

**Figure S1.** Dendrogram of cluster analysis for 14 leachable elements in the Lingshui Pond sediment core.

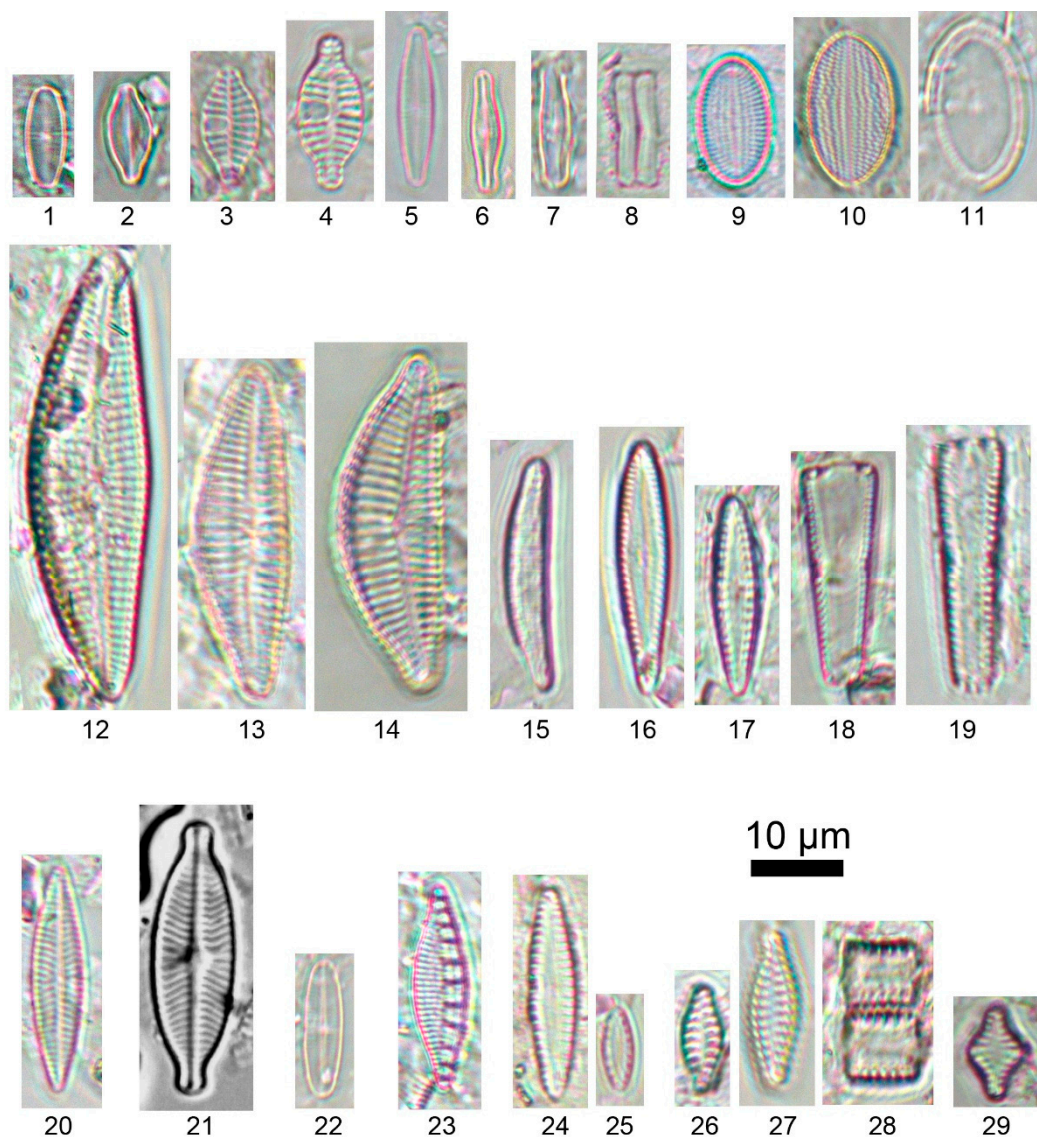
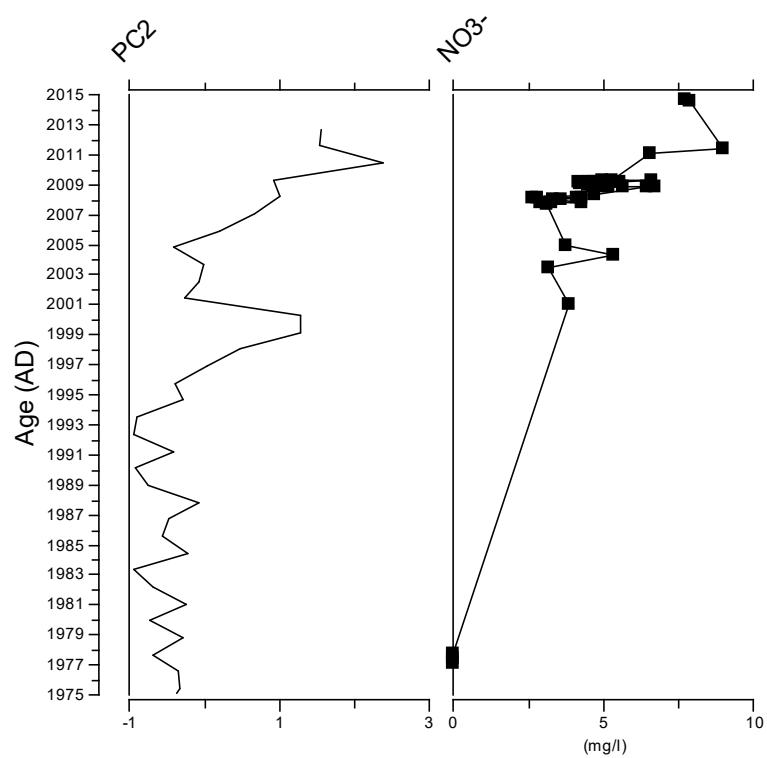


