

Hydrodynamic Control of Microbiologically Influenced Corrosion at the Sediment–Water Interface in Offshore Marine Environments

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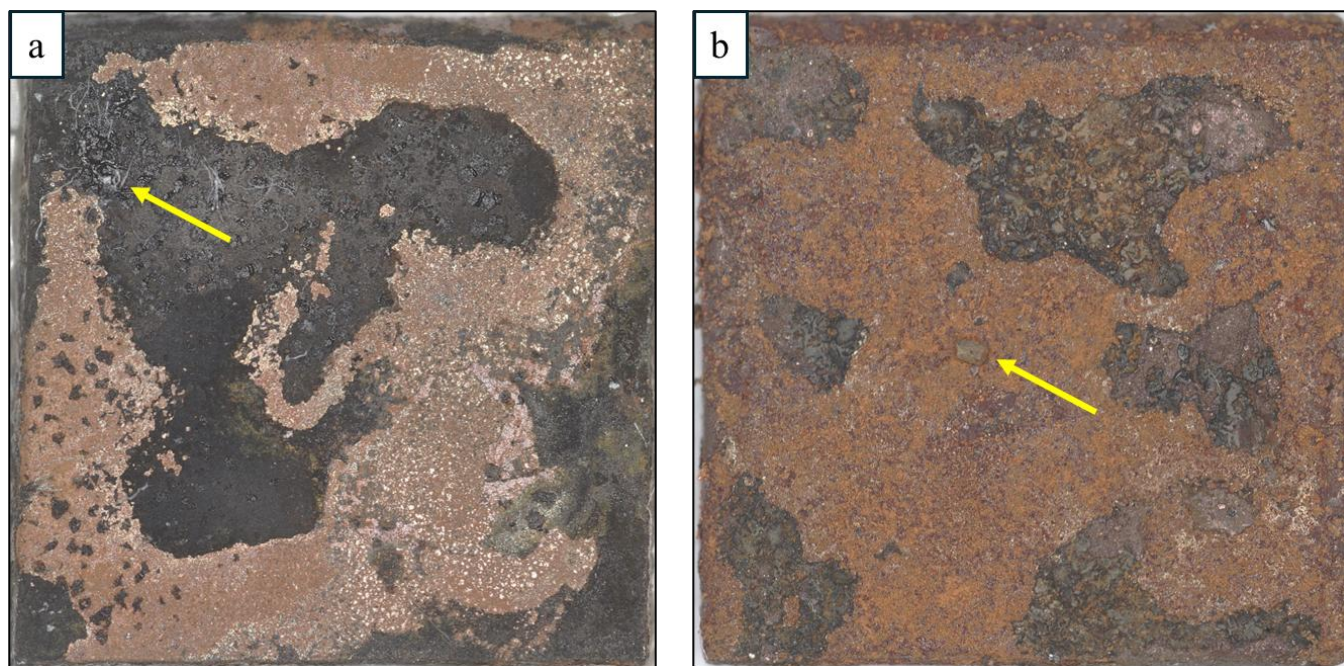


Figure S1. Representative surface images of carbon steel coupons exposed to sediment. (a) static-sediment and (b) low-flow-sediment conditions. Locally elevated thickness values observed in both treatments are attributed to adherent sand particles rather than intrinsic corrosion product or biofilm growth. As indicated by the yellow arrows, several sand grains

were firmly embedded within the surface layer and could not be removed without disrupting the underlying corrosion film.

