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**Figure S1.** Comparison of vertical water temperature profiles between model simulations and observations at the buoy station in 2017 and 2018.

**Table S1**. Governing parameters, descriptions, values, and units adopted in the water quality-ecological model.

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| --- | --- | --- | --- | --- |
| **Symbol** | **Parameter** | **Value** | **Unit** | **Reference** |
| K\_deox | Deoxygenation rate | 0.21 | day-1 | 0.16-0.21 [58] |
| K\_nitr | Nitrification rate | 0.13 | day-1 | 0.09-0.13 [58] |
| K\_deni | Denitrification rate | 0.05 | day-1 | 0.09 [58] |
| K\_mine1 | Organic nitrogen mineralization | 0.075 | day-1 | 0.075 [58] |
| K\_mine2 | Organic phosphorus mineralization | 0.15 | day-1 | 0.22 [58] |
| KCOD | Half-saturation constant of dissolved oxygen required for oxidation of chemical oxygen demand | 0.5 | mg O2 L-1 | 0.5 [58] |
| KNITR | Nitrification half-saturation constant for dissolved oxygen | 0.5 | mg O2 L-1 | 0.5 [58] |
| KNO3 | Denitrification half-saturation constant for dissolved oxygen | 0.1 | mg O2 L-1 | 0.1 [58] |
| KmN | Half-saturation constant for uptake of inorganic nitrogen | 25.0 | ug N L-1 | 25.0 [58] |
| KmP | Half-saturation constant for uptake of inorganic phosphorus | 1.0 | ug P L-1 | 1.0 [58] |
| SOD | Sediment oxygen demand | 0.4 | g O2 m-2 day-1 | 0.2-4.0 [58] |
| FON | Fraction of dead and respired phytoplankton recycled to the organic nitrogen | 0.5 | - | 0.5 [58] |
| FOP | Fraction of dead and respired phytoplankton recycled to the organic phosphorus | 0.65 | - | 0.5 [58] |
| Solar\_S | Optimum solar radiation rate | 250 | langleys day-1 | 216-350 [55]  200-500 [58] |
| Ratio\_NC | Ratio of nitrogen to carbon in phytoplankton | 0.25 | mg N mg-1 C-1 | 0.25 [58] |
| Ratio\_PC | Ratio of phosphorus to carbon in phytoplankton | 0.025 | mg P mg-1 C-1 | 0.025 [58] |
| KB\_ds | Organic carbon decomposition rate | 0.01 | day-1 | 0.004 [58] |
| Dep\_ben | Benthic layer depth | 0.5 | m | 0.2-0.7 [58] |
| GZ | Growth rate of zooplankton | 0.76 | day-1 | 0.1-0.7 [57]  0.1-0.76 [55] |
| BMZ | Basal metabolism rate of zooplankton | 0.254 | day-1 | 0.24-1.2 [55]  0.17 [56,59] |
| PRZ | Mortality rate of zooplankton | 0.02 | day-1 | 0.001-0.125  [55]  0.02 [59] |
| GP | Growth rate of phytoplankton | 2.50 | day-1 | 0.2-8.0 [55]  2.0 [58]  2.0-5.5 [56,59] |
| BMP | Basal metabolism rate of phytoplankton | 0.01 | day-1 | 0.003-0.17 [55]  0.02 [58]  0.01 [59] |
| PRP | Predation rate on phytoplankton | 1.75 | day-1 | 0.02-2.28 [60] |
| WS | Settling velocity of phytoplankton | 0.01 | m day-1 | 0.01-0.6 [55]  0.1 [58] |