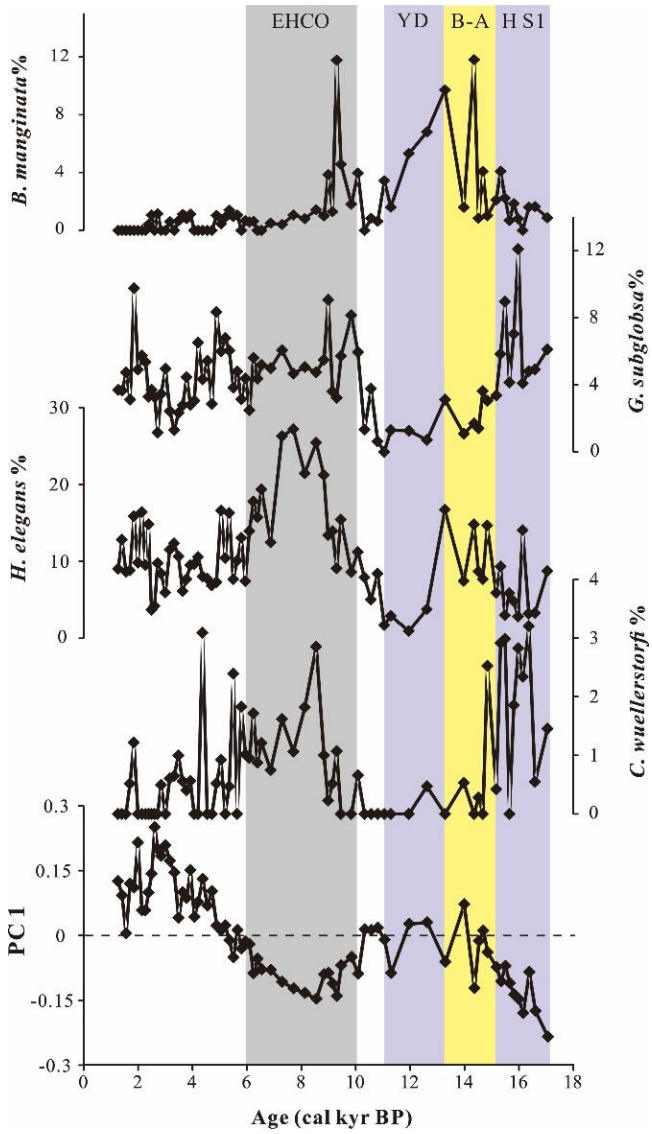

EHCO
YD
B-A
H S1
B. manginata%
G. subglobsa%
H. elegans %
C. wuellerstorfi %
PC 1
Age (cal kyr BP)

Fig. S2

c)

