Comment on essd-2021-259
Anonymous Referee #1

Referee comment on "Revisiting five decades of 234Th data: a comprehensive global oceanic compilation" by Elena Ceballos-Romero et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-259-RC1, 2021

Review of “Revisiting five decades of 234Th data: a comprehensive global oceanic compilation.” By Ceballos Romero et al.

This paper presents a global database of discrete 234Th data measurements in the ocean. Following previous databases compiling Th derived POC flux and C:Th ratios, this represents the next step. No need to say that this is a very useful compilation and that such effort fits perfectly well within the scope of ESSD. Having such compilation will provide information not only on downward export rates of particles but also on processes such as remineralisation, fragmentation or even scavenging rates of Fe for instance. The data and the associated metadata are adequately compiled and presented. Pathways to data access and availability is also well described. I particularly enjoyed the historical perspectives provided in section 4. This provides a nice overview of the 234Th story since the start to nowadays.

There are other biological carbon pump processes apart the downward flux that 234Th could be used for. For instance, processes such as remineralisation, fragmentation, scavenging rates of TMs or particles sinking velocities could be estimated. I believe that such section could easily be added to the final paragraph without going into much details.

Apart from that, only minor issues should be addressed before publication. These are listed below:
Specific comments:

L129: How was bloom stage assessed?

L141: Could CTD data including fluorescence and PAR be added?

L145: Formatting

L169: µm dpm L⁻¹ ???

L173: Why not fluorescence?

L208: Larger

L241-244: I would also stress the fact that other empirical methods such as the ^15N new prod (f-ratio) techniques has been proven as unappropriated to estimate C export (Yool et al. 2007) in the late 2000's.

L245: Section 4

L276: # ?

L295: Most glass fiber filters (so called GF) used for particulate material analysis have a pore size of 0.7 um.

L366: formatting
Consider adding “….and avoid some tedious filter folding sessions.”

A third one is coming up very soon. I suggest adding it here if the reference is made available on time.

How about alternative export pathways (not necessarily gravitational)? In addition, fragmentation (Briggs et al. 2020) could also play a role in setting the magnitude of flux attenuation. Would Th excess be useful to study such mechanism?

not always, see work by (Xie et al. 2020).
doi:10.1126/science.aay1790

