Sulfur 39 taxonomic groups and 361 distinct MAGs sulfate reduction sulfite reduction sulfide oxidation sulfur oxidation associate the electron ancillary genes core genes with Thaumarchaeota CP Verstratearchaeota Archaea Euryarchaeota **DPANN** Woesearchaeota Archaea CP Handelsmanbacteria CP Aminicemantes (OP8) Sericytochromatia, Tanganyikabacteria Cyanobacteria Firmicutes Chloroflexi Armatimonadetes Actinobacteria Gemmatimonadetes CP BRC1 CP Zixibacteria Ignavibacteria Nb.of.genes Calditrichaeota Chlorobi Taxonomy 5 CP Eisenbacteria 4 CP Ziwabacteria 3 Bacteroidetes Bacteria CP TM6 2 CP WOR-2 Omnitrophica 1 Chlamydiae Verrucomicrobia Planctomycetes Planctomycetes (Phycisphaerae) CP Poribacteria Lentisphaerae Acidobacteria Nitrospirae **CP** Tectomicrobia CP Rokubacteria Deltaproteobacteria Alphaproteobacteria non LD12 Betaproteobacteria Gammaproteobacteria CP Kaiserbacteria CPR Bacteria CP Gribaldobacteria fccB dsrA dsrB dsrB sulfur\_dioxygenase\_sdo sulfide\_quinone\_oxidoreductase\_sqr aprA sat thiosulfate\_reductase\_phsA dsrC dsrD

Genes