# Electronic Supplementary Materials

**Table S1.** Summary of candidate predictor variables considered in the models exploring relationships between physical and biological parameters. To identify the best set of predictor variables, we used automatic model selection methods (Burnham & Anderson, 2002) ranking models based on AICc, implemented via the *dredge()* function in the R library(MuMIn) (Barton, 2023). Predictor terms retained in the highest-ranked models for each response variable are shown in bold. Adjusted R2 values are also presented for the highest-ranked model.

|  |  |  |
| --- | --- | --- |
| **Response variable** | **Predictor variables considered** | **Adjusted R2** |
| WW thickness | **MLD**, **Tmin**, **Depth of O2min**, Days since ice melt | 0.43 |
| WW nitrate concentration | **WW thickness**, Tmin, Depth of Tmin, O2min, Depth of O2min, Tmax, Depth of Tmax | 0.09 |
| ML nitrate concentration | WW thickness, **TMLD**, MLD, Tmin, **Depth of Tmin** | 0.32 |
| Nitrate drawdown | TMLD, MLD, **Days since ice melt**, Nutrient drawdown ratio (Si2N\_DD\_ratio), **WW thickness**, Tmin | 0.28 |
| Nitrate-based production | TMLD, **MLD**, Nutrient drawdown ratio (Si2N\_DD\_ratio), WW thickness, Tmin | 0.12 |