Supplementary information

Seasonal speciation of dissolved germanium in Bohemian reservoirs with contrasting chemistry and trophic status

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Figure SI1a. Vrchlice watershed. The red dot indicates our sampling point (49.9270392N, 15.2270806E). The yellow dots correspond to PLA sampling points, numbered 1 to 10, from upstream to downstream, in Figures SI3. The blue dots show tributary sampling points on the Vrchlice river: IV1- at the reservoir inlet near to the Malešov village bridge (49.9092675N, 15.2243681E), IV2- upstream of the Hamerský pond (49.9021136N, 15.2245056E), IV3- near Sion castle (49.8885661N, 15.2104525E).

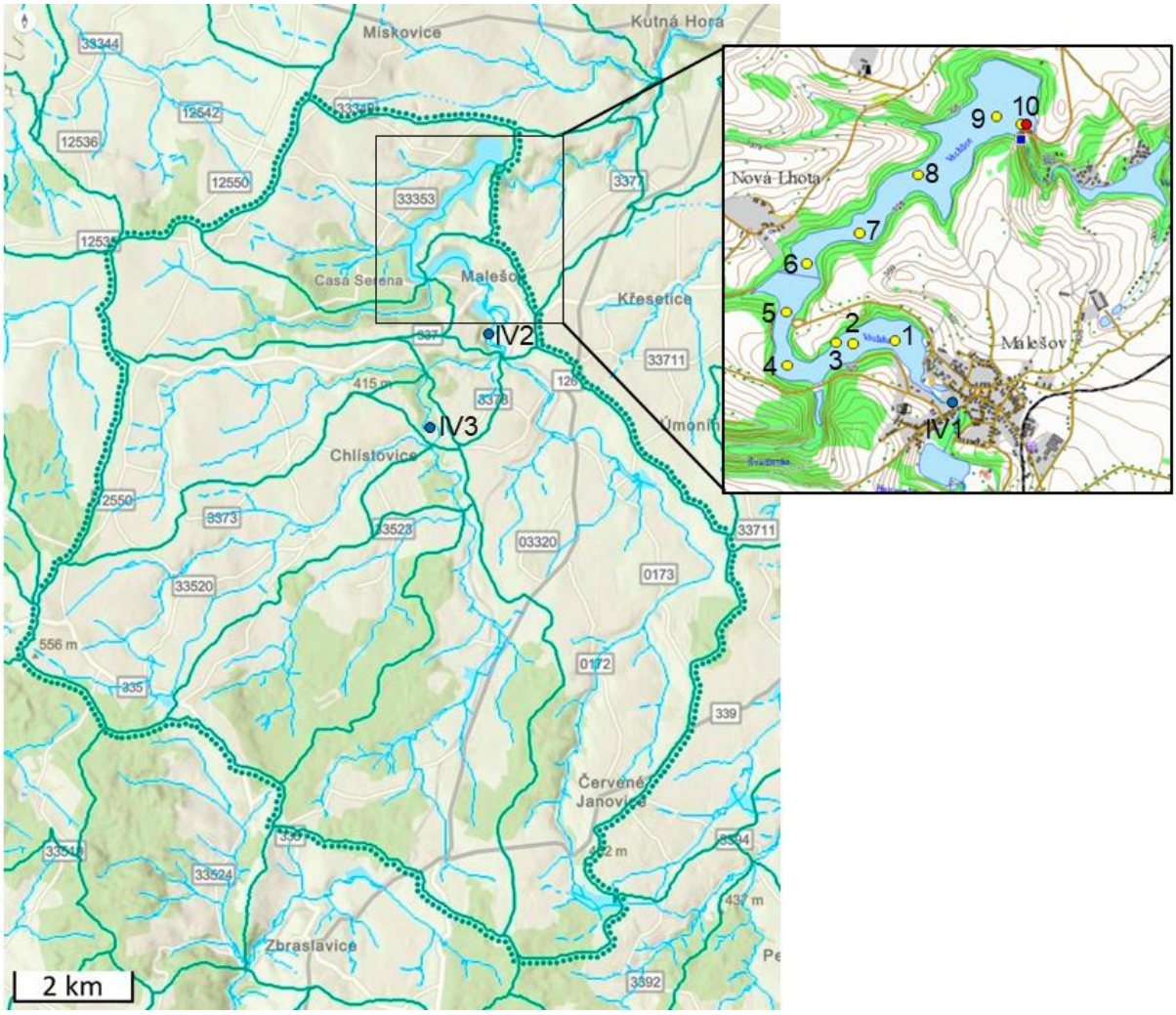


Figure SI1b. Souš watershed. The red dot indicates our sampling point (50.7911378N, 15.3183094E). The yellow dots correspond to PLA sampling points, numbered 1 to 3, from upstream to downstream, in Figures SI3. The blue dots show tributary sampling points: IS1- on the Černá Desná River approximately 1 km upstream of the reservoir inlet (50.8076250N, 15.2930164E), and on the Bilá Desná River at two locations, IS2- approximately 300 m upstream (50.8074222N, 15.2727050E) and IS3- 600 m downstream (50.8017369N, 15.2759692E) of the connecting pipe inlet to the Souš reservoir, respectively.

