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Interactive comment on "Molecular insights into the microbial formation of marine dissolved organic matter: recalcitrant or labile?" *by* B. P. Koch et al.

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Long-term laboratory experiments were used to explore the production and decomposition of marine DOM. Changes in the concentrations of DOC, TEP and total amino acids were monitored along with measurements of the composition of the DOM using ultrahigh resolution mass spectrometry. The main conclusions of the study are that microbial production of DOM is dependent upon and proportional to the amount of labile DOM, TEP is rapidly degraded and does not accumulate, different substrates can lead to different forms of refractory DOM. It is interesting to note that the addition of a labile substrate, glucose, to incubations with refractory DOM did not enhance the degrada-

tion of the refractory DOM, indicating microbial utilization of refractory DOM was not limited by an energy and carbon source. These results do not support the hypothesis that refractory DOM can be degraded through cometabolic processes. They are consistent with the hypothesis that the composition of refractory DOM is the primary factor limiting its degradation.

The incubations received an inoculum (<3 um) that included a diverse assemblage of microoganisms (e.g. bacteria, protozoans, viruses). In section 2.5 it is stated that 2 samples were collected on day 28 and analyzed for the presence of flagellates. Both samples did not have detectable flagellates. This is surprising, so it is important to provide more details, such as the volumes filtered, vacuum applied, and how this procedure was specific for flagellates (i.e. not ciliates). Is it possible flagellates and ciliates passed through the 0.8 um pore-size filter? Are the authors stating there were no flagellates or ciliates in these incubations during the experiment? How do you know TEP was formed by bacteria and not by other microorganisms?

It would be informative to present the concentration and compositional data from the total amino acid analyses (e.g. Fig. 3).

Figure 5 should come before Figs. 2, 3, 4.

Figure quality and text size should be improved (Fig. 2, 5).

The abbreviation used for glucose (Glu) is commonly used for glutamic acid. A different abbreviation (Glc) should be used.

The long lag phase (16 d) before glucose utilization is interesting (Fig. 5a). What was the duration of the lag phase after addition of glucose at 699 d?

Does TEP-C dynamics follow those of DOC? How significant is TEP-C/DOC?

The discussion of the reactivity of different components of DOM is somewhat weak and confusing. The terminology is awkward: labile, bioavailable, non-labile, and bioavailable non-labile, refractory. Fewer terms and clearer definitions would improve the

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manuscript.

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