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HQR23-P19 Room:Convention Hall Time:May 25 17:15-18:30

Formation mechanism of cloudy water in tide pool in methane seepage area, Kujukuri-hama beach, Chiba, central Japan

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In the study area, Holocene series unconfomably overlies the Pleistocene Kazusa Group. The Kazusa Group was deposited mainly in a deep sea environment, and contains methane gas dissolved in water. This condition allows gas to emerge easily from the ground as it moves upward through faults and the sand layer.

In 2007, the water in tide pools at Kujukuri-hama beach in Chiba became cloudy. A field survey revealed that methane gas was seeping out around these tide pools where the cloudiness occurred and that bluish gray sand, which represents a reduction condition, is distributed inside the area of gas seep. Yellow groundwater was found lying immediately beneath the area where the bluish gray sand was distributed, and this yellow groundwater became cloudy as it emerged into the tide pools.

Results of analysis indicated a state of sulfate reduction and that the cloudy substances were mainly composed of elemental sulfur. It is thus suggested that the water in the tide pool became yellow or cloudy in the presence of polysulfide ions or irregular reflections induced by colloidal sulfur.

16S rRNA genes of anaerobic methanotrophic archaea belonging to ANME-1 were detected from the yellow groundwater. This suggests the possibility that anaerobic oxidation was involved in the reduction of the sulfate ions. Based on these findings, we propose a hypothesis of mechanism in which the ANME-1 are active along with the gas seeping from the Kazusa Group to the ground surface, and that the reductive condition was eventually formed at the surface.

Keywords: methane seepage, yellow groundwater, cloudy water, ANME