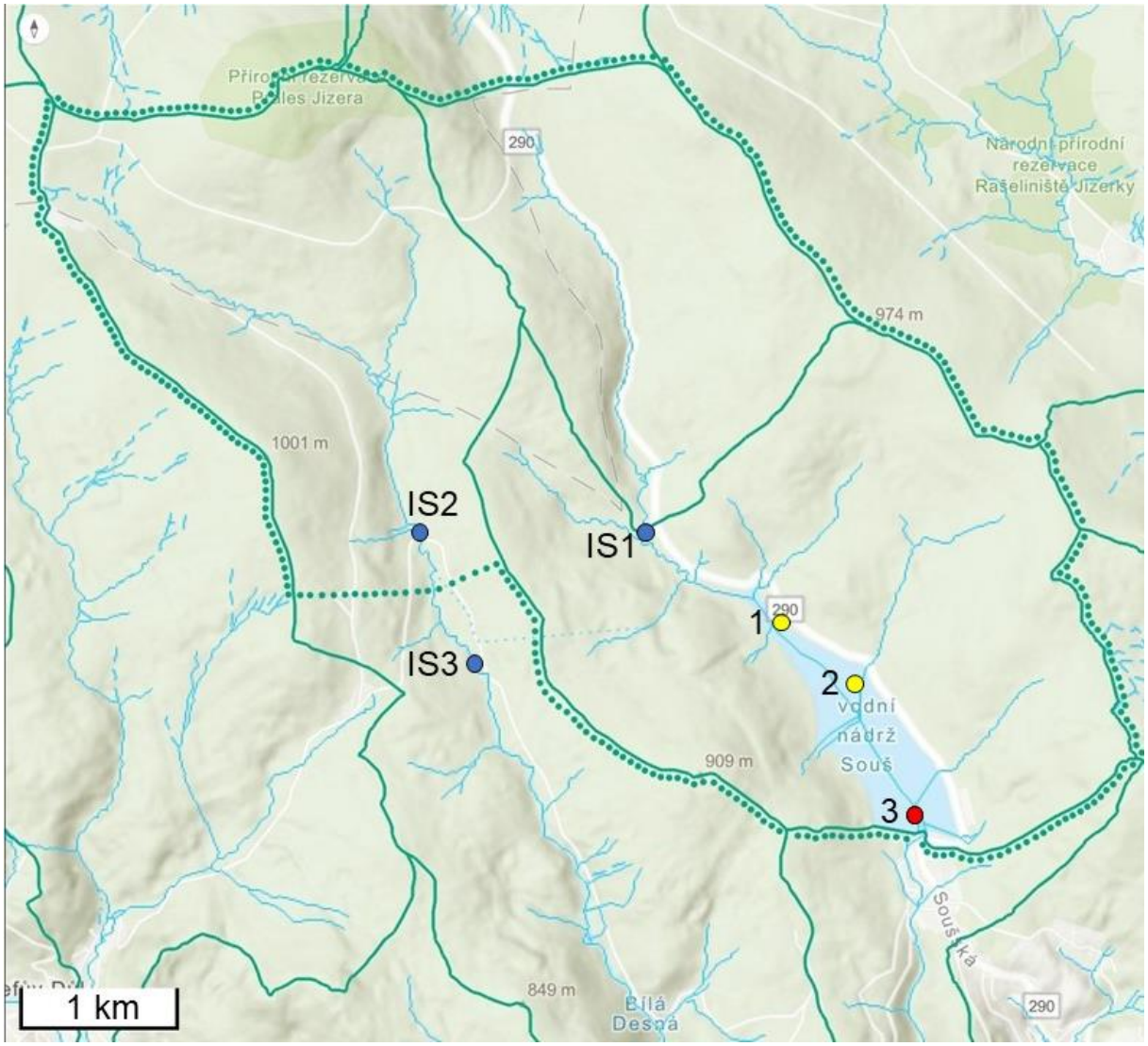
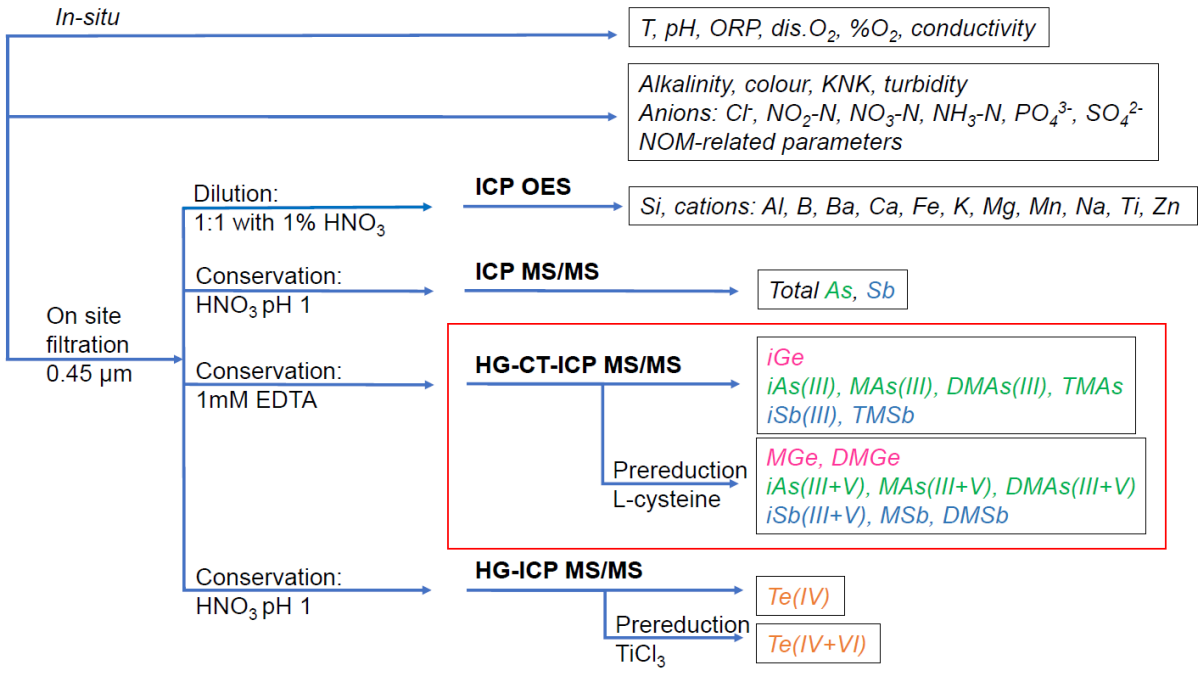
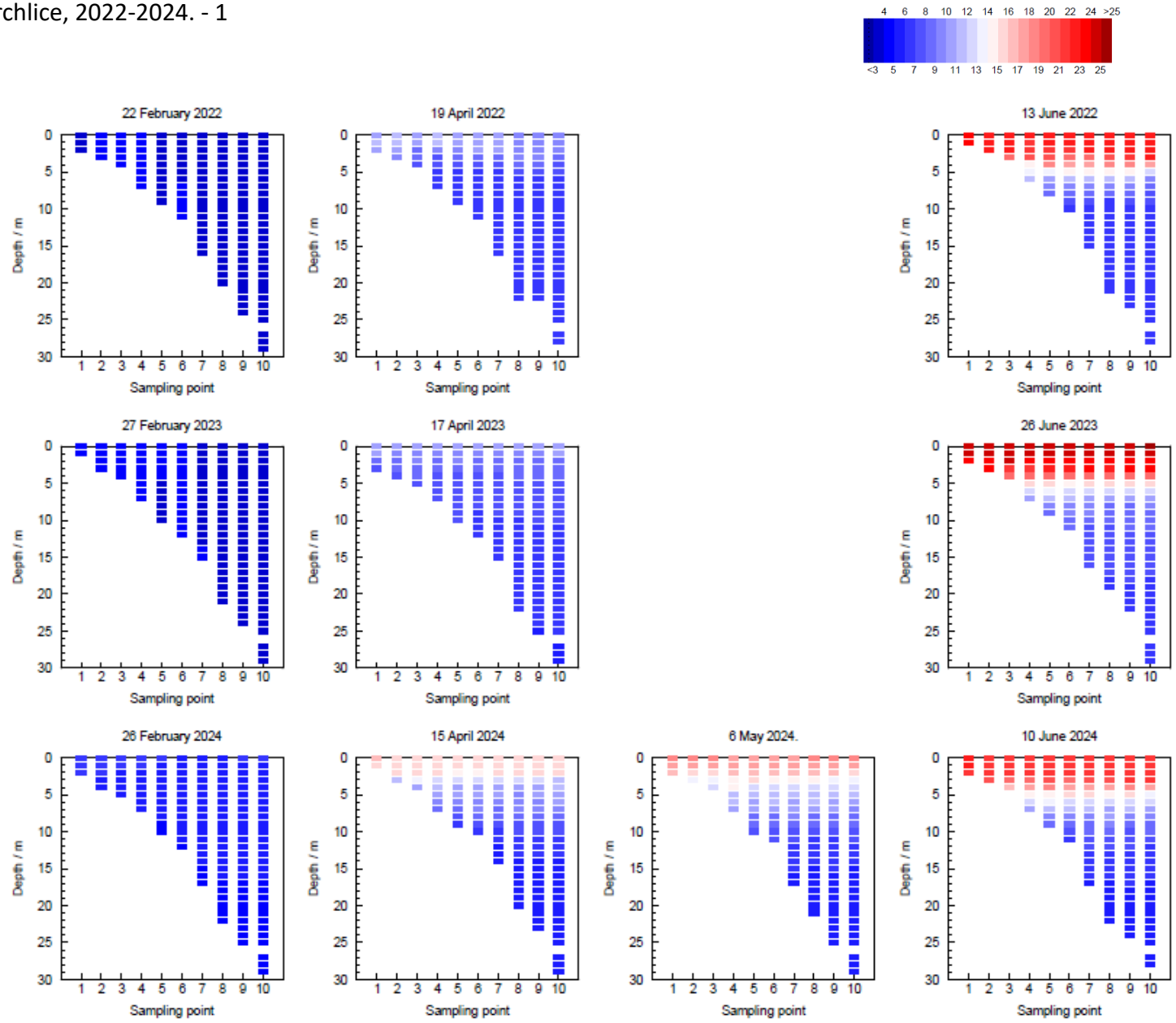


Figure SI2. Complete sampling and conservation procedure scheme.