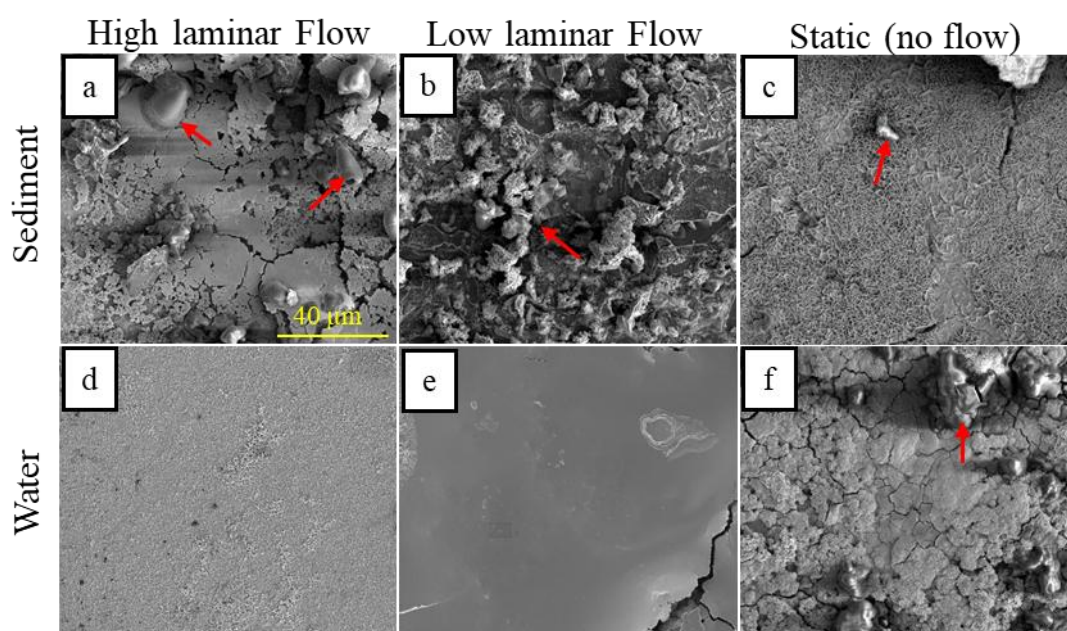


Figure S2. Scanning electron microscopy (SEM) images of coupons exposed to different hydrodynamic conditions. Red arrows indicate vertically oriented microchimney structures. (d) The biofilm is very thin, and such structures are not formed. (f) The biofilm is very thick, and the surface is covered by a continuous, coherent layer.

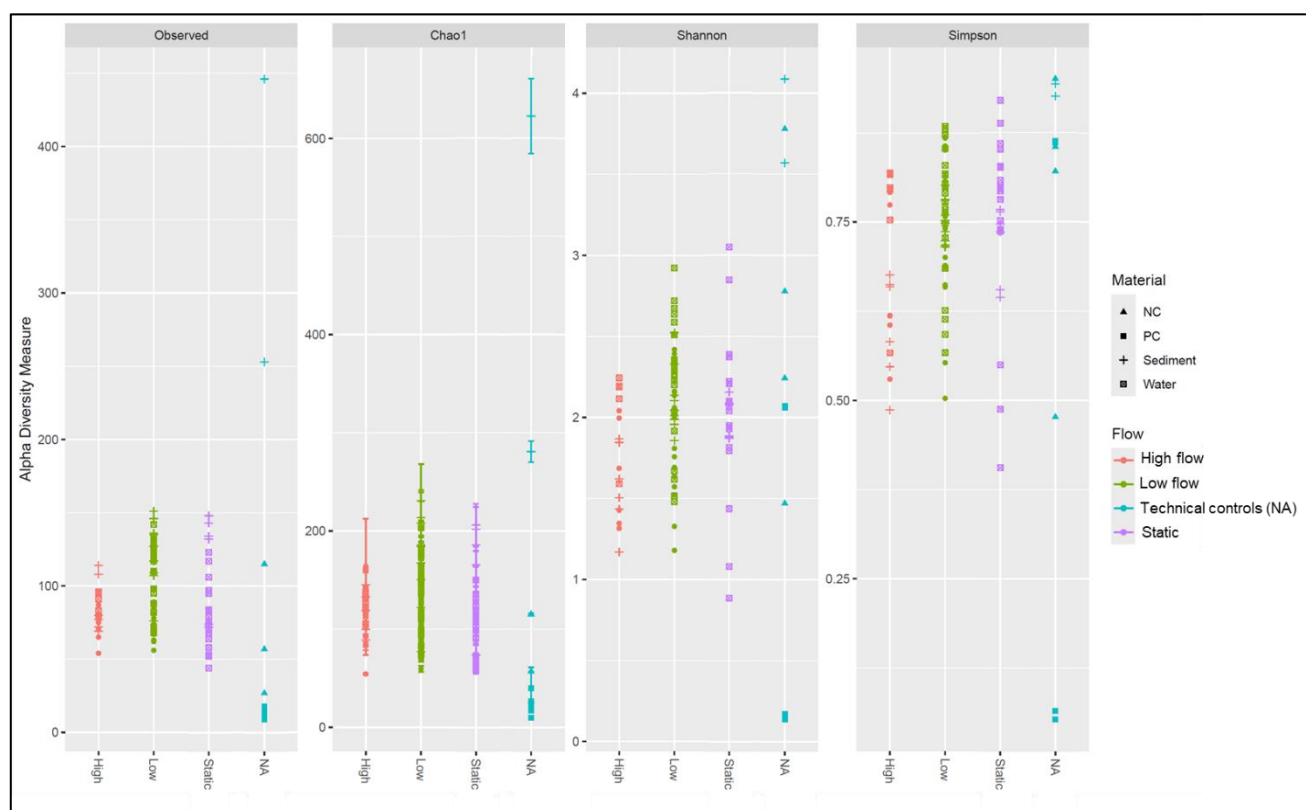


Figure S3. Alpha diversity metrics of microbial communities across different flow conditions. Observed richness, Chao1, Shannon, and Simpson indices are shown for each treatment. Data points represent individual biological replicates, while symbols indicate sample type (negative control (NC), positive control (PC), sediment, and water). Colors denote hydrodynamic conditions (high flow, low flow, technical control, and static).

