

This manuscript describes and analyzes a study of variability in and drivers of carbonate chemistry parameters in the Gulf of Mexico. The high temporal resolution data sets used in this study are very valuable to the field of coastal carbonate chemistry, both individually as long-term discrete and short-term continuous data sets, and when compared against one another. The authors do a nice job of analyzing the seasonal and interannual relationships between the carbonate system and its drivers, as well as critically analyzing the data they use. The current organization and length of the manuscript detract from its message, but it will be a strong contribution after revision. Please see below for specific comments.

Line 56-60: these two sentences are repetitive and could be combined into one thought.

Line 110-111: How does this tidal range compare to other estuaries?

Line 292-294: the current setup of these reported values is slightly confusing at first glance. My eye saw them as negatives even though the dash is not connected to the values. Consider altering the style to avoid confusion (e.g., salinity: 30.8 ± 3.7 instead of salinity - 30.8 ± 3.7).

Table 1: The column labels here don't line up with the data columns. Perhaps add a vertical line between the leftmost and center data columns to indicate that center and right columns are both discrete sampling. Or, re-align the column headings.

Table 1, 2, 3, 4, 5, 6: Consider moving these to a supplemental. You can still report important values in the text but having all the data displayed in large tables is clunky.

Line 354: Why is temperature higher at night?

Line 390-397: The T/B values varied over different time scales, but the overall pattern did not. It might be more useful to point out succinctly that non-thermal processes had more control than thermal processes over the entire sampling period, in each season individually, and on most days (11/178).

Line 419: change "season" to "seasons"

Lines 390-397, 452-459: Why did continuous vs. discrete data show different T/B patterns?

Line 482-483: This paragraph could be re-organized. The first two sentences describe the small relative difference between sampling methods over the 10-month period. The rest of the paragraph describes sampling bias between methods. I'd recommend starting with "The difference in T/B between sampling methods was small over a 10-month period, but sampling methods did not align over shorter, seasonal time scales." Then talk about the reasons for bias.

Section 4.1.2: The linear regressions described in this section don't necessarily aid in describing the system as a whole. They are interesting to see but are overshadowed by the linear discriminant analysis described in section 4.2. I suggest removing this section or cutting it down to its most pertinent pieces. Specific recommendations below:

Much of the text in this section should be moved to methods (lines 536-551, 598-600, 657-659, 719-723,) or results (lines 606-608, 642-649, 664-671, 698-701, 705-706, 723-727).

Line 548: Did omitting stratified water bias observations toward any particular season? I'd assume stratification is strongest in summer and therefore more summer observations would be omitted, but perhaps that is not the case in the Gulf.

Line 657: indent if this is a new paragraph

Lines 728-738: This paragraph should go in the conclusions section – it is a strong summary of the strength of this work

Section 4.2: I think the analysis and results you describe in this section is the most impactful in the study. The linear discriminant (LD) analysis needs to be described in the methods (lines 743-747, 750-755). Table 7 and related text should go in the results.

Section 4.3: This comparison between monitoring methods is valuable, especially given the conclusion that long-term discrete monitoring is generally representative of the system (lines 848-851). However, the authors have already discussed some of the information in this section, including the sampling methods and some results of the sampling method comparison (in section 4.1.1 when discussing differences in reported T/B values). I suggest either moving this section to the beginning of the discussion to set the stage for your discussion of data collected using the different methods, or moving the T/B sampling method discussion points to this section.

Lines 937-958: This paragraph could be pared down or removed. It is nice to understand the thinking behind omitting other carbonate system parameters but since they are not mentioned previously, it almost seems extraneous.

Conclusion: I recommend that the focus should be shifted to the significance of this study, rather than a summary of parameter-by-parameter results. The paragraph in lines 728-738 would fit in nicely. Lines 982-988 are strong conclusions that show the significance of the study as well.