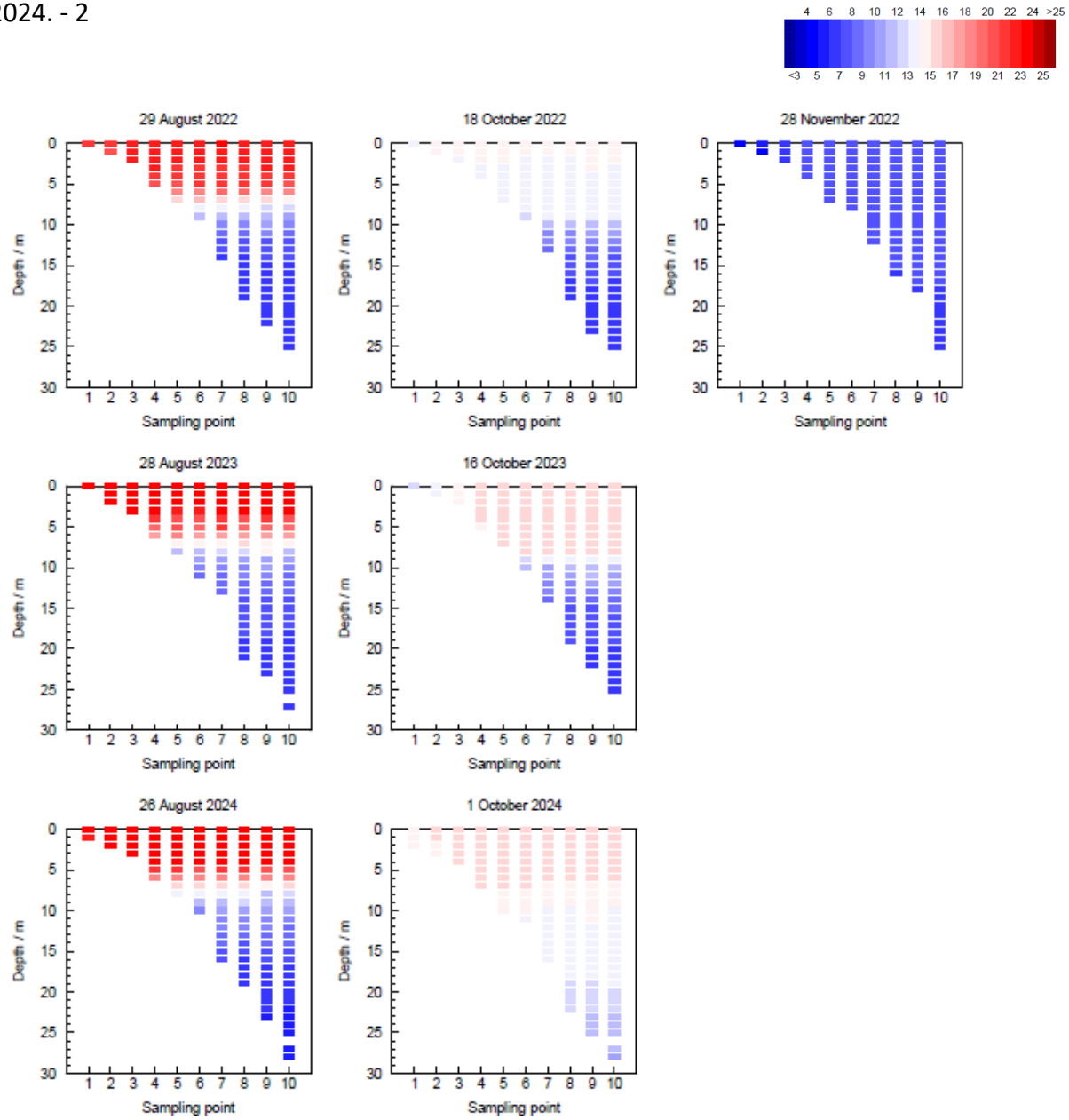


Following pages: Figure SI3. Profiles of temperature, dissolved oxygen, and chlorophyll *a* recorded at ten sampling points in Vrchlice (yellow dots in Figure SI1a) and three in Souš (yellow dots in Figure SI1b) for years 2022, 2023 and 2024. Data provided by Povodí Labe, state enterprise (PLA).