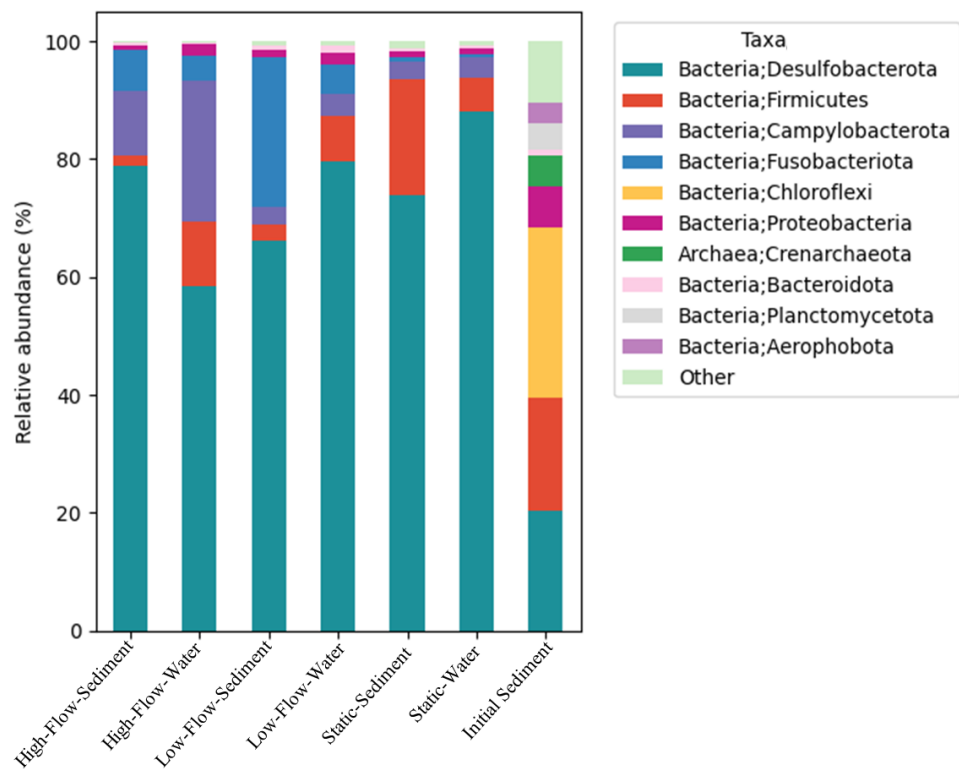


Figure S4. Top ten most abundant Taxa by Treatment

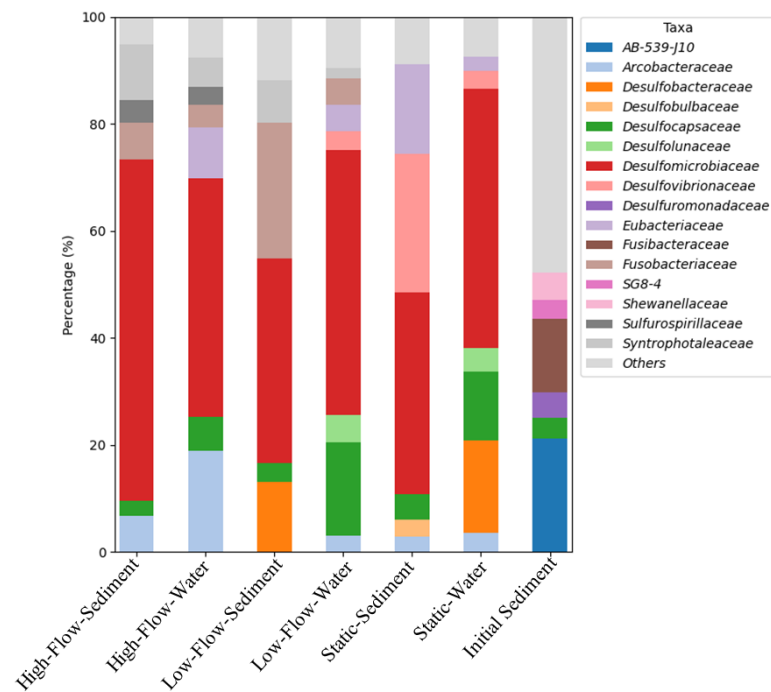


Figure S5: Stacked bar plot showing the relative abundance of ASVs summarized on the taxonomic level of families. 'Taxa (%) by treatment — $\geq 2\%$ shown