Supporting information

# Supplementary Figures and Tables

**Fig. S1** Spatial distribution of BAP in surface sediments of Lake Caohai. BAP is biologically available P, mainly composed of loosely adsorbed P (NH4Cl-P), iron–manganese combined state P (BD-P) and iron–aluminum combined state P (NaOH-Pi).

**Fig. S2** Spatial distribution of P forms in surface sediments of Lake Caohai. A, B, C, D, E and F are the changes in the content of iron–manganese combined state P, iron–aluminum combined state P (NaOH-Pi), loosely adsorbed P (NH4Cl-P), biological detrital organic P (NaOH-Po), calcium-bound P (HCl-P) and [residual](https://translate.googleusercontent.com/translate_f#_ENREF_20) P (Res-P) in the overlying water of Caohai Lake during the high flux season, respectively.

**Fig. S3** Variation profiles of TP contents in sediments of Lake Caohai during the high flux season.

**Table S1** Sediment porewater TP and SRP flux variations during each sampling event

**Table S2** Correlation matrix between P forms and main water quality parameters in surface sediments of Lake Caohai

**Table S2** Correlation matrix of different forms of P in sediments of Lake Caohai

**Table S1** Sediment porewater TP and SRP flux variations during each sampling event

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sites** | **TP** | **SRP** | **Sites** | **TP** | **SRP** |
| **Flux （mg·m−2·d−1）** | | **Flux （mg·m−2·d−1）** | |
| **S1** | 0.03 | 0.08 | **S12** | 0.28 | 0.06 |
| **S2** | 0.05 | 0.04 | **S13** | 0.27 | 0.10 |
| **S3** | 0.09 | 0.05 | **S14** | 0.08 | 0.05 |
| **S4** | 0.05 | 0.04 | **S15** | 0.14 | 0.09 |
| **S5** | 0.04 | 0.07 | **S16** | 0.04 | 0.08 |
| **S6** | 0.05 | 0.03 | **S17** | 0.08 | 0.05 |
| **S7** | 0.07 | 0.06 | **S18** | 0.12 | 0.07 |
| **S8** | 0.05 | 0.10 | **S19** | 0.12 | 0.10 |
| **S9** | 0.11 | 0.09 | **S20** | 0.08 | 0.07 |
| **S10** | 0.11 | 0.06 | **S21** | 0.04 | 0.07 |
| **S11** | 0.07 | 0.07 | **S22** | 0.08 | 0.03 |

**Table S2** Correlation matrix between P forms and main water quality parameters in surface sediments of Lake Caohai

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type | T | DO | EC | pH | WTP | WSRP | NH4Cl-p | BD-P | HCl-P | Res-P | NaOH-Pi | NaOH-PO |
| DO | 0.42 |  |  |  |  |  |  |  |  |  |  |  |
| EC | −0.21 | −0.70\*\* |  |  |  |  |  |  |  |  |  |  |
| pH | 0.06 | 0.76\*\* | −0.80\*\* |  |  |  |  |  |  |  |  |  |
| WTP | 0.03 | −0.49\* | 0.81\*\* | −0.56\*\* |  |  |  |  |  |  |  |  |
| WSRP | −0.20 | −0.40 | 0.42 | −0.19 | 0.45\* |  |  |  |  |  |  |  |
| NH4Cl-P | 0.23 | −0.40 | 0.67\*\* | −0.60\*\* | 0.69\*\* | 0.13 |  |  |  |  |  |  |
| BD-P | 0.04 | 0.12 | 0.01 | 0.11 | −0.10 | 0.03 | −0.23 |  |  |  |  |  |
| HCl-P | −0.28 | −0.40 | 0.75\*\* | −0.39 | 0.65\*\* | 0.47\* | 0.62\*\* | −0.05 |  |  |  |  |
| Res-P | −0.24 | −0.40 | 0.52\* | −0.20 | 0.51\* | 0.42 | 0.42 | −0.20 | 0.73\*\* |  |  |  |
| NaOH-Pi | −0.04 | −0.32 | 0.15 | −0.16 | 0.21 | 0.23 | −0.09 | 0.02 | 0.04 | 0.20 |  |  |
| NaOH-Po | −0.14 | −0.42 | 0.48\* | −0.23 | 0.60\*\* | 0.64\*\* | 0.53\* | −0.32 | 0.65\*\* | 0.87\*\* | 0.33 |  |
| STP | −0.17 | −0.52\* | 0.58\*\* | −0.38 | 0.65\*\* | 0.61\*\* | 0.46\* | −0.12 | 0.72\*\* | 0.81\*\* | 0.57\*\* | 0.89\*\* |

Notes: the number of data is *n* = 22. ⁎⁎ Indicates significance at the 0.01 level. ⁎ Indicates significance at the 0.05 level.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | DGT-P | NH4C  l-P | BD-P | HCl-P | Res-P | NaOH  -Pi | NaOH  -PO | Phos-P | Ortho-P | Mono-P | Diester  -P | Pyro-P |
| NH4Cl-P | 0.63 |  |  |  |  |  |  |  |  |  |  |  |
| BD-P | 0.54 | 0.34 |  |  |  |  |  |  |  |  |  |  |
| HCl-P | 0.85\*\* | 0.89\*\* | 0.59\* |  |  |  |  |  |  |  |  |  |
| Res-P | 0.79\* | 0.85\*\* | 0.20 | 0.82\*\* |  |  |  |  |  |  |  |  |
| NaOH-Pi | 0.63 | 0.32 | 0.72\*\* | 0.43 | 0.20 |  |  |  |  |  |  |  |
| NaOH-Po | 0.76\* | 0.82\*\* | −0.03 | 0.70\*\* | 0.93\*\* | 0.07 |  |  |  |  |  |  |
| Phos-P | 0.87\*\* | 0.01 | 0.10 | 0.11 | −0.17 | 0.36 | −0.11 |  |  |  |  |  |
| Ortho-P | 0.31 | 0.57\* | 0.78\*\* | 0.78\*\* | 0.39 | 0.60\* | 0.31 | 0.30 |  |  |  |  |
| Mono-P | 0.89\*\* | 0.86\*\* | 0.01 | 0.65\*\* | 0.87\*\* | −0.03 | 0.85\*\* | −0.35 | 0.17 |  |  |  |
| Diester-P | 0.51 | 0.76\*\* | −0.09 | 0.63\* | 0.79\*\* | −0.26 | 0.77\*\* | −0.24 | 0.11 | 0.89\*\* |  |  |
| Pyro-P | 0.38 | 0.76\*\* | −0.18 | 0.56\* | 0.68\*\* | −0.28 | 0.72\*\* | −0.19 | 0.10 | 0.88\*\* | 0.93\*\* |  |
| Poly-P | 0.16 | 0.01 | −0.14 | −0.10 | −0.04 | 0.11 | −0.06 | −0.17 | −0.22 | 0.07 | 0.05 | 0.13 |

**Table S3** Correlation matrix of different forms of P in sediments of Lake Caohai

Notes: the number of data is *n* = 15. ⁎⁎ Indicates significance at the 0.01 level. ⁎ Indicates significance at the 0.05 level.