

Interactive comment on “Biogeochemical processes accounting for the natural mercury variations in the Southern Ocean diatom ooze sediments” by S. Zaferani and H. Biester

Anonymous Referee #3

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The paper present very important aspect of mercury fluxes in Antarctic region. there are very unique and valuable data. There are very interesting conclusions but firstly (I) “to scavenge all water column Hg.” – but this is not directly supported by the data. this is a rare situation that “Hg in the water column is removed through scavenging during diatom blooms” can you prove it? do you know situation that mercury concentration in that region was 0 pg/L? do you know literature about this phenomenon? This is opposite to PCA results where mercury don't correlate with Cp2 appears to reflect phytoplankton blooms and export of biological materials or with Cp1 - load of lithogenic elements. Cp4 including Hg described 1.35 % of the variance which is marginally. Did you try to make PCA for three factors? I supposed it could be more useful. (II)

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Otherwise there are lack of comment whether these Hg values are high, toxic or not? why you didn't account a Vulcanic sources in this region? Describe Hg sources to the water in this region. (III) Why Hg and As correlated (Cp4)? Maybe this is explanation of Hg sources to the sediment? And some specific comments:

- In the abstract (shortly, at least one sentence) and in the introduction section is lack of information why mercury is so important, why do you research Hg? - I suggest more detail map of sampling station (Fig. 1) - Describe more detailed preparing the core to analysis: how do you determine the age of the sediment (sediment layers)? The 0-3.2 mbsf is the mixing layer? - How do you determine accumulation rates - Too long title of 3.1 section - Line 148 “which includes positive loadings of lithogenic elements,” – write which one - figure 9 is missing in the text

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