

Supplementary Table 1. Functional genes present in basalt sample D3815F determined by microarray analysis.

Genbank ID	Gene short description	Gene category	Organism
23012702	0	Carbon fixation	Magnetospirillum magnetotacticum
12407235	acIB	Carbon fixation	Chlorobium limicola
30721807	FTHFS	Carbon fixation	Methylobacterium extorquens
32307749	rbcL	Carbon fixation	uncultured bacterium
505126	rbcL	Carbon fixation	Hydrogenophilus thermoluteolus
37791353	rbcL	Carbon fixation	uncultured proteobacterium
7592878	rbcL	Carbon fixation	uncultured deep-sea autotrophic bacterium ORII-2
7592885	rbcL	Carbon fixation	uncultured deep-sea autotrophic bacterium ORII-5
37791373	rbcL	Carbon fixation	uncultured proteobacterium
21217703	rbcL	Carbon fixation	uncultured bacterium
7229162	rbcL	Carbon fixation	uncultured deep-sea autotrophic bacterium SBI-5
132036	rbcL	Carbon fixation	Rhodospirillum rubrum
7592852	rbcL	Carbon fixation	uncultured deep-sea autotrophic bacterium SBII-4
6778693	dsrA	Sulfate reduction	uncultured sulfate-reducer HMS-25
40253098	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
FW015084A	dsrA	Sulfate reduction	lab clone
34017136	dsrA	Sulfate reduction	uncultured bacterium
34017154	dsrA	Sulfate reduction	uncultured bacterium
13898425	dsrA	Sulfate reduction	uncultured phenanthrene mineralizing bacterium
20501981	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
FW010274A	dsrA	Sulfate reduction	lab clone
13898437	dsrA	Sulfate reduction	uncultured phenanthrene mineralizing bacterium
12667570	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium UMTRAdsr626-27
7262420	dsrA	Sulfate reduction	uncultured sulfate-reducer HMS-54
20501993	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
34017094	dsrA	Sulfate reduction	uncultured bacterium
7262428	dsrA	Sulfate reduction	uncultured sulfate-reducer HMS-24
20502017	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
14090290	dsrA	Sulfate reduction	Desulfomicrobium escambiense
14389123	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
25990790	dsrA	Sulfate reduction	uncultured bacterium
40253034	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
14389119	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
15055587	dsrA	Sulfate reduction	Desulfococcus multivorans
22900884	dsrA	Sulfate reduction	uncultured bacterium
22999275	dsrA	Sulfate reduction	Magnetotactic cocci
14276799	dsrA	Sulfate reduction	Desulfotomaculum geothermicum
6778709	dsrA	Sulfate reduction	uncultured sulfate-reducer HMS-4
12667674	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium UMTRAdsr826-16
TPB16340A	dsrA	Sulfate reduction	lab clone
20501983	dsrA	Sulfate reduction	uncultured sulfate-reducing bacterium
FW300226A	dsrA	Sulfate reduction	lab clone
6179922	dsrB	Sulfate reduction	Solar Lake Mat Clone9065
18034323	dsrB	Sulfate reduction	Desulfacinum infernum
FW005271B	dsrB	Sulfate reduction	lab clone

