Supplementary online materials:

# The influences of historic lake trophy and mixing regime changes on long-term phosphorus fractions retention in sediments of deep, eutrophic lakes: a case study from Lake Burgäschi, Switzerland

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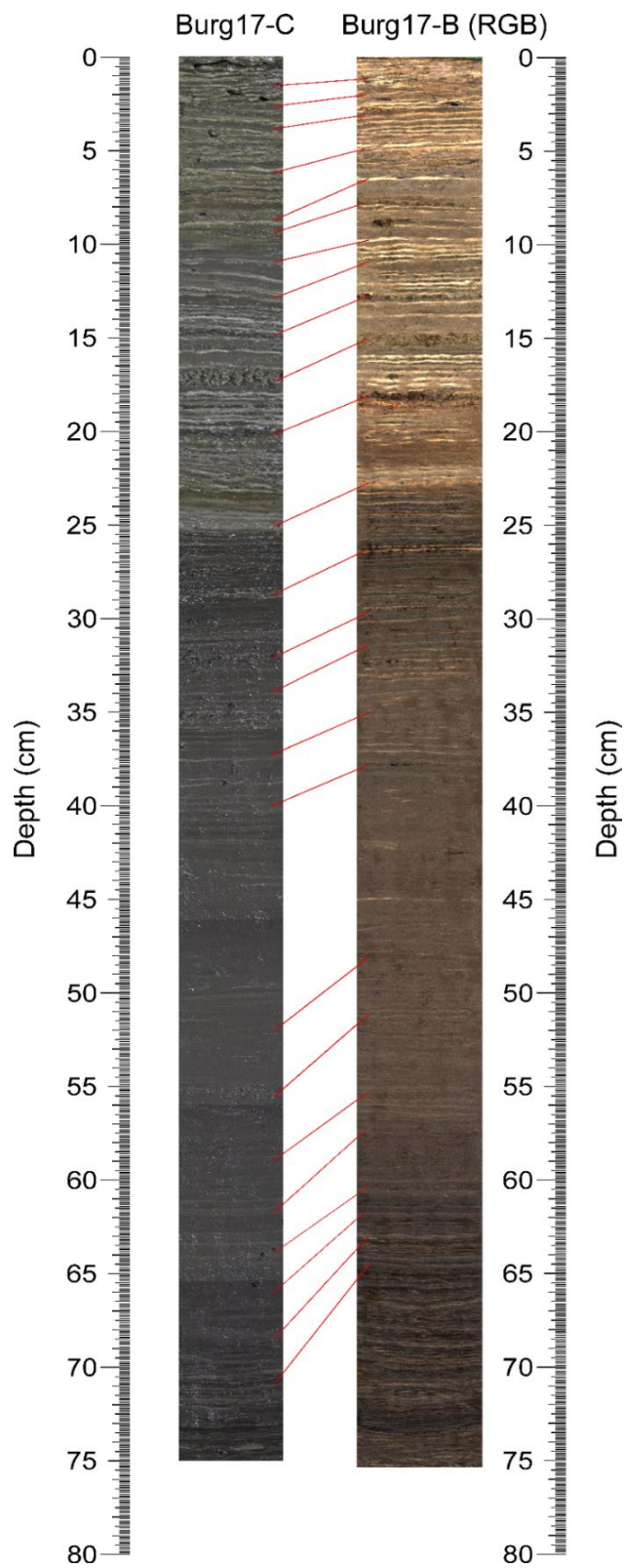


**Figure S1: Core correlation between Core Burg17-C and Core Burg17-B (the dated core) sediment images. The core picture of Burg17-B is true color RGB (R: 640 nm, G: 545 nm, B: 460 nm) linear-stretch image. The core picture of Burg17-C was taken with a Nikon D80 digital camera.**