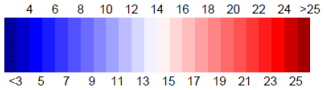
Temperature. Vrchlice, 2022-2024. - 1

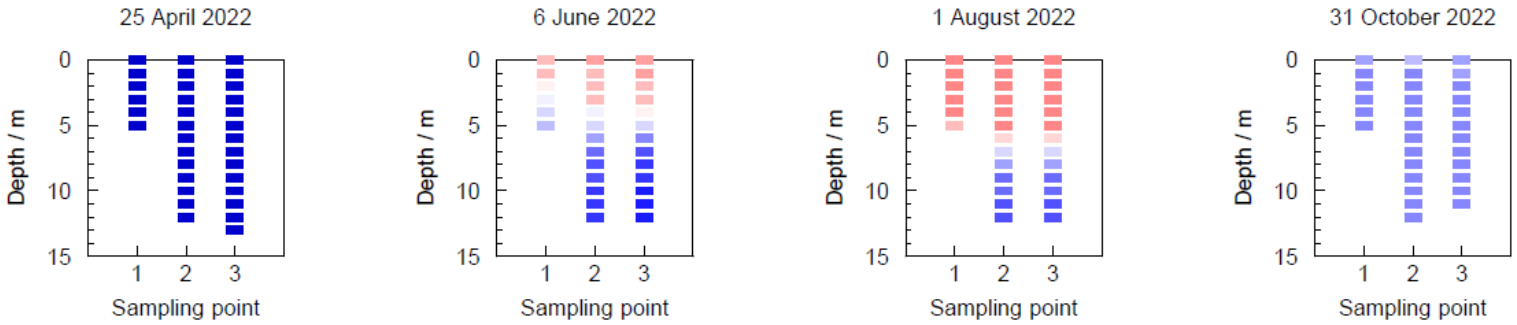


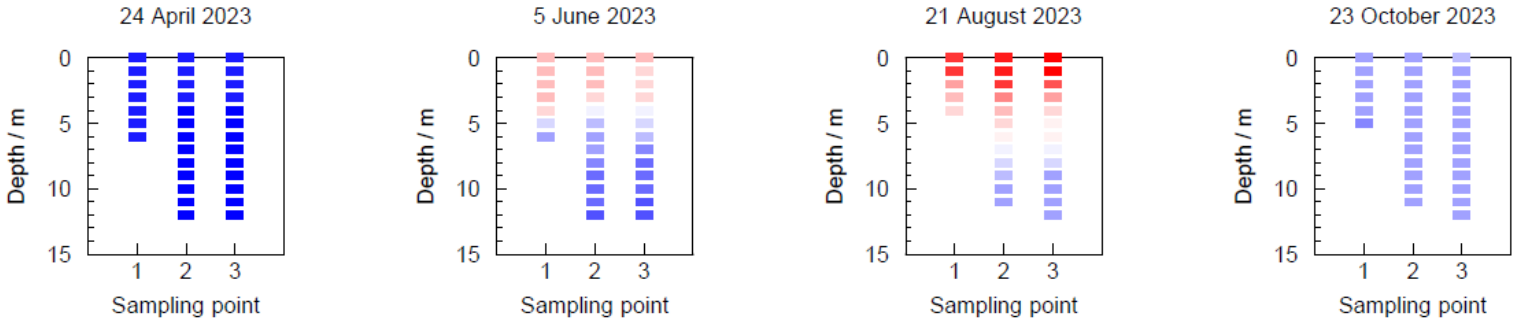
Temperature. Vrchlice, 2022-2024. - 2

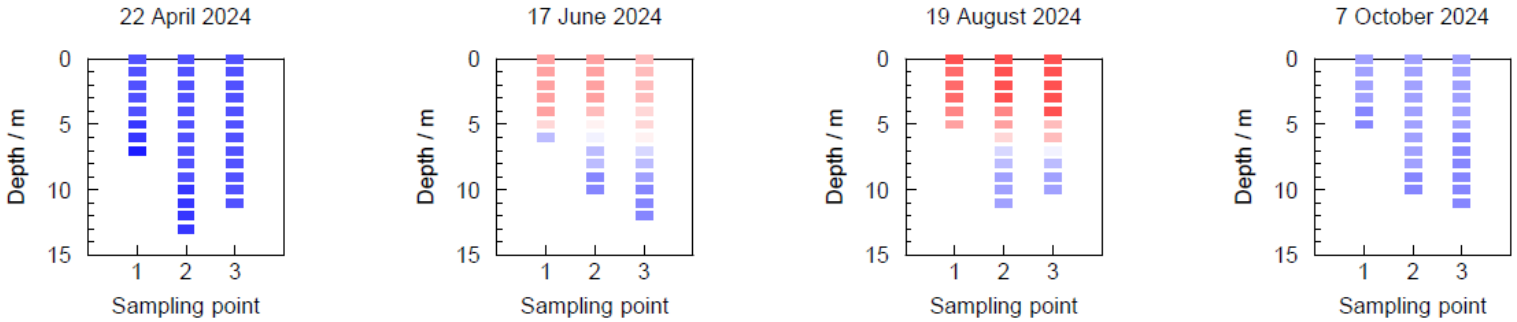


Temperature. Souš, 2022-2024

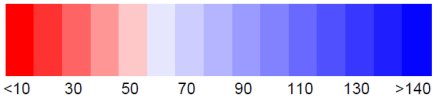


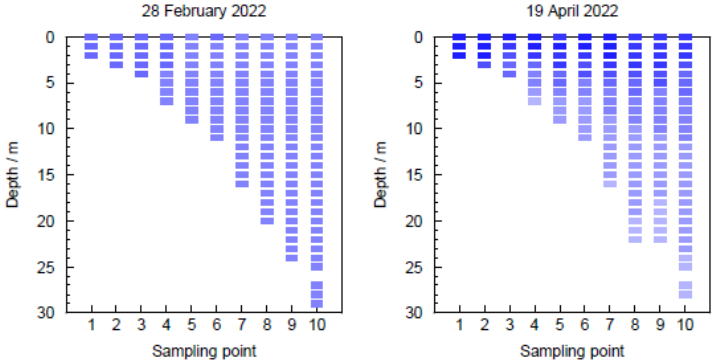


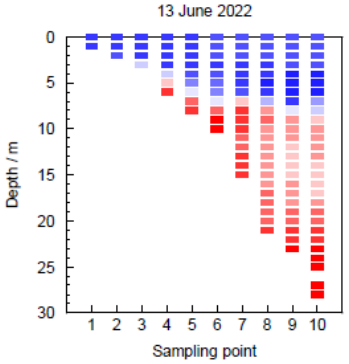


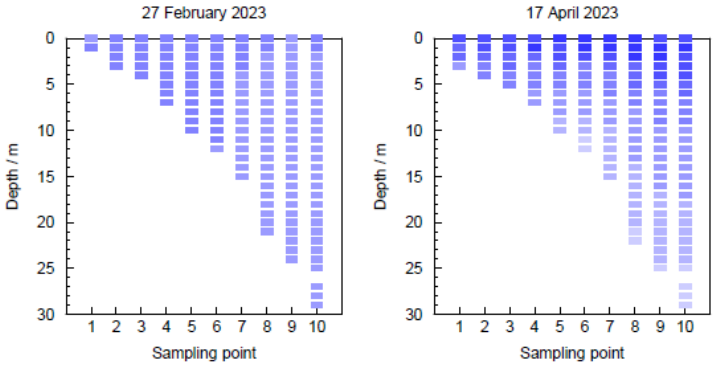