13249527	dsrB	Sulfate reduction	uncultured sulfate-reducing bacterium
13561055	dsrB	Sulfate reduction	<i>Desulfosarcina variabilis</i>
TPB16051B	dsrB	Sulfate reduction	lab clone
15076856	dsrB	Sulfate reduction	<i>Desulfosporosinus orientis</i>
FW003272B	dsrB	Sulfate reduction	lab clone
14389217	dsrB	Sulfate reduction	uncultured sulfate-reducing bacterium
FW003264B	dsrB	Sulfate reduction	lab clone
28974756	dsrB	Sulfate reduction	uncultured bacterium
3892198	dsrB	Sulfate reduction	<i>Archaeoglobus profundus</i>
15077475	dsrB	Sulfate reduction	<i>Desulfovibrio desulfuricans</i> subsp. <i>desulfuricans</i>
FW015318B	dsrB	Sulfate reduction	lab clone
13249551	dsrB	Sulfate reduction	uncultured sulfate-reducing bacterium
FW010117B	dsrB	Sulfate reduction	lab clone
10716971	dsrB	Sulfate reduction	unidentified sulfate-reducing bacterium
TPB16055B	dsrB	Sulfate reduction	lab clone
28974734	dsrB	Sulfate reduction	uncultured bacterium
21673682	dsrB	Sulfate reduction	<i>Chlorobium tepidum</i> TLS
FW003269B	dsrB	Sulfate reduction	lab clone
TPB16070B	dsrB	Sulfate reduction	lab clone
13249539	dsrB	Sulfate reduction	uncultured sulfate-reducing bacterium
34017190	dsrB	Sulfate reduction	uncultured bacterium
40253070	dsrB	Sulfate reduction	uncultured sulfate-reducing bacterium
39998311	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
24372200	cytochrome	Metal resistance/reduction	<i>Shewanella oneidensis</i> MR-1
39995722	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
39996424	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
24373346	cytochrome	Metal resistance/reduction	<i>Shewanella oneidensis</i> MR-1
39998423	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
39935825	cytochrome	Metal resistance/reduction	<i>Rhodopseudomonas palustris</i> CGA009
2865528	cytochrome	Metal resistance/reduction	<i>Shewanella putrefaciens</i>
39998372	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
39998004	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
39997392	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
23475584	cytochrome	Metal resistance/reduction	<i>Desulfovibrio desulfuricans</i> G20
39996164	cytochrome	Metal resistance/reduction	<i>Geobacter sulfurreducens</i> PCA
39937295	cytochrome	Metal resistance/reduction	<i>Rhodopseudomonas palustris</i> CGA009
145083	cytochrome	Metal resistance/reduction	<i>Desulfovibrio vulgaris</i>
15022433	mcr	Methane generation	<i>Treponema</i> medium
12802200	mcrA	Methane generation	uncultured archaeon 85A
38570220	mcrA	Methane generation	uncultured euryarchaeote
13259189	mcrA	Methane generation	uncultured methanogen RS-MCR04
38570178	mcrA	Methane generation	uncultured euryarchaeote
38570176	mcrA	Methane generation	uncultured euryarchaeote
799197	mcrA	Methane generation	<i>Methanlobus oregonensis</i>
34305116	mcrA	Methane generation	uncultured archaeon
13259303	mcrA	Methane generation	uncultured methanogen RS-ME32
7445687	mcrA	Methane generation	<i>Methanothermobacter thermautotrophicus</i>
34305109	mcrG	Methane generation	uncultured archaeon
20094092	mcrG	Methane generation	<i>Methanopyrus kandleri</i> AV19
6002398	mmo	Methane oxidation	<i>Methylomonas</i> sp. KSPIII
141050	mmo	Methane oxidation	<i>Methylococcus capsulatus</i>
6002402	mmo	Methane oxidation	<i>Methylomonas</i> sp. KSPIII
6002409	mmo	Methane oxidation	<i>Methylomonas</i> sp. KSWIII
2098700	mmo	Methane oxidation	<i>Methylocystis</i> sp. M

37813016	mmoA	Methane oxidation	uncultured bacterium
34915630	mmoA	Methane oxidation	uncultured methanotrophic proteobacterium
21685061	mmoA	Methane oxidation	Methylocella palustris
37813004	mmoA	Methane oxidation	uncultured bacterium
2098698	mmoA	Methane oxidation	Methylocystis sp. M
11038435	mmoA	Methane oxidation	uncultured putative methanotroph
37813020	mmoA	Methane oxidation	uncultured bacterium
7188932	pmo	Methane oxidation	Methylosinus trichosporium
7188937	pmo	Methane oxidation	Methylocystis sp. M
34733039	pmoA	Methane oxidation	uncultured bacterium
37496853	pmoA	Methane oxidation	uncultured bacterium
6424923	pmoA	Methane oxidation	uncultured eubacterium pAMC512
7578614	pmoA	Methane oxidation	uncultured bacterium FW-47
11493646	nifD	Nitrogen fixation	Azoarcus sp. BH72
29293348	nifH	Nitrogen fixation	uncultured bacterium
12001854	nifH	Nitrogen fixation	uncultured bacterium NR1611
13173333	nifH	Nitrogen fixation	uncultured bacterium
780721	nifH	Nitrogen fixation	unidentified marine eubacterium
780717	nifH	Nitrogen fixation	unidentified marine eubacterium
22449921	nifH	Nitrogen fixation	uncultured bacterium
12659182	nifH	Nitrogen fixation	Spirochaeta zuelzeriae
3157500	nifH	Nitrogen fixation	unidentified nitrogen-fixing bacteria
10863131	nifH	Nitrogen fixation	marine stromatolite eubacterium HB(0898) Z02
1236929	nifH	Nitrogen fixation	Anabaena variabilis
10863141	nifH	Nitrogen fixation	marine stromatolite eubacterium HB(0697) A100
12659198	nifH	Nitrogen fixation	Treponema azotonutricium
3157624	nifH	Nitrogen fixation	unidentified nitrogen-fixing bacteria
13173301	nifH	Nitrogen fixation	uncultured bacterium
3157594	nifH	Nitrogen fixation	unidentified nitrogen-fixing bacteria
1255464	nifH	Nitrogen fixation	unidentified bacterium
22449901	nifH	Nitrogen fixation	uncultured bacterium
19070843	nifH	Nitrogen fixation	unidentified nitrogen-fixing bacteria
13173319	nifH	Nitrogen fixation	uncultured bacterium
29649383	nifH	Nitrogen fixation	uncultured nitrogen-fixing bacterium
13173335	nifH	Nitrogen fixation	uncultured bacterium
33385573	nifH	Nitrogen fixation	uncultured bacterium
780713	nifH	Nitrogen fixation	unidentified marine eubacterium
1572591	nifH	Nitrogen fixation	Desulfovibrio gigas
29293188	nifH	Nitrogen fixation	uncultured bacterium
13173305	nifH	Nitrogen fixation	uncultured bacterium
5701924	nifH	Nitrogen fixation	Paenibacillus polymyxa
3157704	nifH	Nitrogen fixation	unidentified nitrogen-fixing bacteria
12001832	nifH	Nitrogen fixation	uncultured bacterium NR1600
12001842	nifH	Nitrogen fixation	uncultured bacterium NR1605
3157506	nifH	Nitrogen fixation	unidentified nitrogen-fixing bacteria
20804123	nifH	Nitrogen fixation	Mesorhizobium loti
22450003	nifH	Nitrogen fixation	uncultured bacterium
22988609	0	Nitrification	Rhodobacter sphaeroides
7595786	amoA	Nitrification	unidentified bacterium
7544069	amoA	Nitrification	Nitrosomonas halophila
7578632	amoA	Nitrification	uncultured bacterium WC306-54
27529221	amoA/pmoA	Nitrification	uncultured bacterium