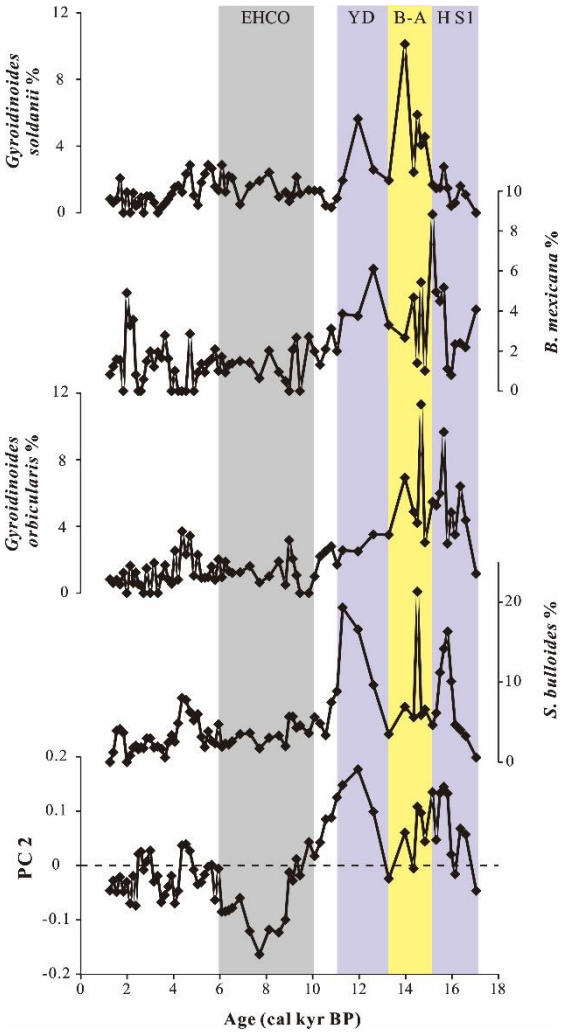
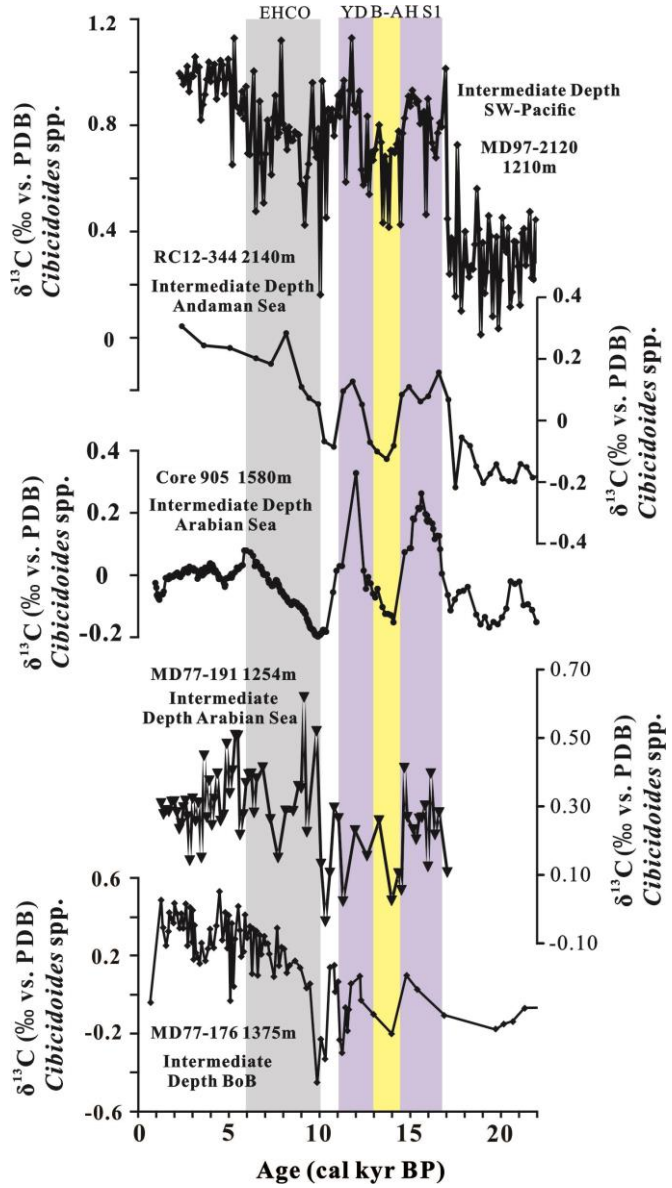

EHCO
YD
B-A
H S1
Gyroidinoides soldanii %
B. mexicana %
Gyroidinoides orbicularis %
S. bulloides %
PC 2
Age (cal kyr BP)

Fig. S2



103

104 Fig. S3

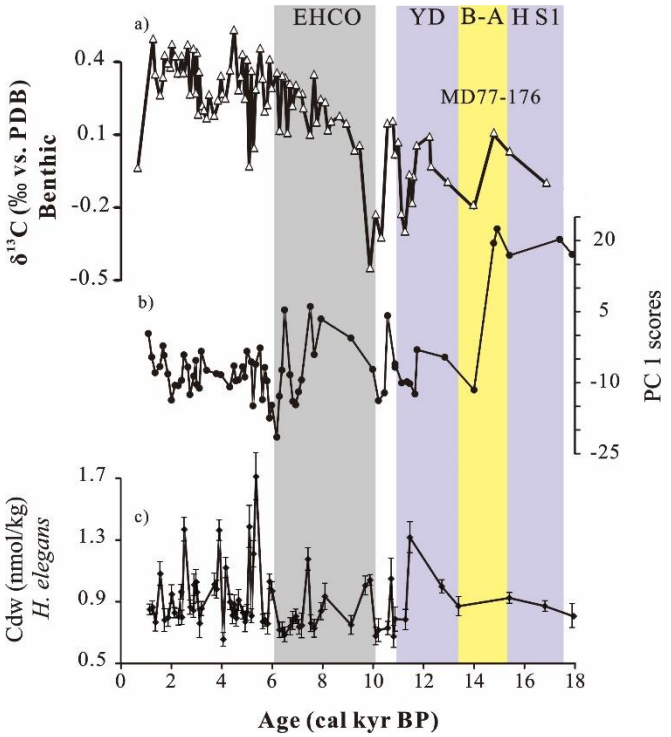

EHCO
YD
B-A
H S1
a)
MD77-176
δ13C (‰ vs. PDB)
Benthic
0.4
0.1
-0.2
-0.5
b)
20
5
-10
-25
PC 1 scores
c)
Cdw (nmol/kg)
H. elegans
1.7
1.3
0.9
0.5
0
2
4
6
8
10
12
14
16
18
Age (cal kyr BP)

Fig. S4