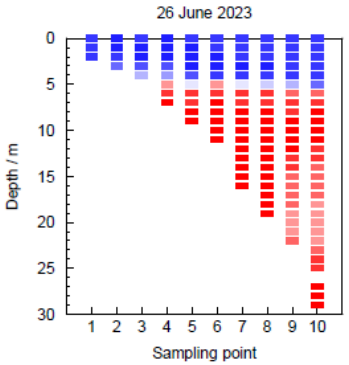
%O2. Vrchlice, 2022-2024. - 1

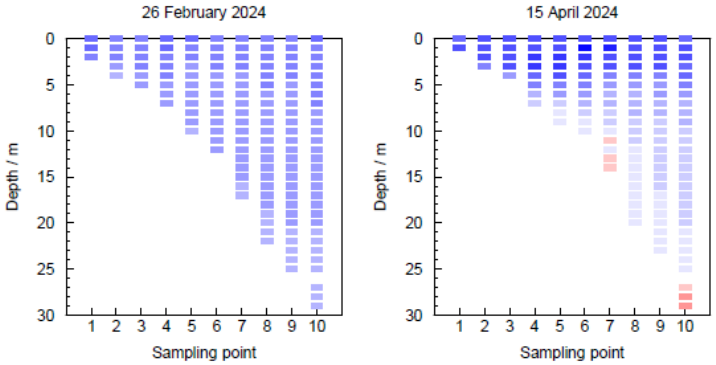


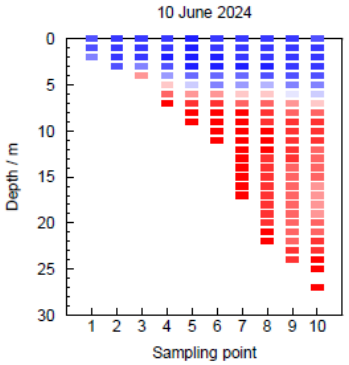




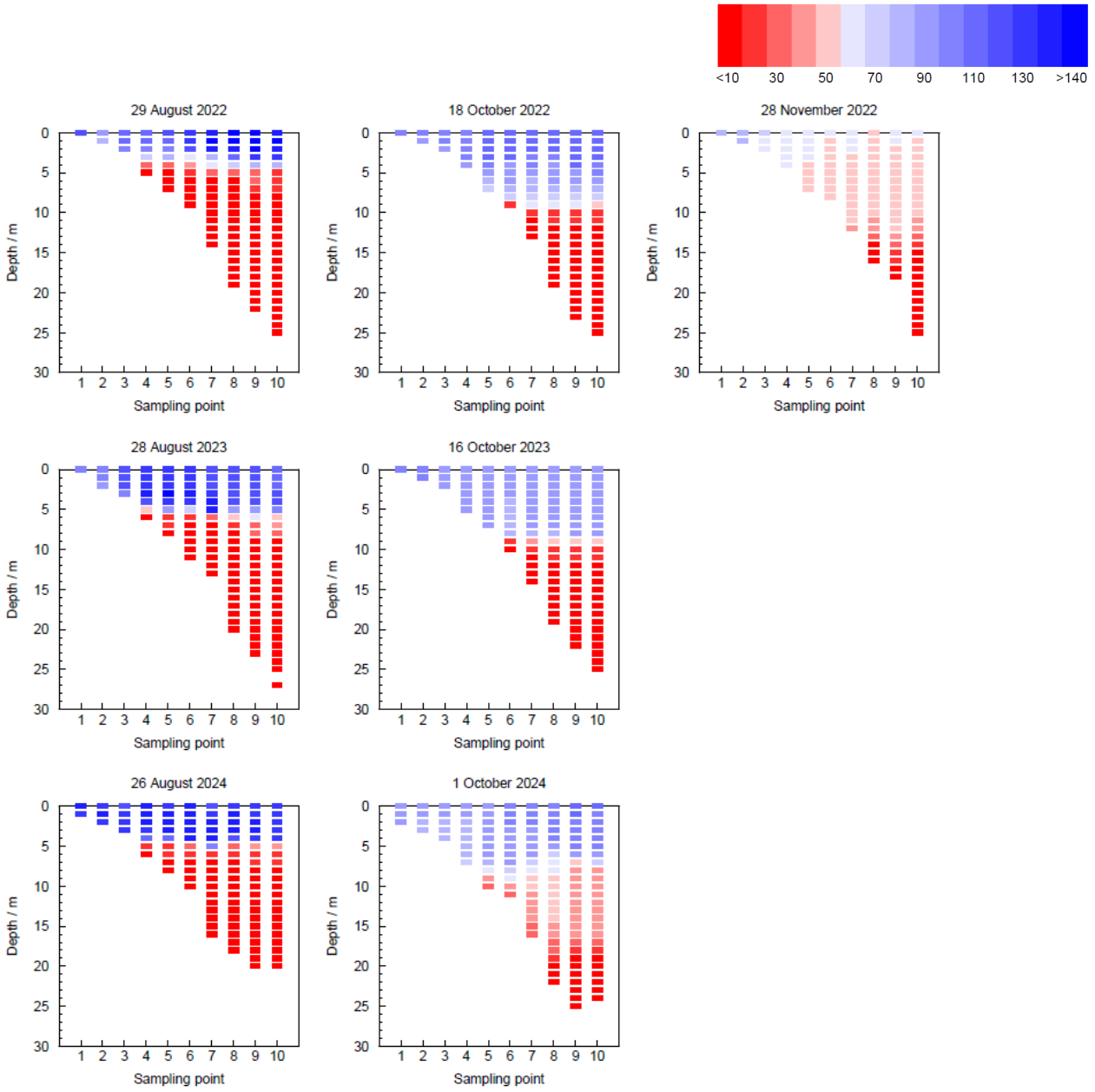




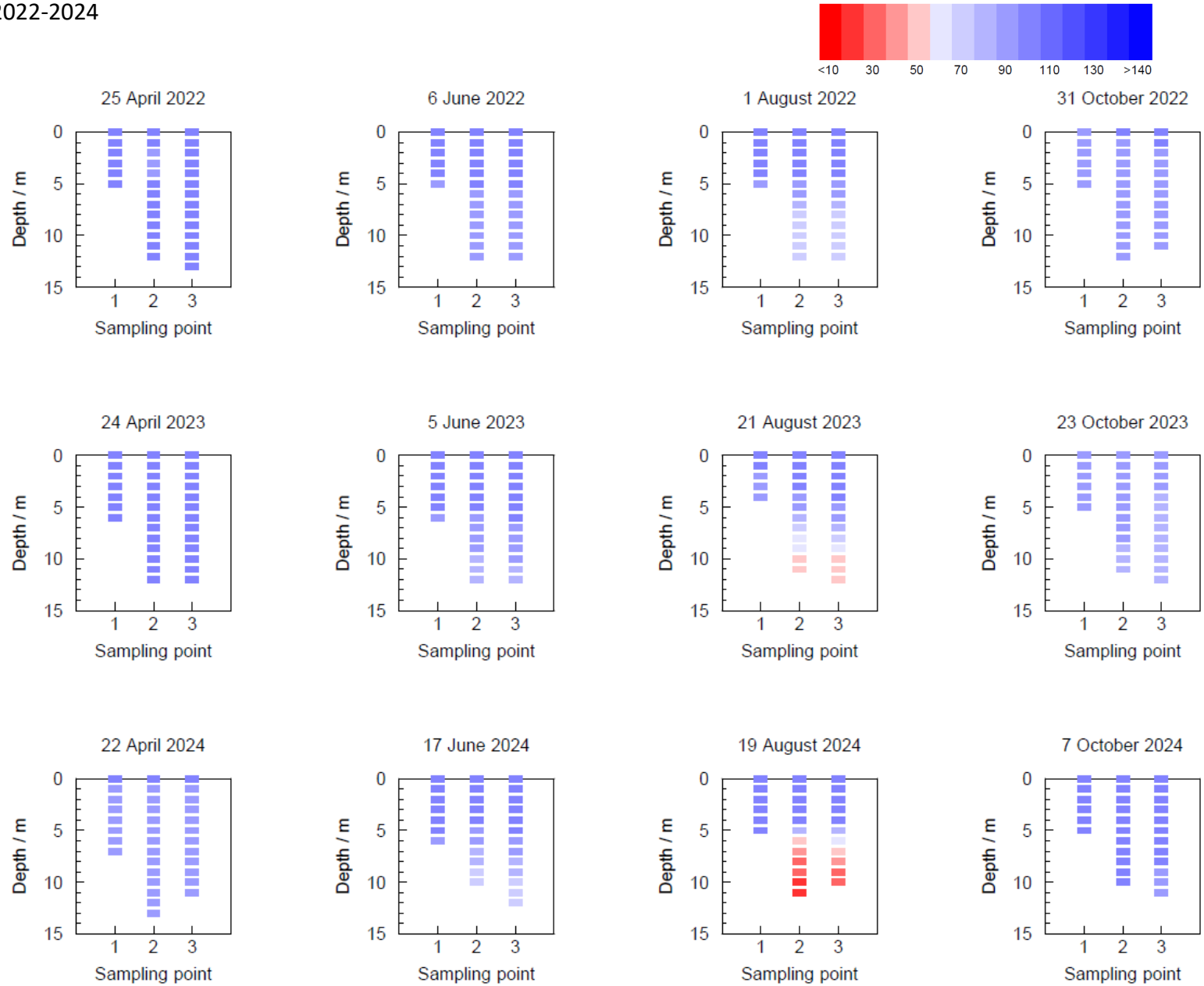




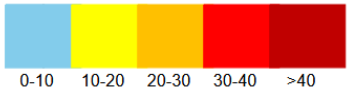
%O2. Vrchlice, 2022-2024. - 2

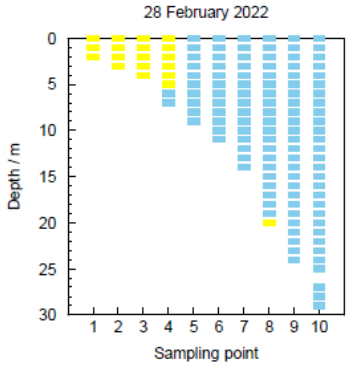


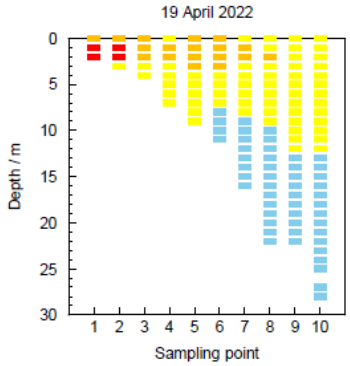
%O2. Souš, 2022-2024

