Methanogenesis and methanotrophy caused by submarine volcanic activities during 2.7 to 2.0 Ga

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Abnormally light carbon isotope compositions of kerogen samples have been reported in the 2.7 Ga, 2.5 Ga and 2.0 Ga black shales. These are interpreted as overwhelming activities of methanotrophs at each age. To promise for elevation of methane concentrations in oceans, significant methanogenetic events are required.

It is found that many 2.7 Ga black shales are disseminated into contemporary lava flows. The dissemination of marine sediments has caused the thermal decompositions or degradations of kerogen producing methane. Such process is evidenced by carbon isotope compositions of degraded kerogens. Periodic occurrence of mehanotrophy was mot likely related to the intense activities of submarine volcanism at each age, probably linked to change of the thermal structure in the Earth interior.