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Interactive comment on "Review and syntheses: Turbidity flows – evidence for effects on deep-sea benthic community productivity is ambiguous but the influence on diversity is clearer" *by* Katharine T. Bigham et al.

Anonymous Referee #1

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The manuscript reviews the literature on seven turbidity flows, from millennial submarine landslides to contemporary mass wasting events, with the aim of establishing response patterns of the benthic fauna to such large disturbances. Two hypotheses are tested, i) that turbidity flows enhance standing stocks, and ii) that turbidity flows reduced local diversity while increasing regional diversity. Overall the manuscript is clear, informative and well-written and my comments are mainly minor. In the Introduction, Figure 1 provides a conceptual model for a turbidity flow and its consequences on the benthic fauna, Figure 2 summarizes the temporal and spatial scales of physical distur-

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bances of different origins in the marine environment. These Figures are valuable but the rationales behind the Figures are not explained. Figure 1 is not even referenced in the Introduction and quickly mentioned in the discussion. In Figure 1, the response of the benthic community is hypothesized to vary according to the location along the flow path and according to the timing from initial disturbance but the presentation of results that follows is not structured according to these hypotheses. This Figure 1 might be better moved to the conclusion as an outcome of the review underlying the factors that may influence the response of benthic communities and the absence of clear patterns if turbidity flows are considered without specifying the erotional/depositional context nor the history/frequency of the flows. In Figure 2, because seabed mining in the deep sea rises a number of concerns, including the potential impacts of mining plumes, it might be interesting to develop the justifications for plotting seabed mining with a rather low frequency and extent of disturbances. According to the literature, a plume of sediments due to nodule mining might have an impact over hundreds of km^2 for daily operations lasting for decades (e.g. Glover et al. 2001). l.248-249 "there is evidence that the biomass but not the abundance of all faunal size classes is higher in turbidites than in nearby pelagic sediments" But there is also evidence that biomass was not significantly different between turbidite and pelagic (see l.239). To avoid any bias in interpretation I would suggest to delete this sentence. l.335 It might be interesting to underline here that carbon content, oxygen and ammonium are related to early diagenetic processes along a gradient of redox conditions so all of these measurements provide proxies for OM degradation. Figue 4 It is not clear how contradictory patterns in abundance and biomass were classified in the "Both" graph, some details might be needed. For example small-size opportunists may proliferate with no influence on biomass, how this will fit into Increase, Decrease or No Change? l.397-399 This is an important conclusion of this review, which is supporting the conceptual models in Figure 1, and would deserve to be elaborated here. l.406-407 Carbon availability and chemical characteristics, if they refer to oxygen and ammonium, are likely related to the same processes of OM degradation. Along a gradient of redox conditions, OM degradation first consumes oxy-

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gen, then nitrates producing ammonium, then sulfates producing hydrogen sulphides. Along this gradient, when OM inputs are large enough to deplete oxygen and nitrate, abundance and biomass increase, when OM inputs are large enough to deplete oxygen, nitrate, and sulfate then the combined effects of hypoxia and hydrogen sulphide toxicity reduce abundance and biomass, unless the detritic-based system turns into a chemosynthetic-based system.

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