

Anaerobic microbial oxidation of methane by pyrogenic black carbon

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Methane is the second most important anthropogenic greenhouse gas (GHG) and contributes to approximately 30% of the GHG warming. Anaerobic methane oxidation represents an important sink of biogenic methane, which is produced from a wide range of sources including landfills, wastewater and sludge treatment facilities, animal manure, and rice cultivation. Collectively, these biogenic sources represent about half of the global methane emissions. In the presence of an electron acceptor(s), methane can be oxidized through anaerobic respiration. In this paper, we report that pyrogenic black carbon can serve as an electron acceptor to support/enable anaerobic methane oxidation. Our data illustrate a new and previously unrecognized impact of black carbon on climate, and suggest a potential approach to curb methane emissions from biogenic sources.