

**Table S1.** Relative abundance of the major archaeal taxonomic groups, in the oxic (ox) and anoxic (ax) incubations, and in the sediment (S) and water (W) samples. Relative abundance is expressed in percentage of the total number of sequences for each sample (in parentheses). Both numbers indicate abundances for each duplicate. For the water samples, number of sequences per total number of sequences for each sample is given. S0, initial sediment before incubation; Dam, dam lake water sample; Unc., unclassified; Cand., candidatus.

<b>S0</b>	Unc. Archaea (21.58-22.05) Bathy_6 (16.84-17.36) Woese_5a (8.1-8.52) Unc. Woeseearchaeales (7.65-7.83) <i>Methanoregula</i> (5.34-4.92) Woese_5b (5)	<b>Dam</b>	Nitrosoarchaeum (6/13) Unc. Archaea (4/13)
<b>S12H_o x</b>	<i>Methanosaeta</i> (24.47) <i>Methanosarcina</i> (23.46) <i>Methanoregula</i> (15.68) Rice Cluster 1 (5.53) Bathy_6 (5.02)	<b>W12H_ ox</b>	Bathy_6 (6/22) <i>Methanobacterium</i> (4/22) Cand. <i>Methanoperedens</i> (3/22) <i>Methanocella</i> (2/22) unc. Nitrososphaeraceae (2/22)
<b>S240H_ ox</b>	<i>Methanosarcina</i> (23.44-24.67) <i>Methanoregula</i> (16.72-12.91) <i>Methanosaeta</i> (15.36-15.21) Bathy_6 (9.33-13.86) <i>Methanocella</i> (6.31-5.45) Rice Cluster 1 (6.12-5.4) Unc. <i>Methanomassiliococcaceae</i> (5.71-4.73)	<b>W240_ ox</b>	Bathy_6 (12/71) <i>Methanosarcina</i> (10/71) <i>Methanobacterium</i> (9/71) Cand. <i>Methanoperedens</i> (6/71) <i>Methanosaeta</i> (6/71) Rice Cluster 1 (6/71)
<b>S720H_ ox</b>	<i>Methanosarcina</i> (26.98-24.06) Bathy_6 (17.9-12.86) Rice Cluster 1 (15.36-21.91) <i>Methanocella</i> (12.23-15.9) <i>Methanobacterium</i> (7.17-6.6) Unc. <i>Methanocellaceae</i> (5.15-2.63)	<b>W720H_ _ox</b>	Bathy_6 (21/113) <i>Methanobacterium</i> (18/113) Unc. Nitrososphaeraceae (15/113) Cand. <i>Methanoperedens</i> (12/113) <i>Methanosarcina</i> (11/113) <i>Methanocella</i> (9/113) Rice Cluster 1 (9/113) <i>Methanosaeta</i> (7/113)
<b>S12H_a x</b>	<i>Methanosarcina</i> (37.34) <i>Methanosaeta</i> (14.52) <i>Methanoregula</i> (10.44) Rice Cluster 1 (9.28) <i>Methanobacterium</i> (6.12)	<b>W12H_ ax</b>	Cand. Nitrosotalea (1/3) <i>Methanosarcina</i> (1/3) Unc. Nitrososphaeraceae (1/3)
<b>S240H_ ax</b>	<i>Methanocella</i> (26.94-24.97) Rice Cluster 1 (21.94-25.08) <i>Methanosarcina</i> (19.67-16.1) <i>Methanobacterium</i> (15.15-8.48) Bathy_6 (8.31-16.12)	<b>W240H_ _ax</b>	Bathy_6 (7/45) <i>Methanosarcina</i> (7/45) <i>Methanobacterium</i> (6/45) Unc. Nitrososphaeraceae (6/45) <i>Methanocella</i> (4/45) Rice Cluster 1 (4/45) Cand. <i>Methanoperedens</i> (3/45) <i>Methanosaeta</i> (3/45)
<b>W720H_ _ax</b>	<i>Methanosarcina</i> (64.69-73.35) <i>Methanocella</i> (9.31-7.3) Rice Cluster 1 (6.73-7.31) Unc. <i>Methanocellaceae</i> (6.7-3.23) <i>Methanobacterium</i> (5.87-3.95)	<b>W720H_ _ax</b>	Unc. Archaea (2/2)