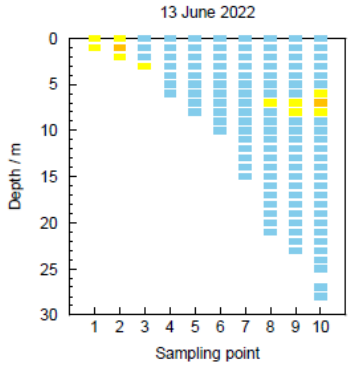


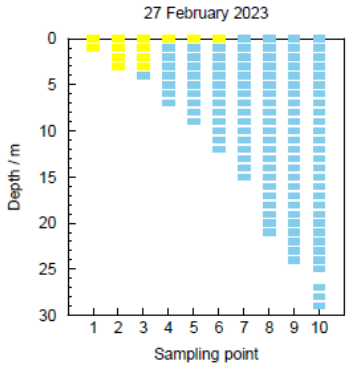
Chlorophyl a. Vrchlice, 2022-2024 - 1

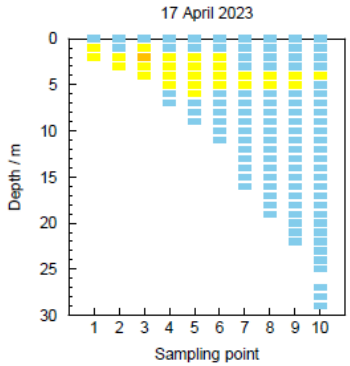


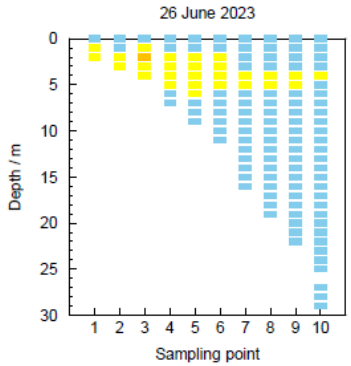


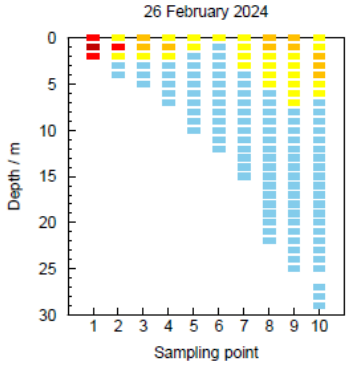


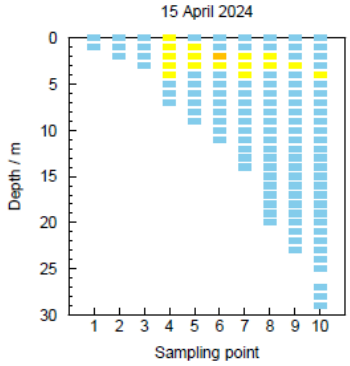


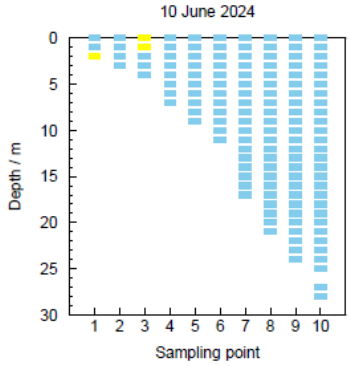




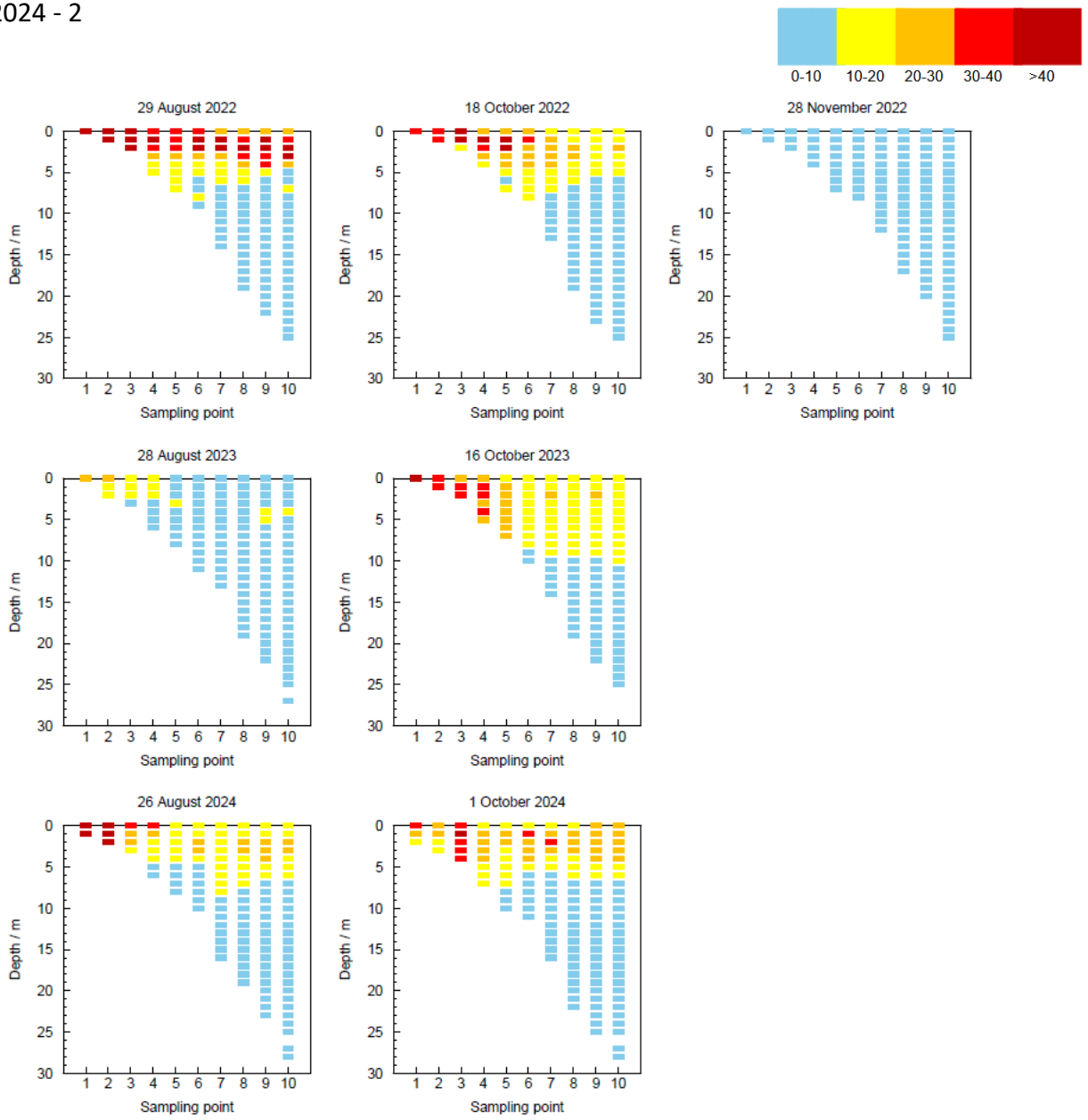








Chlorophyl a. Vrchlice, 2022-2024 - 2



Chlorophyl a. Souš.