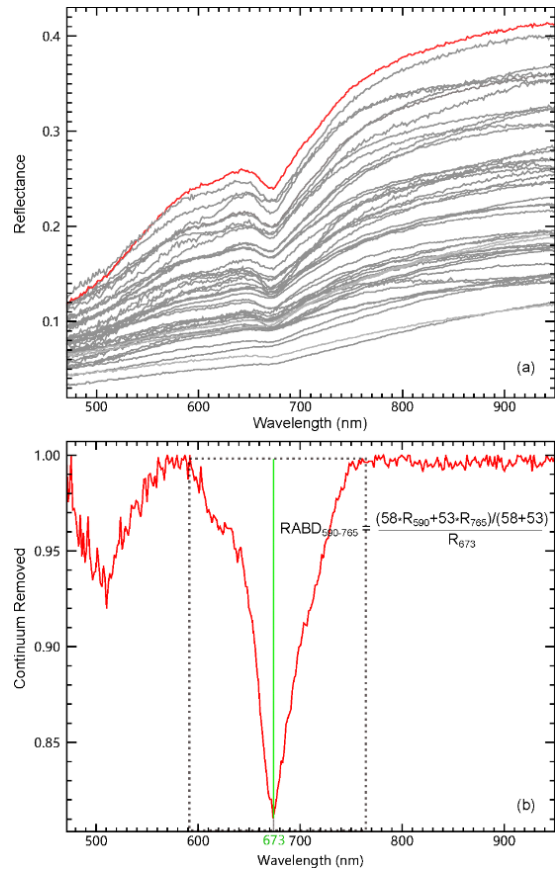



**Figure S2: (a)** Spectral endmembers obtained from Spectral Hourglass Wizard. The highlighted red endmember spectra #19 is used in **(b)**. **(b)** Continuum removed spectrum of endmember #19, showing the formula for $RABD_{590\text{-}765}$ calculation for a trough minimum at $R_{673}$.

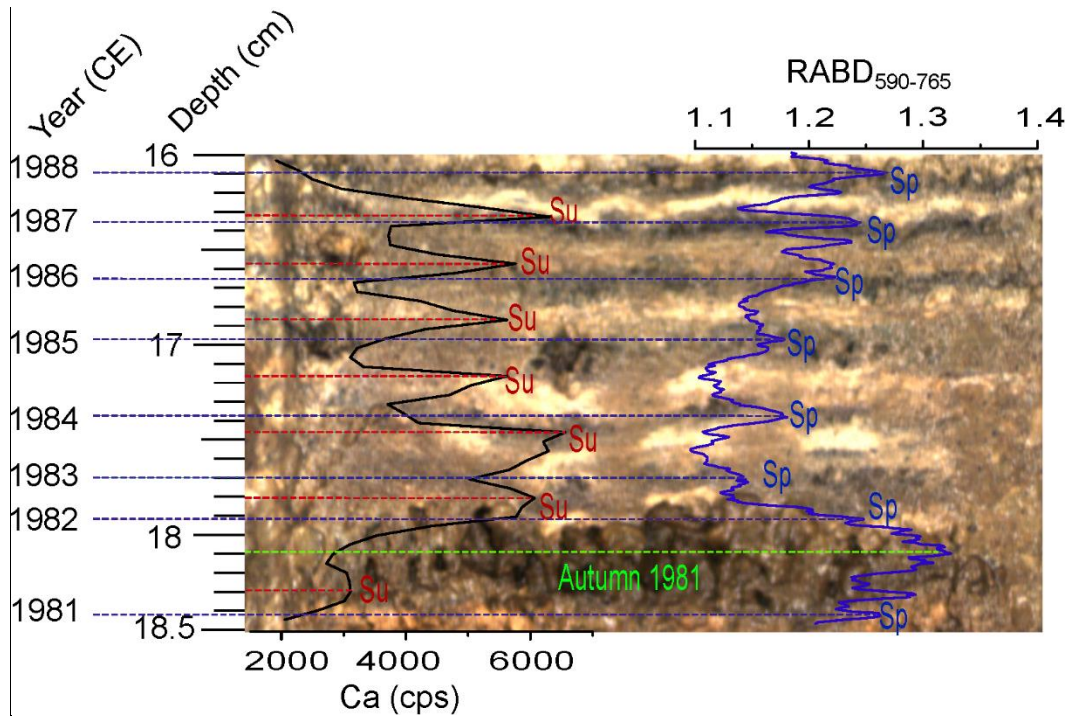



**Figure S3: The laminations from depth 16 cm to 18.5 cm with a regular succession of light calcite layers (Ca-rich) and dark organic-rich (RABD$_{590-765}$ inferred green-pigments) layers indicated by different colored lines (color figure online). The background is the RGB contrast enhanced core picture (Sp: Spring; Su: Summer). The algal bloom in the autumn of 1981 year coincides with the historical record in Markus (2007).**

