

Interactive comment on “Drivers of 21st Century carbon cycle variability in the North Atlantic Ocean” by Matthew P. Couldrey et al.

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Response to Reviewer 2

We would like to thank the reviewer for their detailed and insightful evaluation of our manuscript. Clearly the reviewer took time and care to critically engage with the work, as this is reflected in the constructive nature of the comments. We agree that the suggestions regarding some reorganisation of the manuscript will benefit the work.

Major comments: 1. We agree that Section 4 requires some restructuring, including removing the repetitive elements of Section 4.4, and Figure 7. It may be the case that this reorganisation improves the structure of the section sufficiently, and that separating sections by timescale may not be necessary. We will try both and see which is

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preferable. 1a: Plotting the components of DIC in Figure 3 or in separate Figures is a tempting way to spot similarities, and our previous attempts at doing so have created crowded or a multitude of figures, as the reviewer suspects. The aim of including such figures (and the spectra in Figure 2b) was to show a more intense collection of information that would then be distilled down using the subsequent statistical analysis. Preliminary experimentation with re-plotting these data shows that it should be possible to produce a plot with a separate subpanel for each component at each timescale to clearly convey this information. 1b: We agree that the text on page 11 should be revised to better specify how Figure 4 implies each of these hypotheses. In addition, these hypotheses will be addressed more thoroughly throughout the manuscript (as each piece of analyses confirms or refutes them), and a summary of the hypotheses found to be accepted will be included at the end. This comment was common to both reviewers and we agree the text must be updated to address this. As for reproducing Figure 4 for additional components, we will experiment with this and see what balance can be struck between conveying useful versus excessive additional information. 1c: We agree that this section should be largely removed and the relevant parts folded into the rest of the manuscript.

2 We agree that this work should be reorganised within the manuscript following the reviewer's suggestion. The incorporation of the closed-budget analysis will address this. In particular, the correlation analysis would indeed benefit from being added into Section 5.

Minor comments: All the minor points made by Reviewer 2 are good ones, and we agree with the proposed suggestions.

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