26278794	narG	Denitrification	uncultured bacterium
29652478	narG	Denitrification	uncultured bacterium
26278922	narG	Denitrification	uncultured bacterium
26278882	narG	Denitrification	uncultured bacterium
29652532	narG	Denitrification	uncultured bacterium
38427014	narG	Denitrification	uncultured bacterium
26278770	narG	Denitrification	uncultured bacterium
32308011	narG	Denitrification	uncultured bacterium
32307889	narG	Denitrification	uncultured bacterium
38427060	narG	Denitrification	uncultured bacterium
32307981	narG	Denitrification	uncultured bacterium
26278784	narG	Denitrification	uncultured bacterium
29652590	narG	Denitrification	uncultured bacterium
29652508	narG	Denitrification	uncultured bacterium
38427022	narG	Denitrification	uncultured bacterium
29652428	narG	Denitrification	uncultured bacterium
26278684	narG	Denitrification	uncultured bacterium
32307917	narG	Denitrification	uncultured bacterium
26278870	narG	Denitrification	uncultured bacterium
17385544	narG	Denitrification	uncultured bacterium
26278676	narG	Denitrification	uncultured bacterium
30269569	nasA	Denitrification	uncultured bacterium
30269577	nasA	Denitrification	uncultured bacterium
12597209	nirK	Denitrification	Alcaligenes sp. STC1
3758830	nirK	Denitrification	Hyphomicrobium zavarzinii
NBPd1-B05	nirK	Denitrification	lab clone
27125563	nirK	Denitrification	uncultured bacterium
37999212	nirK	Denitrification	uncultured bacterium
ORA-NIRK-	nirK	Denitrification	lab clone
1488172	nirK	Denitrification	Rhizobium sllae
3758901	nirK	Denitrification	Rhodobacter sphaeroides f. sp. denitrificans
28542653	nirS	Denitrification	uncultured bacterium
24421455	nirS	Denitrification	uncultured organism
24421507	nirS	Denitrification	uncultured organism
37999198	nirS	Denitrification	uncultured bacterium
24421269	nirS	Denitrification	uncultured organism
24528368	nirS	Denitrification	uncultured bacterium
28542627	nirS	Denitrification	uncultured bacterium
38455926	nirS	Denitrification	uncultured bacterium
24421271	nirS	Denitrification	uncultured organism
22252866	nirS	Denitrification	uncultured bacterium
34391466	norB	Denitrification	Nitrosomonas europaea
29466090	norB	Denitrification	uncultured bacterium
29466092	norB	Denitrification	uncultured bacterium
38373207	nosZ	Denitrification	uncultured bacterium
3057083	nosZ	Denitrification	Paracoccus pantotrophus
29125972	nosZ	Denitrification	uncultured soil bacterium
13959038	nosZ	Denitrification	Azospirillum lipoferum
4633572	nosZ	Denitrification	uncultured bacterium ProR
14994626	nosZ	Denitrification	uncultured bacterium