

Interactive comment on “Terrigenous input off northern South America driven by changes in Amazonian climate and the North Brazil Current retroflexion during the last 250 ka” by A. Govin et al.

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Govin et al. present palaeoclimate records from a transect of four marine cores along the North East Brazilian coast ranging from 5 deg to 12 deg N. One site extends back to ~150 ka while the other two sites extend further back to 250 ka. The authors have reconstructed the terrigenous input at each site and interpreted them in terms of both terrestrial input and oceanic deposition.

The authors have produced excellent rigorous manuscript. The Introduction is clear,

C3105

however there are a few points that they might like to include for completeness, which are listed below. The regional setting section is clear though the authors may like to include some details on modern rainfall over South America as it is relevant to their discussion section. Material and Methods are very clear. My only comment is that ‘Age Models’ might be better as 3.3 following directly from the Stable isotopes section. I am impressed with the endmember unmixing analysis and it seems to have worked extremely well at these sites. In the Discussion section is comprehensive and the authors investigate all the potential mechanisms that could be influencing the terrestrial inputs and deposition. This thoroughness lends much greater creditability to their final conclusions. I cannot fault the final interpretation that the Sites at 5 deg N and 8 deg N are controlled by precessional modulated Amazon rainfall and thus sediment discharge. While the 12 deg N Site is strongly influenced by the duration of the NBCC retroflexion. The only part that I might a slight different interpretation is that I would suggest that precession influence could be through increased convection strength and not movements of the ITCZ. While the retroflexion would be more influenced by wind direction and hence the position of the northern arm of the ITCZ, which is in turn strongly influenced by the Equator-Temperate Northern Hemisphere temperature gradient. Conclusions are short concise and reflect the outcomes of the Discussion section. Overall this is an excellent manuscript and my comments are minor and are intended only to help the authors to improve it further.

Some specific comments are:

1. In the Introduction – there seems to be missing the debate concerning whether the Amazon was wetter or drier during glacial periods compared to Interglacial periods. It seems this should be discussed on page 5857 before Heinrich events are introduced. There is a good summary of the current state of knowledge in both Sylvestre (2009) and Maslin et al. (2011)

2. In the Introduction and also the Discussion it might be worth looking in more detail to the relative role of precessional driven austral summer convection which influences the

C3106

strength of the monsoon versus the position of both the northern and southern ITCZ boundary. An attempt to try and look at these mechanisms is included in Maslin et al. (2011).

3. In the Discussion section Sea level is discussed – however the one key fact is missed in the discussion. The Amazon river sediment discharge is a threshold mechanism which occurs at about 80-100 m relative sea level drop. Before this drop is reached the sediment is deposited on the continental shelf and transported along the shelf. Once the sea level drop below this critical depth the sediments are funnel into the Amazon canyon and terrigenous sediments are pushed much further in to the Atlantic Ocean (see Milliman et al., 1979; 1983; Maslin et al. 2006).

4. The original work on which Wilson et al. (2011) is based is from an obscure paper Maslin (1998) in Geol Soc volume, which discusses the effects of glacial and Heinrich event conditions on the NBCC retroflexion. Though dated it might help the authors with their excellent discussion on the retroflexion.

5. Figure 8 – I would be tempted to switch (F) 12 deg N upside down so that peak and trough matched with the other two record. Moreover it would be interesting to see if a cross plot of the 5 deg N and 12 deg N records clearly show the inverse relationship.

6. Figure 1 – It might be helpful if the core names were included either on the Figure or at the very least in the Figure caption for easy of reference.

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C3107

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C3108