**Supplemental Information**

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**Title: Spatiotemporal succession of ammonia-oxidizing archaea abundance and composition in a created riparian wetland**

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**Table S1 Physicochemical indexes of sediments in SJY-CW from 2011 to 2013.**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Functioning | Operation | Temperature | pH | ORP | NH4+-N | NO3−-N | TN | TC | TS | C/N |
|  | zone | time (Days) | (°C) |  | (mV) | (mg kg−1) | (mg kg−1) | (g kg−1) | (g kg−1) | (g kg−1) |  |
| 2011 | Inlet | 1003 | 21.0 | 6.85 | −176.8 | 18.52 | 10.48 | 1.38 | 13.52 | 0.95 | 11.43 |
|  | West | 1003 | 21.0 | 6.89 | −157.7 | 28.21 | 13.01 | 2.56 | 27.17 | 0.24 | 12.38 |
|  | South | 1205 | 21.0 | 7.08 | −120.5 | 12.09 | 2.97 | 0.90 | 8.68 | 0.59 | 11.25 |
|  | North | 1205 | 21.0 | 7.47 | −131.9 | 13.16 | 10.9 | 1.00 | 10.78 | 1.09 | 12.57 |
|  | Outlet | 1205 | 21.0 | 7.27 | −124.3 | 18.78 | 7.47 | 0.87 | 8.42 | 0.88 | 11.29 |
| 2012 | Inlet | 1414 | 12.1 | 7.28 | −16.7 | 31.41 | 7.18 | 1.57 | 15.64 | 0.89 | 11.62 |
|  | West | 1414 | 12.1 | 6.32 | 41.6 | 16.30 | 3.21 | 0.55 | 3.47 | 0.20 | 7.36 |
|  | South | 1616 | 12.1 | 6.09 | 53.7 | 21.24 | 4.28 | 0.91 | 6.70 | 0.50 | 8.59 |
|  | North | 1616 | 12.1 | 6.49 | 30.4 | 18.28 | 3.92 | 0.74 | 7.91 | 0.88 | 12.47 |
|  | Outlet | 1616 | 12.1 | 6.35 | 38.6 | 24.00 | 5.03 | 1.07 | 10.65 | 0.63 | 11.61 |
| 2013 | Inlet | 1653 | 33.6 | 6.69 | 18.3 | 82.62 | 0.85 | 1.58 | 16.04 | 0.88 | 11.84 |
|  | West | 1653 | 33.6 | 6.24 | 44.4 | 7.50 | 0.46 | 0.65 | 5.59 | 0.55 | 10.03 |
|  | South | 1855 | 33.6 | 7.01 | −1.5 | 22.22 | 0.95 | 0.84 | 6.96 | 1.00 | 9.66 |
|  | North | 1855 | 33.6 | 7.23 | −14.3 | 8.69 | 3.83 | 0.59 | 5.13 | 0.19 | 10.14 |
|  | Outlet | 1855 | 33.6 | 7.27 | −15.9 | 4.57 | 1.39 | 0.95 | 6.67 | 0.27 | 8.19 |

**Table S2 Spearman correlation matrix between physicochemical indexes and AOA *amo*A functional gene abundance as per all samples (*n*=15) and Plant-bed system (*n*=9).**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Days | Temperature | pH | ORP | NH4+-N | NO3−-N | TN | TC | TS | C/N |
| Abundance | *r* | −0.7422 | −0.6047 | ns | ns | ns | 0.5536 | ns | ns | ns | Ns |
| (All samples) | *p* | 0.0015 | 0.0169 | / | / | / | 0.0323 | / | / | / | / |
| Abundance | *r* | −0.9115 | ns | ns | ns | ns | ns | 0.7167 | 0.7500 | ns | ns |
| (Plant-bed system) | *p* | 0.0006 | / | / | / | / | / | 0.0298 | 0.0199 | / | / |

Notes.

ns: not significant.



**Figure S1 Rarefaction curves of OTUs in AOA libraries.**



**Figure S2 Relative abundance of sequences affiliated with AOA subclusters in SJY-CW sediments.**

|  |  |
| --- | --- |
|  |  |
| **(a)** Variation of ammonia concentration in 2011 | **(d)** Variation of dissolved oxygen in 2011 |
|  |  |
| **(b)** Variation of ammonia concentration in 2012 | **(e)** Variation of dissolved oxygen in 2012 |
|  |  |
| **(c)** Variation of ammonia concentration in 2013 | **(f)** Variation of dissolved oxygen in 2013 |

**Figure S3 Spatial variation of ammonia nitrogen and dissolved oxygen in SJY-CW water.** In the box and whisker plot (box plots), the central line indicates the median of the data, while the bottom and top edges of the box indicate the first and third quartiles (that is, the 25th and 75th percentiles). The center square symbol is the average value (mean) of the data. The vertical lines, or whiskers, extend from the box as far as the data extend, to a distance of at most 1.5 interquartile ranges. The upper and lower line symbols illustrate the maximum and minimum of the data. The upper and lower cross symbols show the 99% and 1% percentiles of the data.



**Figure S4 Conceptual framework of AOA community succession in SJY-CW.**