**Supplementary material**

**Table S1**. Diatom bloom in the Hanjiang River.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Time (year) | Site | Duration of diatom bloom (days) | Dominant species | Maximum density of diatom（107ind./L） | Reference |
| 1992 | From Qianjiang to Wuhan | 18 days | *Cyclotella*sp. | 2.02 | Liang et al. (2012) |
| 1996 | From Xiantao to Wuhan | about 20 days | *Cyclotella*sp. | 1.5 | Liang et al. (2012) |
| 1998 | From Xiantao to Wuhan | more than 20 days | *Cyclotella*sp. | 2.6 | Liang et al. (2012) |
| 2000 | From Qianjiang to Wuhan | more than 20 days | *Cyclotella*sp. | 3.52 | Liang et al. (2012) |
| 2003 | From Xiantao to Wuhan | about 20 days | *Cyclotella*sp. | 3.5 | Liang et al. (2012) |
| 2008 | Dongjing River (a tributary of Hanjiang River) | about 20 days | *Cyclotella*sp. | 2.6 | Liang et al. (2012) |
| 2009 | Dongjing River (a tributary of Hanjiang River) | more than 20 days | *Stephanodiscushantzschii* | 2.1 | Yang (2012) |
| 2010 | From Xiangfan to Wuhan | 36 days | *Stephanodiscushantzschii* | 2.4 | Yang (2012) |
| 2015 | From Shayang to Wuhan | about 10 days | *Cyclotella*sp. | 1.71 | Xin et al. (2019) |
| 2016 | From Shayang to Qianjiang | about 10 days | *Cyclotella*sp. | 4.0 | Xin et al. (2019) |
| 2018 | From Shayang to Wuhan | more than 30 days | *Cyclotella*sp. | 4.0 | Xin et al. (2019) |

**Table S2**. Phytoplankton density of three pairs of samples were collected from Zhongxiang to Xiantao.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Habitat | *Melosiragranulata* | *Stephanodiscushantzschii* | *Synedra*  *ulna* | *Fragilaria crotonensis* |
| LLH1 | 5.98×105±7.3×103 | 6.91×105±3.1×103 | 9.26×104±2.5×103 | 6.93×104±1.2×103 |
| HLH1 | 5.43×105±5.6×103 | 6.31×105±2.2×103 | 9.35×104±2.1×103 | 6.72×104±1.3×103 |
| LLH2 | 7.70×105±7.9×103 | 8.13×105±9.0×103 | 1.28×105±3.4×103 | 9.62×104±2.3×103 |
| HLH2 | 7.81×105±7.5×103 | 7.86×105±8.7×103 | 1.25×105±3.7×103 | 9.37×104±2.1×103 |
| LLH3 | 8.52×105±1.1×104 | 2.61×106±2.4×103 | 1.35×104±1.5×103 | 8.83×104±1.6×103 |
| HLH3 | 8.23×105±5.6×103 | 1.86×106±3.2×103 | 1.47×104±2.8×103 | 8.31×104±2.3×103 |

The unit of cell density was ind./L.Values are the median ± standard deviation of triplicate measurements.