Figure S2. . Light microscope images of the 14 main diatom taxa in the Lingshui Pond sediment core. 1-2: *Achnanthes exigua*; 3-4: *Achnanthes lanceolata*; 5-8: *Achnanthes minutissima*; 9-11: *Cocconeis placentula*; 12-14: *Cymbella affinis*; 15: *Eunotia minor*; 16-19: *Gomphonema clevei*; 20: *Navicula cryptotenella*; 21: *Navicula elginensis*; 22: *Navicula minima*, 23: *Nitzschia sinuata* var. *delognei*; 24-25: *Pseudostaurosira brevistriata*; 26-28: *Punctastriata linearis*; 29: *Staurosira construens*.



**Figure S3.** Spatial variation of diatom PC2 from the sediment records and NO<sub>3</sub><sup>-</sup> concentration of spring water in Lingshui Pond.

**Table S1.** Checklist of diatom species found in the Lingshui Pond sediment core.

No.	Species name	No.	Species name	No.	Species name
1	<i>Achnanthes exigua</i>	37	<i>Gomphonema italicum</i>	73	<i>Nitzschia parvuloides</i>
2	<i>Achnanthes joursacense</i>	38	<i>Gomphonema parvulum</i>	74	<i>Nitzschia sinuata</i> var. <i>delognei</i>
3	<i>Achnanthes lanceolata</i>	39	<i>Gomphonema pseudoaugur</i>	75	<i>Nitzschia tabellaria</i>
4	<i>Achnanthes minutissima</i>	40	<i>Gomphonema subclavatum</i>	76	<i>Pinnularia borealis</i>
5	<i>Achnanthes rupestroides</i>	41	<i>Gyrosigma procerum</i>	77	<i>Pinnularia gibba</i>
6	<i>Achnanthidium gracillimum</i>	42	<i>Gyrosigma scalproides</i>	78	<i>Pinnularia microstauron</i>
7	<i>Amphipleura pellucida</i>	43	<i>Hantzschia amphioxys</i>	79	<i>Pinnularia schoenfelderi</i>
8	<i>Amphora veneta</i>	44	<i>Melosira varians</i>	80	<i>Pseudostaurosira brevistriata</i>
9	<i>Aulacoseira ambigua</i>	45	<i>Navicula notha</i>	81	<i>Punctastriata linearis</i>
10	<i>Bacillaria paxillifer</i>	46	<i>Navicula protractoides</i>	82	<i>Reimeria lacusidahoensis</i>
11	<i>Caloneis tenuis</i>	47	<i>Navicula amphiceropsis</i>	83	<i>Rhopalodia gibba</i>
12	<i>Cocconeis placentula</i>	48	<i>Navicula atomus</i>	84	<i>Rhopalodia operculata</i>
13	<i>Cyclotella meneghiniana</i>	49	<i>Navicula bacillum</i>	85	<i>Stauroneis anceps</i>
14	<i>Cyclotella praetermissa</i>	50	<i>Navicula capitatoradiata</i>	86	<i>Stauroneis anceps</i> var. <i>linearis</i>
15	<i>Cymbella affinis</i>	51	<i>Navicula cincta</i>	87	<i>Stauroneis smithii</i>
16	<i>Cymbella cuspidata</i>	52	<i>Navicula concentrica</i>	88	<i>Staurosira construens</i>
17	<i>Cymbella cymbiformis</i>	53	<i>Navicula confervacea</i>	89	<i>Surirella angusta</i>
18	<i>Cymbella delicatula</i>	54	<i>Navicula contenta</i>	90	<i>Surirella bifrons</i>
