Niche specificity of Bathyarchaeota in the surface sediment of Pearl River Estuary, China

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Estuary is the important link between the land and the ocean with typically high amount of terrestrial organic carbon being transported through it. Bathyarchaeota are a cosmopolitan group of archaea with high phylogenetic diversity. In this study, the temporal and spatial distributions of Bathyarchaeota in the Pearl River estuarine were investigated. Bathy-6, Bathy-8, Bathy-15 and Bathy-17 subgroups dominated in all samples and showed distinct shift along a salinity gradient. The algal abundance showed positive correlation with bacteria but not with Bathyarchaeota, suggesting that the latter may be at disadvantage in competing for fresh and labile organic matter from algal degradation. On the other hand, the abundance of Bathyarchaeota correlated significantly with the $\delta^{13}C$ values of total organic carbon that is predominantly terrestrially derived, suggesting that Bathyarchaeota are instead adapted to utilize recalcitrant organic matter in the sediments. Our results shed light on the possible biochemical pathways of carbon metabolism by this diverse group of archaea that so far have eluded cultivation.