

Figure S7: Univariate analyses of SR-FTIR absorption band ratios. A-B) The comparison of total proteins and lipids to the carbohydrate amount can provide information on the overall composition of the matrix that composes these communities; we can observe that in both SM-BF and MSI-BF the amount of proteins and lipids is higher in respect to SM-SOPC, implying that the anaerobic biofilm frameworks are richer in proteins and in our case can accounts for the abundance of *hami* proteins, whereas the aerobic environment of the SOPC promotes a polysaccharide rich framework. C-D) Evaluation of nitrogen and sulfur compounds shed light on the metabolic imprints in the immediate geochemical surroundings at the time of sampling. A comparison of the ratio of NO_2^- to NO_3^- ($\text{NO}_2^-/\text{NO}_3^-$) and the ratio of S^{2-} to SO_4^{2-} ($\text{S}^{2-}/\text{SO}_4^{2-}$). These analyses revealed spatial variations in the microbial reduction/oxidation processes.

