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Climate of the Past Discussions

Interactive comment on "Deglacial intermediate water reorganization: new evidence from the Indian Ocean" *by* S. Romahn et al.

Anonymous Referee #2

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Romahn et al present a new record of foraminiferal stable isotopic ratio and trace metal ratio to understand surface and subsurface hydrography of western Indian Ocean during the last deglaciation. Based on the similarity between surface temperature record and benthic d13C record, authors suggest Southern Ocean processes as the driver of carbon isotopic minimum event through oceanic tunnel. The authors put forward a new hypothesis to explain global CIME. The manuscript is very well written and I recommend it for publication. I, however have a few reservations, as listed below.

Page 4, Section 2 Oceanographic framework, Please add details of productivity in the study area. It will help in assessing the possible contribution of downward flux of organic matter in driving benthic stable isotopic ratio, as the core is located at only 446 m depth.

Page 5, Line 6, replace 'We wet sieved over' with 'The sediments were wet sieved over'.

Page 5, Section 3.2, Add a table with AMS date details including which dates are monospecific while which ones are based on mixed species.

Page 5, Section 3.2, Does an age model based on both monospecific and mixed-species dates lead to age discrepancy due to depth dependent 14C reservoir age?

Page 5, Section 3.2, How much is the error associated with age model? It will help in assessing the timing of events mentioned in the text.

Page 5, Section 3.3, As the authors picked only 6-8 G. ruber and 3-4 Planulina ariminensis for stable isotopic analysis, is there a possibility of a seasonal bias in the record?

Page 7, Line 6, The d18O planktic enrichment at $\sim$13 kyr is based on only two data points. As authors have drawn far reaching conclusions based on this enrichment, is it possible to supplement it with additional close spaced samples. It will help to strengthen the arguments put forward by the authors.

Page 7, Line 7-8, The overall structure of the d18O ruber matches well with Antarctic temp record rather than with NGRIP d18O, especially the beginning of deglacial depletion of d18O ruber, which is contrary to what the authors have mentioned.

Page 7, Line 15, the reference to sea level rise is irrelevant here, unless the same is discussed in the manuscript.

Page 7, Line 17, Indicate the increase in d13Cbenthic during ACR, as it appears insignificant and probably within the error limit.

Page 7, Results, Please include core-top estimated Mg/Ca SST as well as modern SST, in order to get an idea about the validity of Mg/Ca SST.

Page 7, Line 23, I'm not convinced about the argument about d18Oplanktic being similar to Northern Hemisphere climate variability.

Page 7, Line 24, Again the d18Obenthic is continuously increasing during ACR unlike Antarctic temp record.

Page 8, Line 3-4, Several SST records from the Indian Ocean, especially the latest high resolution SST record by Saraswat et al, 2013, EPSL, does not match with the Antarctic temp record.

Page 8, Line 10-11, The assumption that SST in the entire western Indian Ocean is controlled by Antarctic Temperature is too-much generalization, as surface water in the entire Arabian Sea is mainly sourced either from Red Sea or surface runoff from Bay of Bengal. Please modify.

Page 8, Line 18, How relevant is the assumption that the EPICA temp record is the representative or average of entire Antarctic deglacial warming, especially in the context of recent WAIS temp record?

Page 9, Line 9, Though the beginning of CIME in this core is same as that in previous reports, the timing of most depleted d13C during CIME in this core (towards the end of deglaciation) is clearly different than previously reported (beginning of deglaciation). Please explain. It is possible that the late deglacial termination timing of CIME is linked with the strengthening of the SW monsoon as the record comes from a region highly affected by upwelling induced productivity, which will lead to enhanced downward flux of light carbon organic matter to the bottom.

Page 11, Line 24, can you please define the high southern latitudes (from what to what S) Page 12, Line 8, It is difficult to accept 'Southern Ocean surface water temperature variability' as the cause of global occurrence of CIME, as a few records from tropical Indian Ocean not affected by AAIW/SAMW also have a distinct deglacial CIME and as authors also mention in the very next section. Please modify the text.

Page 12, Line 8, The authors also mention (Page 4, Line 10) that several of the northern tropical Indian Ocean records are from regions affected by Red Sea water. Therefore

they should be cautious while proposing Southern Ocean processes as the sole cause of CIME.

Figure 1, please add south-equatorial counter current.

Figure 3 Change x-axis caption to 'Age (kyr BP)

Figure 3 Graph g) is EPICA ΔT not temperature

Figure 3 Graph d) SST. Both the SST and Mg/Ca axis have same regular subdivisions, suggesting linear relationship between SST and Mg/Ca, which is wrong. Please modify.

Typos: Page 4, Line 16, associated 'with' not to.

Page 5, Line 4, replace spans 644 cm with is 644 cm long.

Page 6, Line 11, delete 'Then'

page 6, Line 13, 'ratio', not 'ratios'

Page 6, Line 17, analysing, not analysis

Page 11, Line 24, type sea-ice, not see-ice

Page 12, Line 25, and 'are' in line

Page 12, Line 26, replace 'drafted' with 'proposed'

Page 13, Line 4, delete 'to' before be coupled

Interactive comment on Clim. Past Discuss., 9, 4035, 2013.