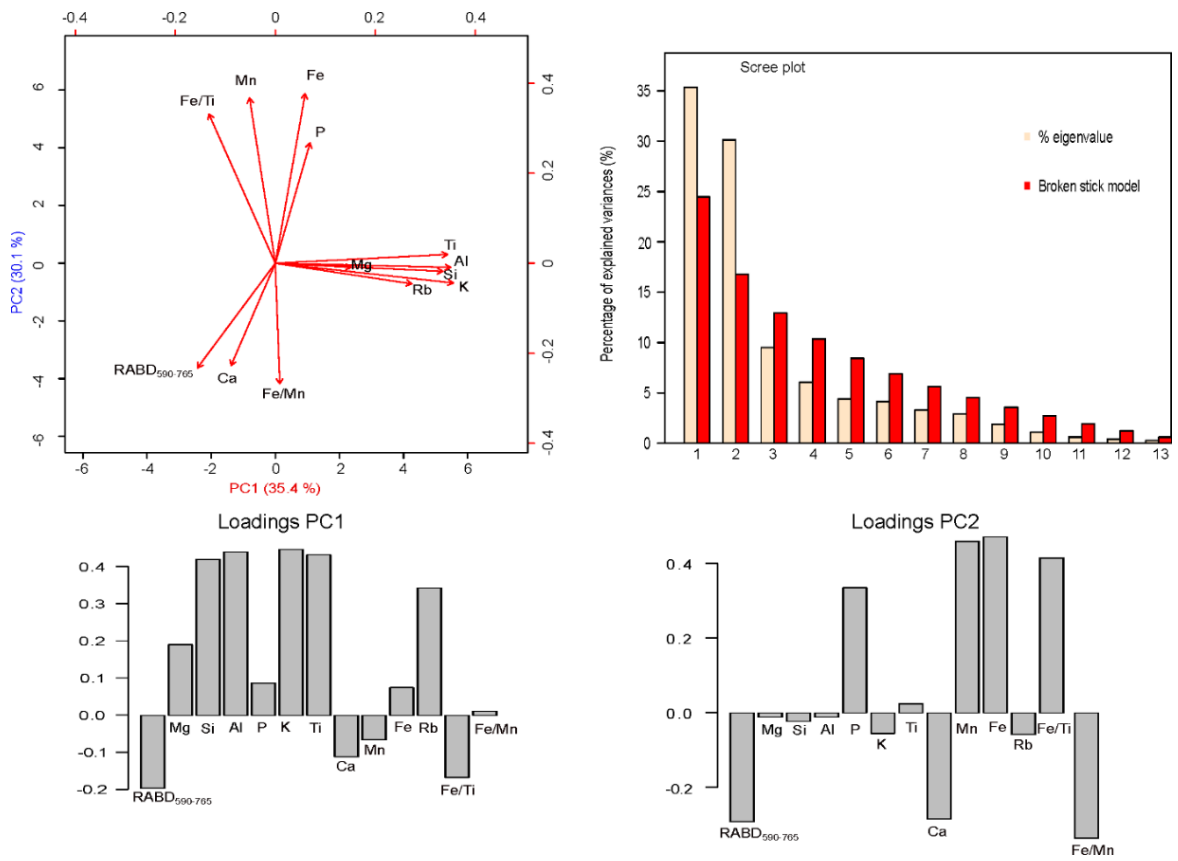



**Figure S 4: The biplot on standardized data of variables from Fig. 4, the screeplot and the loadings of the PCA.**

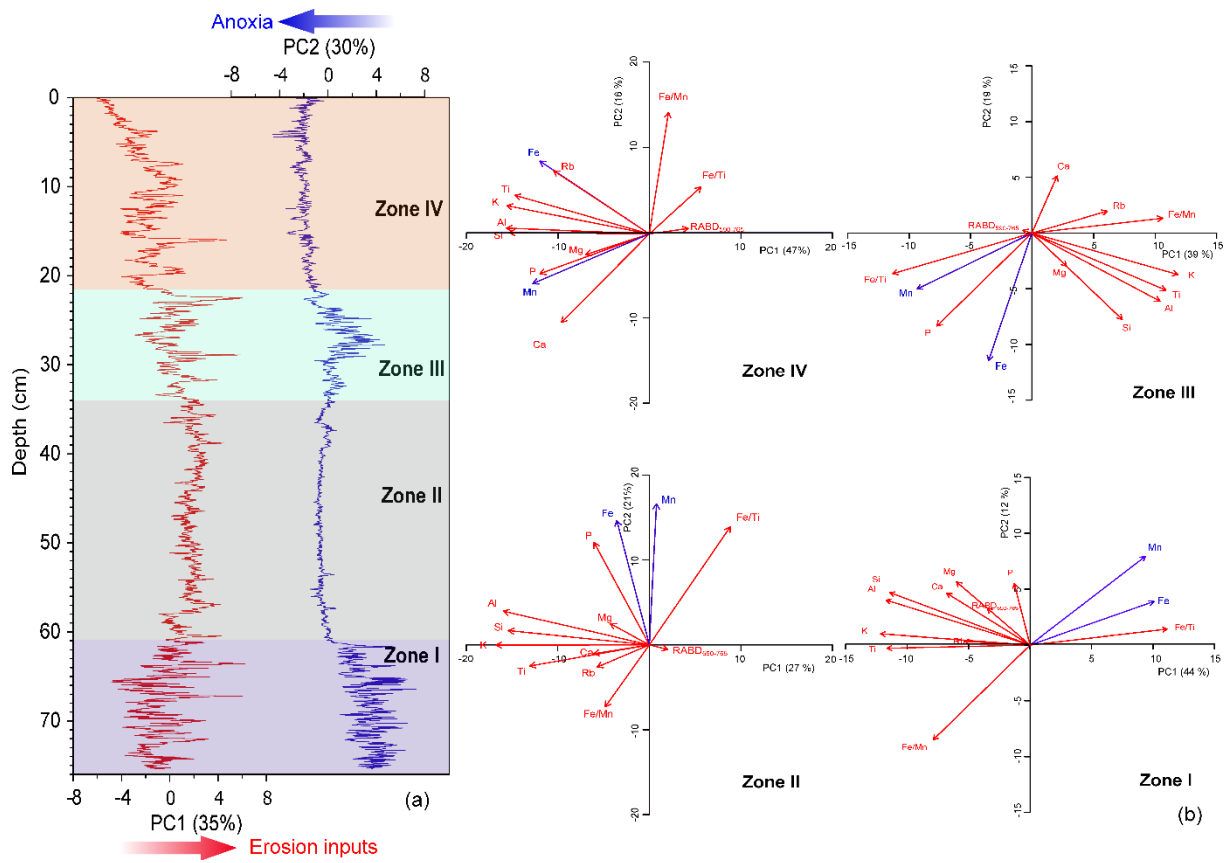



**Figure S5: Multivariate analysis of green-pigments and geochemical dataset from Fig. 4. (a) Distribution of four CONISS-zones, and PC1 and PC2 scores along with the sediment Core Burg17-B. (b) Biplots of PC1 and PC2 for individual CONISS-zones.**