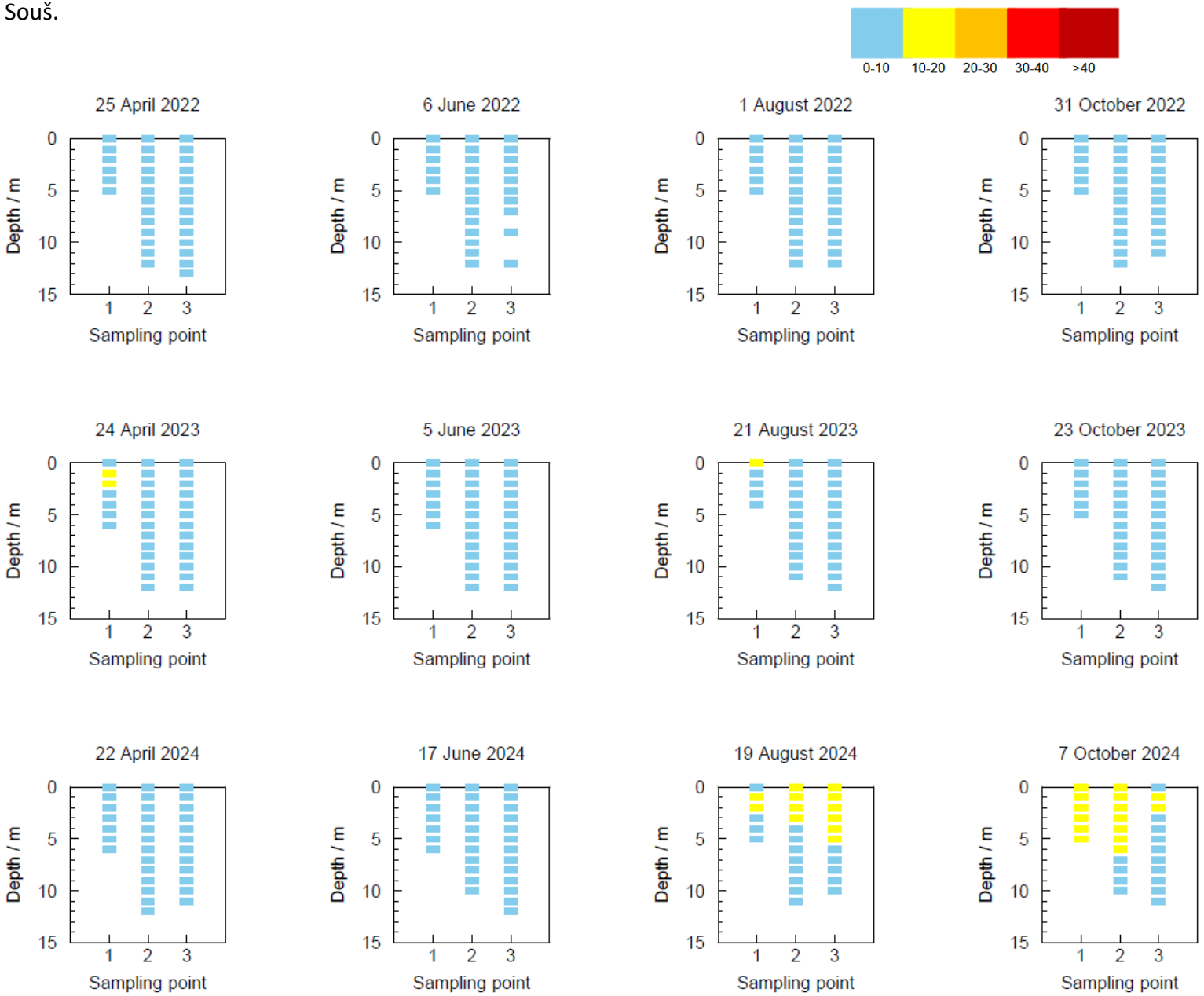
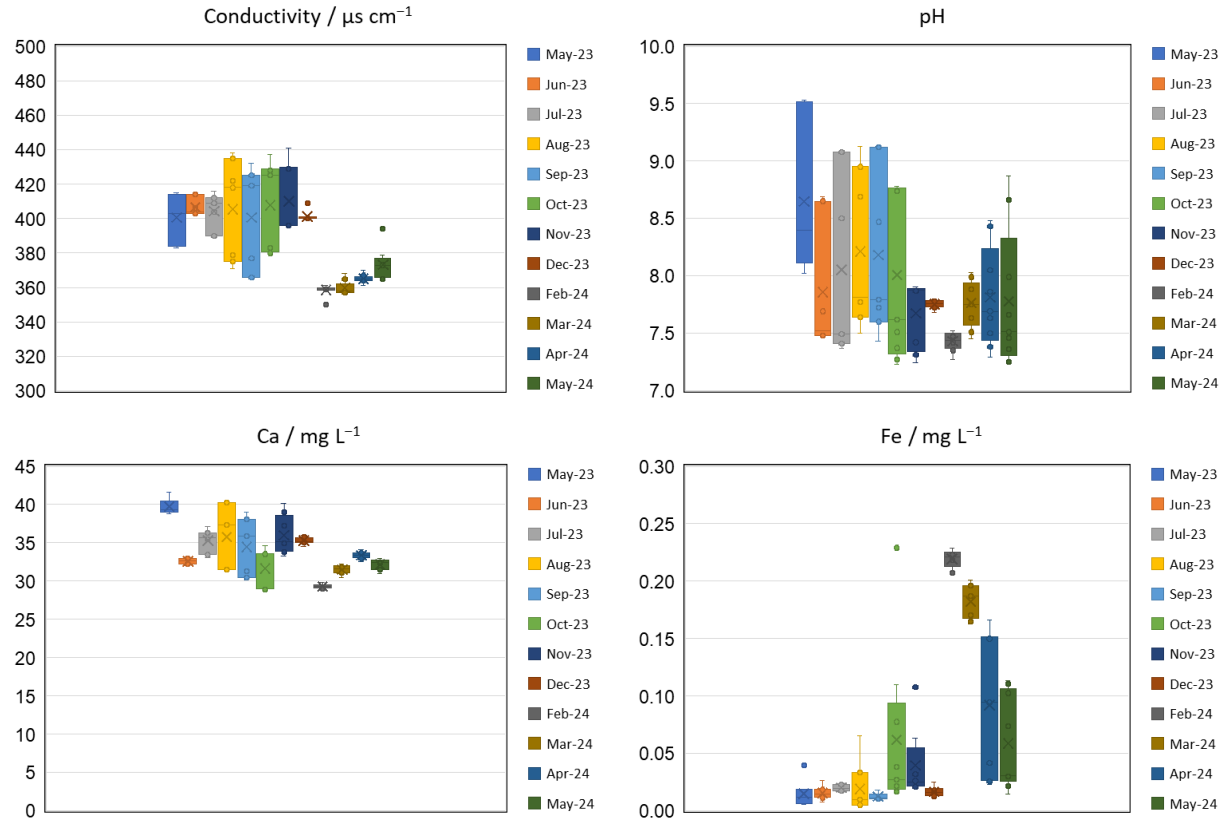


Figure SI4. Box and whisker plots of conductivity, pH, calcium, iron, methylgermanium, dimethylgermanium, silicon, inorganic germanium and Ge/Si ratio in Vrchlice reservoir (49.9270392N, 15.2270806E).



