

## Supplementary Information

### **Dissimilatory Nitrate Reduction to Ammonium in the Yellow River Estuary: Rates, Abundance, and Community Diversity**

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## Supplementary Figures

### Legends for Supplementary Figure

**Supplementary Figure 1.** Venn diagram of OTUs in the four sites of the Yellow River Estuary.

**Supplementary Figure 2.** Rank abundance curve based on *nrfA* sequencing in the Yellow River Estuary.

**Supplementary Figure 3.** Functional gene abundance of two dissimilatory nitrate reduction processes (DNRA and Denitrification) in the Yellow River Estuary. Genes include *nirS* (cytochrome cd1 nitrite reductase), *nirK* (copper containing nitrite reductase), *nosZ* (nitrous oxide reductase) and *nrfA* (periplasmic nitrite reductase). Error bars represent standard deviation.

**Supplementary Figure 4.** Sampling sites in the Yellow River Estuary, Shandong, China. The figure was generated according to the distribution of land, sea and river using Adobe Photoshop CS5 (<http://www.52z.com/soft/23642.html>).

**Supplementary Figure 5.** Bioinformatic pipeline of *nrfA* pyrosequencing analysis.

**Supplementary Table 1.** Environmental parameters of bottom water and sediment in the five sites of the Yellow River Estuary.

Study site		1(mouth)	2	3	4	5
Bottom water	Depth (m)	1.3	2	4	3	5
	Temperature (°C)	25.0	23.4	21.0	20.8	20.6
	Salinity (‰)	22.1	21.3	7.7	5.1	4.2
	pH	7.94	7.94	8.08	8.03	8.05
	DO (mg/L)	8.92	9.19	10.31	9.90	9.76
	NO <sub>3</sub> <sup>-</sup> (μM)	102.86	159.29	229.29	269.29	272.14
	NH <sub>4</sub> <sup>+</sup> (μM)	155.71	118.57	110.71	110.71	118.57
Sediment	Moisture content (%)	20.76	23.62	28.22	22.07	45.11
	Organic carbon (g/kg)	3.60	4.28	5.37	3.95	6.71
	Extractable NH <sub>4</sub> <sup>+</sup> (μmol/g)	0.28	0.10	0.40	0.18	0.81

**Supplementary Table 2.** DO saturation in the five sites of the Yellow River Estuary.

Study site	Temperature °C	DO mg/L	DO saturation %
1	25.0	8.92	108
2	23.4	9.19	107
3	21.0	10.31	116
4	20.8	9.90	111
5	20.6	9.96	112

**Supplementary Table 3.** DNRA rate and *nrfA* gene abundance in the five sampling sites of the Yellow River Estuary. ds: dry sediment.

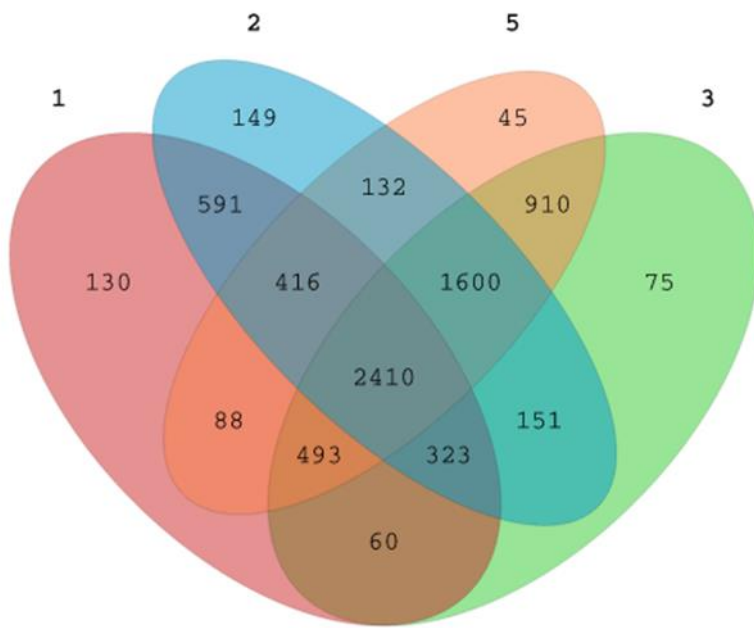
Study site	DNRA rate nmoles N g <sup>-1</sup> h <sup>-1</sup>	<i>nrfA</i> gene copies g <sup>-1</sup> ds
1	0.19	$3.19 \times 10^9 \pm 1.38 \times 10^8$
2	0.10	$6.00 \times 10^9 \pm 5.81 \times 10^8$
3	1.52	$2.27 \times 10^{10} \pm 1.75 \times 10^9$
4	0.21	$8.65 \times 10^9 \pm 1.61 \times 10^8$
5	3.29	$1.74 \times 10^{10} \pm 9.27 \times 10^7$