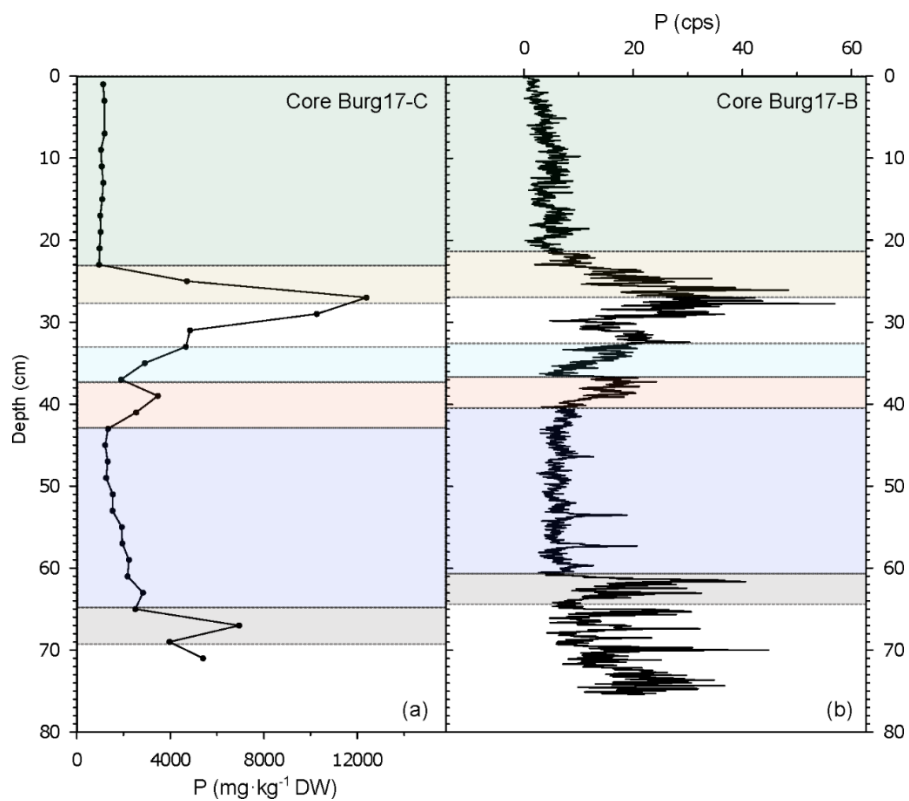



**Figure S6: The profiles of (a) total P concentrations from sequential P extraction (Burg17-B) and (b) semi-quantitative µXRF-P (Burg17-C). The colored sections indicate the matching between the two profiles.**

