

Long distance electron transport by cable bacteria in marine sediments: a global phenomenon

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Recently, long filamentous bacteria have been reported to conduct electron over centimeter distances in marine sediments. These so-called cable bacteria perform a novel 'electrogenic' form of sulphur oxidation, whereby long distance electron transport (LDET) links sulphide oxidation in deeper sediment horizons to oxygen reduction in the upper millimeters of the sediment. Electrogenic sulphur oxidation exerts a strong impact on the sediment biogeochemistry, but it is unknown how prevalent this newly discovered process is within the ocean floor.

After their initial discovery in laboratory sediment incubations, the first field observations of cable bacteria performing electrogenic sulphur oxidation were obtained from a seasonally hypoxic lake in the Netherlands in 2013. Here we present novel field observations, which demonstrate that electrogenic sulphur oxidation by cable bacteria is a globally occurring process. The process is found in widely distributed geographical locations (the Netherlands, Greenland, US, Australia) and over a range of different marine habitats (estuaries, salt marshes, coastal hypoxic basins, intertidal flats). This suggests that electrogenic sulphur oxidation could be an important, and hitherto overlooked, component of the marine sulphur cycle.