Review of Broder et al. "Fate of terrigenous organic matter across the Laptev Sea from the mouth of the Lena River to the deep sea of the Arctic interior"

Accept with major revisions

Pros

- Does fill a much needed role as it is one of few papers that looks at the fate of terrigenous organic matter as it is carried out past the continental shelf
- They do compare their data to other shelf studies but some of there comparisons are not valid (i.e. explaining differences in HMW degradation in different studies is due to differences in chain length)
- Seems likely that the amount of time spent during cross-shelf transport is correlated with terrigenous organic matter degradation

Cons

- Figure 1 should include coastal currents and could have an inset of where the Laptev Sea is relative to the rest of the arctic
- Need to justify in the paper that the terrigenous matter in this study is only coming from the Lena River and not from the two other rivers (shown in Figure 1 and are not labeled) that empty into the Laptev Sea
- Need specific references when discussing what TOC/SA ratios are expected for what kind of environment (i.e. river, deep ocean; lines 248-253).
- Line 272: Uses a lateral transport time for an active margin instead of one of a passive margin. Suggest using a east coast system from the U.S.
- Along the same lines as bullet point number 2 in this section, if you cannot prove the source of this OC is the same, then you can not prove that it is aging
- Lines 307-310: One sentence that has been made into its own paragraph. Should incorporate this sentence with the following paragraph.
- Chose HMW wax lipids based on chain length (lines 376-379)
- Need to include Fig. 3B for reference in the parentheses in lines 376-379
- Typo: line 388, should say terrigenous d13C endmember, not marine
- They don't mention what lignin phenols they used
- Every time they reference figure 5 in the paper, they should be referring to figure 4 (example: 5A should be 4A)
- The authors then need to include Fig. 5 in the text of their paper once they made the changes to Fig. 4
- Figures 2-5 are also very descriptive. Leave the interpretation of the data to the discussion
- Their S/V and C/V explanation (section 3.2.2) should be taken with a grain of salt, the loss of C can make it look like woody material when it is not
- Acid/aldehyde values for the syringyl phenols off the shelf seem too high (Fig. 5A)
- Lines 513-516: statement does not seem accurate and it also applies to a different shelf system
- Lines 537-538: the chain length should not determine which lipids are HMW