**Supplementary Table 4.** Number of *nrfA* sequences, richness and diversity in the Yellow River Estuary.

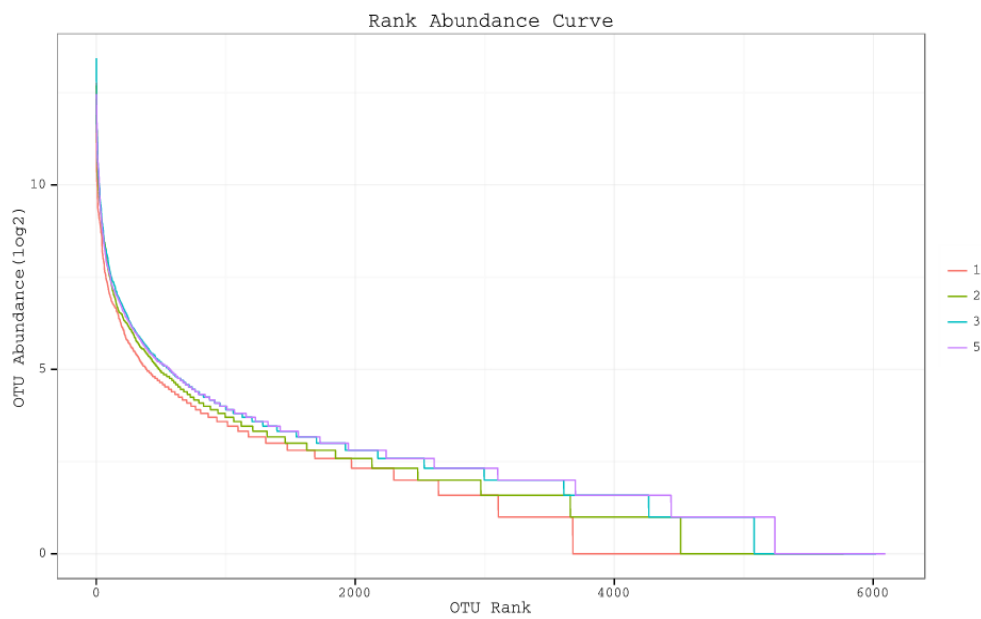
Study site	Valid reads	High quality reads	OTUs	Chao 1	ACE	Simpson	Shannon
1	114,138	104,395	4,511	3,680	3680.00	0.9907	9.34
2	169,444	145,453	5,699	4,512	5256.75	0.9906	9.04
3	205,444	174,960	6,022	5,068	6316.29	0.9895	9.12
5	205,114	165,790	6,093	5,240	6444.56	0.9926	9.36

**Supplementary Table 5.** OTUs classification at different levels.

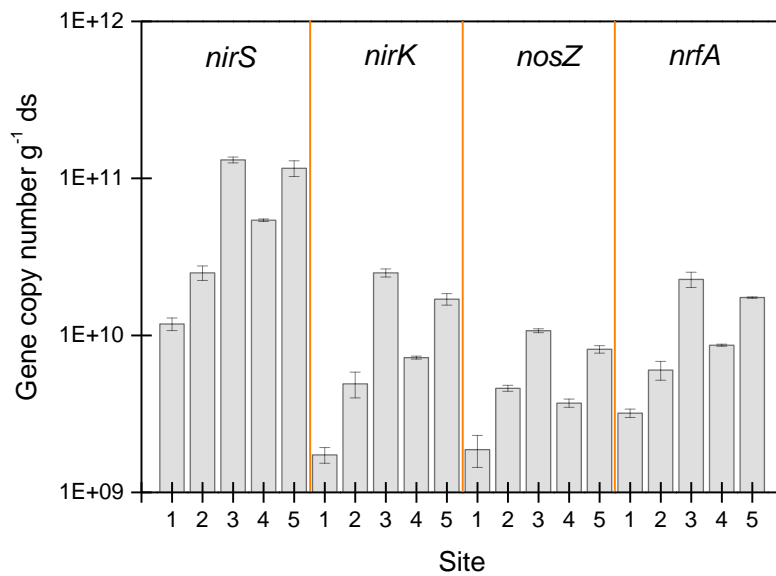
Study site	Phylum	Class	Order	Family	Genus	Species
1	21	47	55	77	106	121
2	25	55	68	86	114	128
3	25	58	65	78	102	116
5	23	54	61	72	95	107



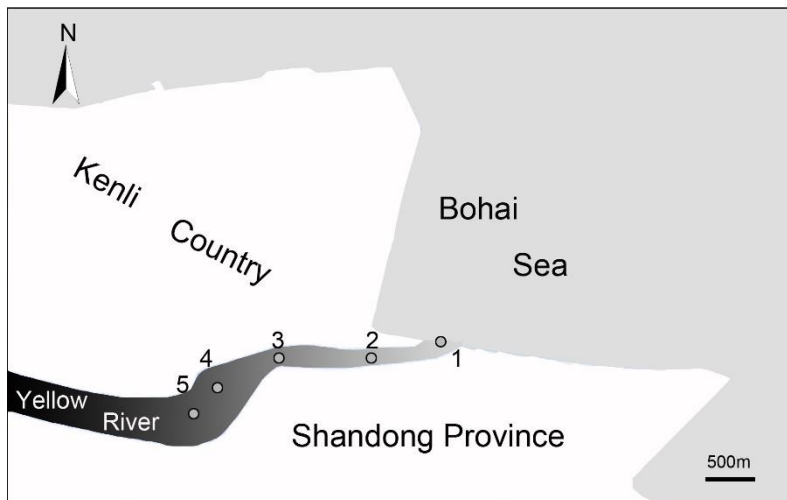
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