Biogeosciences
Discussions

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Interactive comment on "Evidence of Changes in Sedimentation Rate and Sediment Fabric in a Low Oxygen Setting: Santa Monica Basin, CA" *by* Nathaniel Kemnitz et al.

Anonymous Referee #2

Received and published: 8 February 2020

This paper utilizes sediment cores collected over the past 45 years to determine changes in sediment accumulation rates in Santa Monica Basin in response to urbanization using 14C and 210Pb methodologies. The overall conclusion shows that the mass accumulation rate did not show evidence of significant changes over this period. The paper will be a somewhat useful contribution with minor changes

Specific comments: 1. The authors should clearly identify which 210Pb data were measured and which rates are from previously published work. 2. The Pb-210 method section is long and can be summarized by references appropriate publications, given that 210Pb is a commonly used method. 3. The figure for alpha vs gamma calibration

for Pb-210 can be moved to supplement and is not directly relevant, especially since some of the co-authors have long established history of working in these isotopes. 4. Pb-210 should explicitly state this method is based on constant input and constant sedimentation rate (e.g. Appleby; Cochran papers). 5. The constant rate of sedimentation can be partly verified by looking at the goodness of fit and any apparent break in slope. In this context it will be more appropriate to plot Fig xx as ln(Pbex) vs depth and provide the regression equation and r2. 6. The mass accumulation rates calculated using the slope of regression has an associated uncertainty term based on fit, which should be translated to the uncertainty term for the determined sedimentation rates. Since change in sedimentation rate is an important objective of this work, the uncertainty associated with determined sedimentation rate can give a sense of how much it could have changed. 7. On the same note it might be worthwhile to do a sensitivity study for the 210Pb model used, to determine its ability to capture subtle changes in sedimentation rate. A single sedimentation rate is determined by linear regression of downcore distribution of 210Pb excess, where it is assumed each data point provides equally precise information about the deterministic part of the total process variation. However the 210Pb excess activities in deeper layers are lower with larger errors compared to shallower depths. Thus it is possible, barring major shift in sedimentation rate, less dramatic changes in sedimentation rates may not be detectable.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2019-420, 2019.