A review of "Constraints on the applicability of the organic temperature proxies $U^{k'}_{37}$, TEX_{86}, and LDI in the subpolar region around Iceland"

General Comments:

In this work the authors investigated the applicability of $U^{k'}_{37}$, TEX_{86}, and LDI to paleotemperature reconstructions around Iceland using filtered water, sediment trap, and surface sediment samples. The results suggest that while there is good agreement between proxy derived temperatures in surface sediment samples and seasonally averaged temperatures, there are large discrepancies between the proxy inferred temperatures in suspended and sinking particulate matter and in situ temperature, as has been seen previously. The authors contribute these discrepancies to production seasonality, diagenetic alteration, and/or lack of producing species. This work represents an important study of three widely used paleotemperature proxies in a climatically important setting in which previous work has shown them to have difficulty reproducing meaningful temperature estimates. The authors adequately addressed nearly all of my prior remarks, except in one instance, noted below. It warrants publication after some minor edits for clarity.

Specific comments:

Lines 93-95: The link between increased stratification and a deep mixed layer is counter-intuitive. One would think that increased stratification would lead to a thinning of the mixed layer. Please clarify how these two phenomena co-exist.

Lines 140-142: Were DCM and copper added to sediment and SPM samples too? If not, why?

Lines 144-161: The authors addressed my initial concerns regarding the complexity of the sample work-up, but the steps are still a bit unclear. I might have trouble repeating this work-up based solely on the text. Would the authors consider using a flow chart to illustrate the steps performed on each of the many fractions?

Section 2.3.1, 2.3.2, & 2.3.3: Please list the calibration errors associated with each of the Uk'37, TEX86, and LDI Indexes.

Lines 541-542: "This suggests the July is not the period of highest productivity for long chain diols around Iceland." Why the focus on July? Did you hypothesize their abundance should be highest at this time?