19	<i>Cymbella leptoceros</i>	55	<i>Navicula cryptotenella</i>	91	<i>Synedra ulna</i>
20	<i>Cymbella tumida</i>	56	<i>Navicula cuspidata</i>		
21	<i>Cymbella turgidula</i>	57	<i>Navicula elginensis</i>		
22	<i>Diploneis elliptica</i>	58	<i>Navicula heuflerii</i>		
23	<i>Diploneis oblongella</i>	59	<i>Navicula hustedtii</i>		
24	<i>Discostella stelligera</i>	60	<i>Navicula laterostrata</i>		
25	<i>Encyonema leei</i>	61	<i>Navicula minima</i>		
26	<i>Encyonema mesianum</i>	62	<i>Navicula mutica</i>		
27	<i>Encyonema minutum</i>	63	<i>Navicula pseudosilicula</i>		
28	<i>Encyonema silesiacum</i>	64	<i>Navicula pupula</i>		
29	<i>Epithemia adnata</i>	65	<i>Navicula scutelloides</i>		
30	<i>Eunotia minor</i>	66	<i>Navicula seminulum</i>		
31	<i>Eunotia pectinalis</i>	67	<i>Navicula viridula</i> var. <i>linearis</i>		
32	<i>Fragilaria capucina</i>	68	<i>Neidium affine</i> var. <i>longiceps</i>		
33	<i>Frustulia rhomboides</i> var. <i>crassinervia</i>	69	<i>Nitzschia angustata</i>		
34	<i>Gomphonema clevei</i>	70	<i>Nitzschia fonticola</i>		
35	<i>Gomphonema gracile</i>	71	<i>Nitzschia levidensis</i>		
36	<i>Gomphonema grovei</i> var. <i>lingulatum</i>	72	<i>Nitzschia palea</i>		

**Table S2.** Scores of PCA and environmental conditions for the selected diatom species in the Lingshui Pond sediment core.

Species name	PC1	PC2	Environmental indication		
			pH	Trophic state	Habitat
Variables (%)	47.73	13.91			
<i>Achnanthes exigua</i>	-0.17	0.50	alkaliphious	oligo- to eutraphentic	benthic
<i>Achnanthes lanceolata</i>	-0.33	0.80	alkaliphious	eutraphentic	benthic
<i>Achnanthes minutissima</i>	0.01	0.26	circumneutral	oligo- to eutraphentic	benthic
<i>Cocconeis placentula</i>	2.33	0.56	alkaliphious	eutraphentic	epiphytic
<i>Cymbella affinis</i>	-0.07	-0.53	alkaliphious	eutraphentic	epiphytic
<i>Eunotia minor</i>	-0.18	-0.61	acidophilous	oligotraphentic	benthic
<i>Gomphonema clevei</i>	0.83	-0.62	circumneutral	meso-eutraphentic	epiphytic
<i>Navicula cryptotenella</i>	-0.46	-0.58	alkaliphious	oligo- to eutraphentic	benthic
<i>Navicula elginensis</i>	-0.52	-0.57	alkaliphious	eutraphentic	benthic
<i>Navicula minima</i>	-0.38	0.41	alkaliphious	eutraphentic	benthic
<i>Nitzschia sinuata</i> var. <i>delognei</i>	-0.13	0.40	alkaliphious	meso-eutraphentic	benthic
<i>Pseudostaurosira brevistriata</i>	-1.30	0.16	alkaliphious	oligo- to eutraphentic	benthic-to planktonic
<i>Punctastriata linearis</i>	-1.60	0.26	alkaliphious	oligo- to eutraphentic	benthic-to planktonic
<i>Staurosira construens</i>	-0.94	0.34	alkaliphious	meso-eutraphentic	benthic-to planktonic