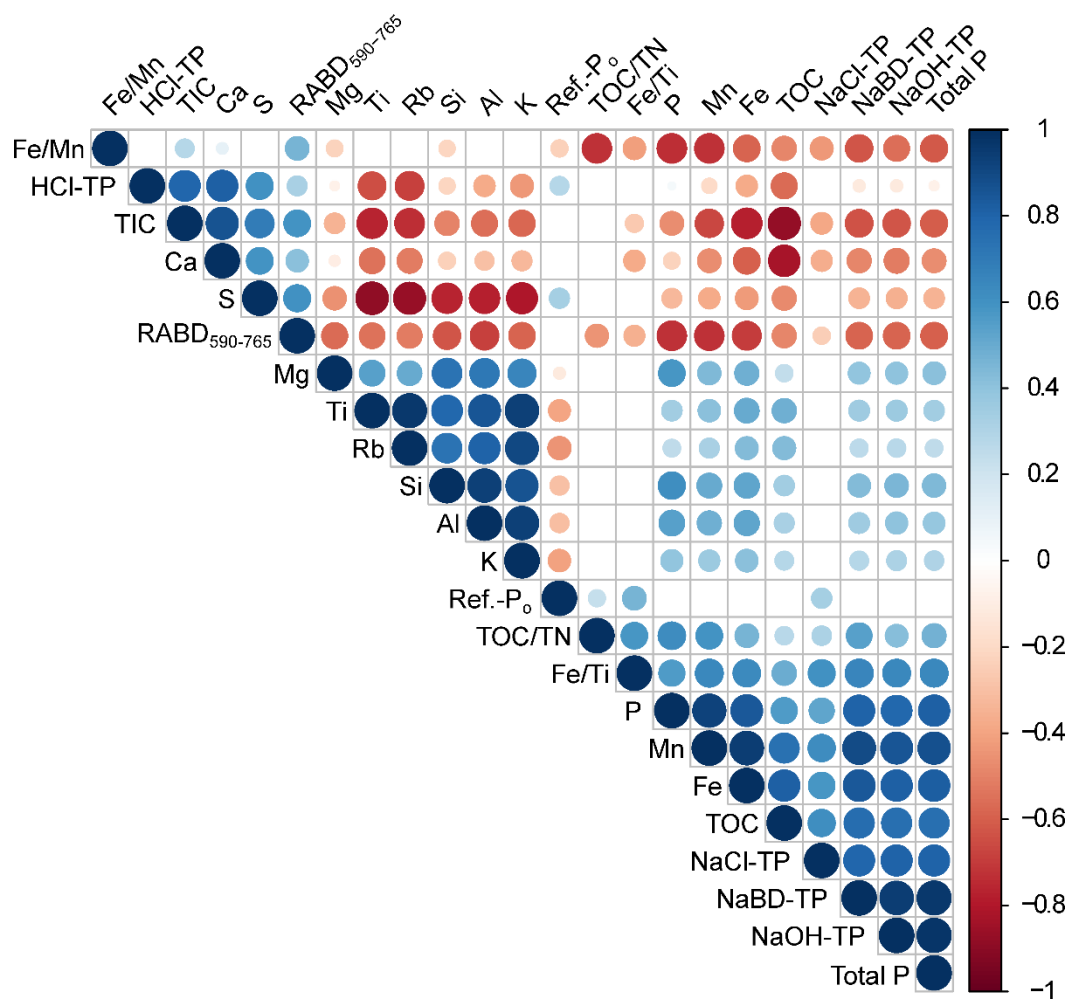
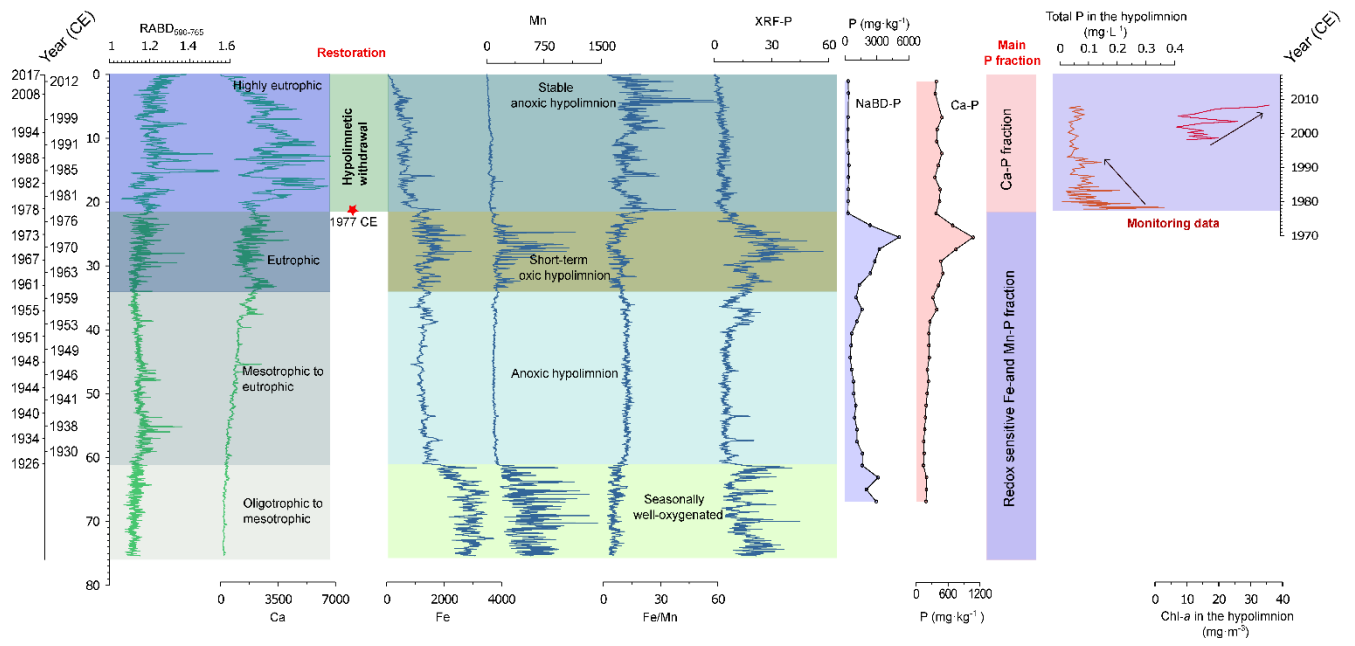



**Figure S7: Spearman's rank correlation matrix of all variables (presented in Fig. 7) at the significant level of 0.05. Only the p-value of the correlation < 0.05 is shown. In total 35 samples points are included. The variable-order follows the output of hierarchical clustering.**

**Synthesis figure**

**References**

Markus, Z.: 30 Jahre Tiefenwasser-Ableitung Wie geht es dem Burgäschisee heute?, Office for Water Protection and Waste Management of the Canton of Bern, Bern, 2007.