

## ***Interactive comment on* “Characterization of particle-associated and free-living bacterial and archaeal communities along the water columns of the South China Sea” by Jiangtao Li et al.**

### **Anonymous Referee #1**

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Li et al investigated particle-attached (PA) and free-living (FL) bacterial and archaeal community structures in South China Sea. They quantified the abundance of bacteria and archaea by using qPCR and surveyed the community structure with pyrosequencing. High abundance and diversity of FL than PA were observed. They tried to related microbial community composition, life styles and environmental adaption to organic and inorganic substrate availability from surface to deep ocean. Major concern: The present MS is a little bit “microbial”, not “biogeochemical”. It will be great to include organic chemical analysis of particles and waters if any. At least, discuss this based on data available in previous studies. I suggest to discuss possible technique bias including 1) filtration with 3  $\mu\text{m}$  to collect particles, especially for deep sea samples which is

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very fragile. 2) qPCR data which showed relatively low “cell abundance” compared to microscopy. Having age data of particles is very interesting. I encourage the authors discuss more about this and its relationship, and biogeochemical implicates, with microbial data. A logic is needed to explain the sinking rate and age of particles as well as microbes attached.

Specific comments: Sometimes the “recently” is not appropriate since the references are not recent at all (e.g. Line 59, Line 460). Provide methods for particle age measurement. Salinity does not have unit (e.g. Line 200). Include statistical analysis (e.g. Line 219). Line 240, seems meaningless to point out the number of sequences per depth. Line 365, any evidence or previous study to support the different origins of organic matter of G3 and J5? Line 404, I understand that POM remineralization is oxygen dependent, but the cause and effect relationship between DO concentration and particle flux is not clear to me. Line 462: li? Maybe use copy number, not cell abundance, throughout the MS.

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