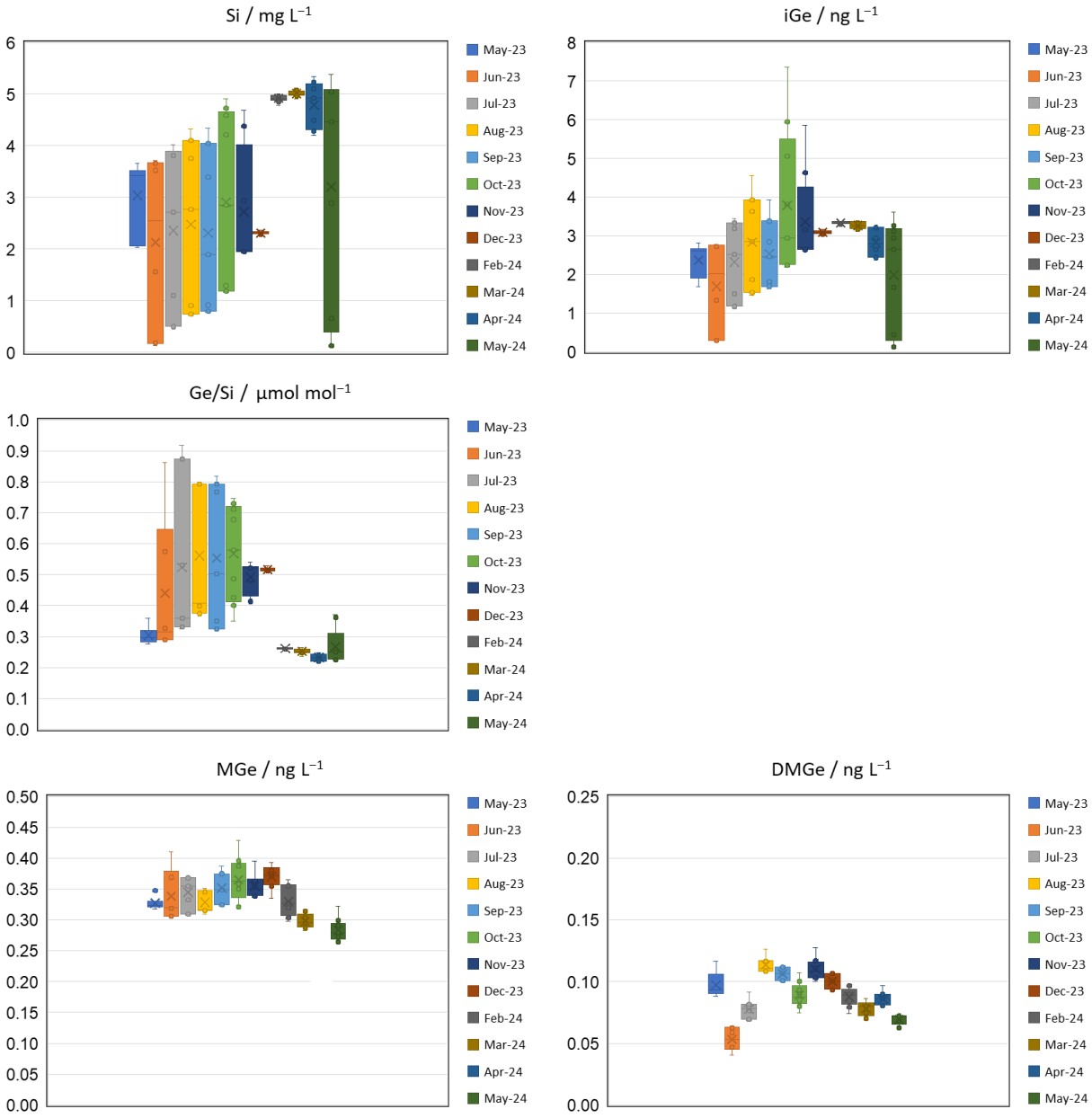
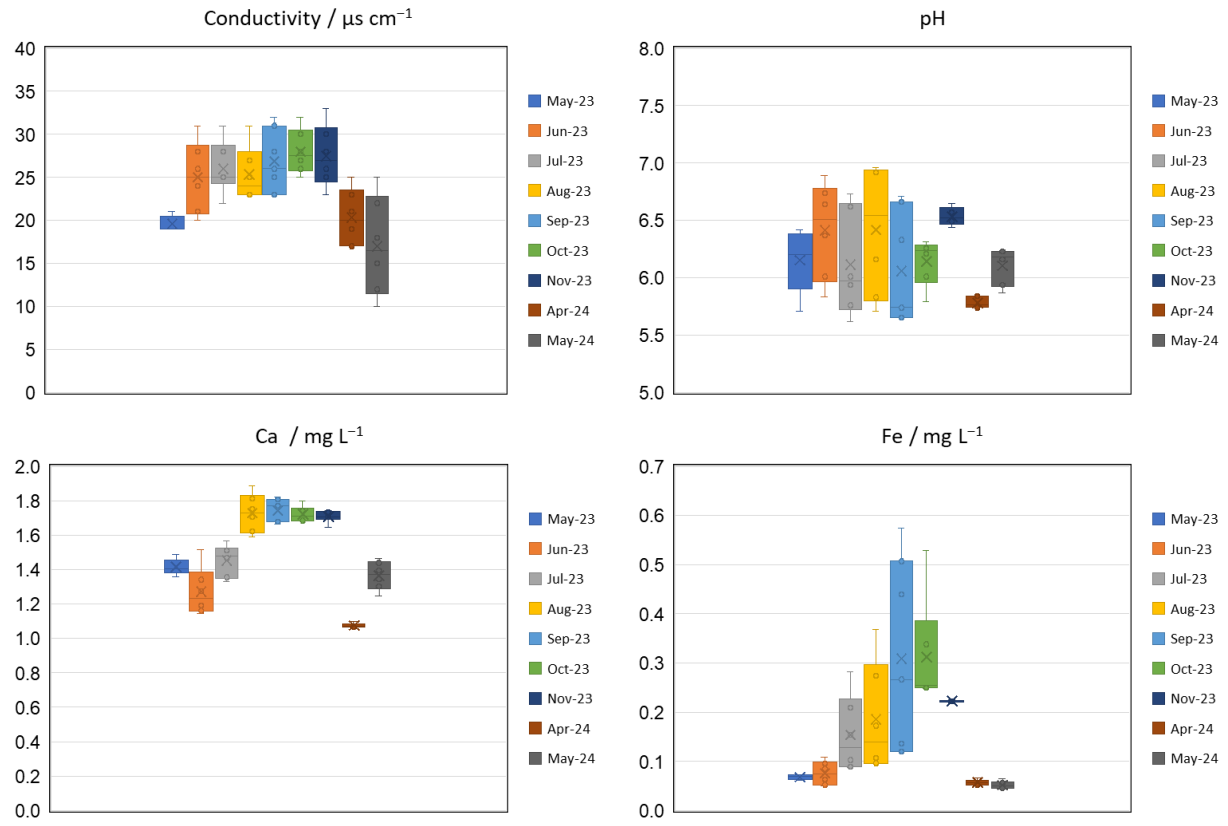
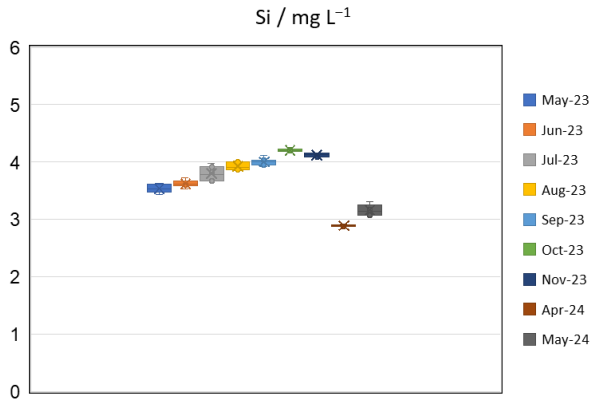
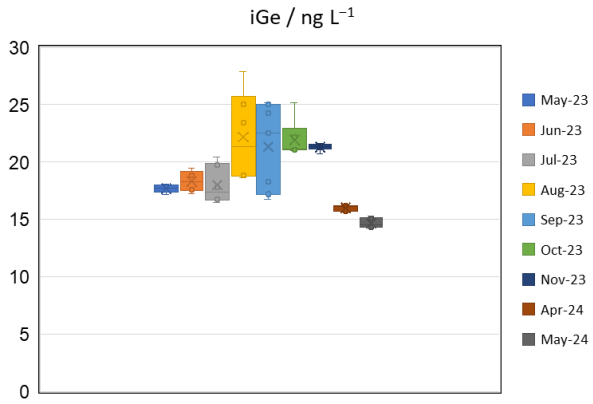

Si / mg L^{-1}
iGe / ng L^{-1}
Ge/Si / µmol mol^{-1}
MGe / ng L^{-1}
DMGe / ng L^{-1}
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Dec-23
Feb-24
Mar-24
Apr-24
May-24

Figure SI5. Box and whisker plots of conductivity, pH, calcium, iron, silicon, germanium and Ge/Si ratio in Souš reservoir (50.7911378N, 15.3183094E).




Si / mg L^{-1}
6
5
4
3
2
1
0
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Apr-24
May-24


iGe / ng L^{-1}
30
25
20
15
10
5
0
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Apr-24
May-24

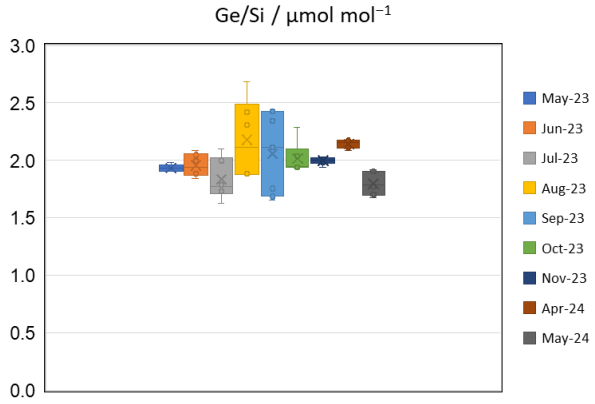
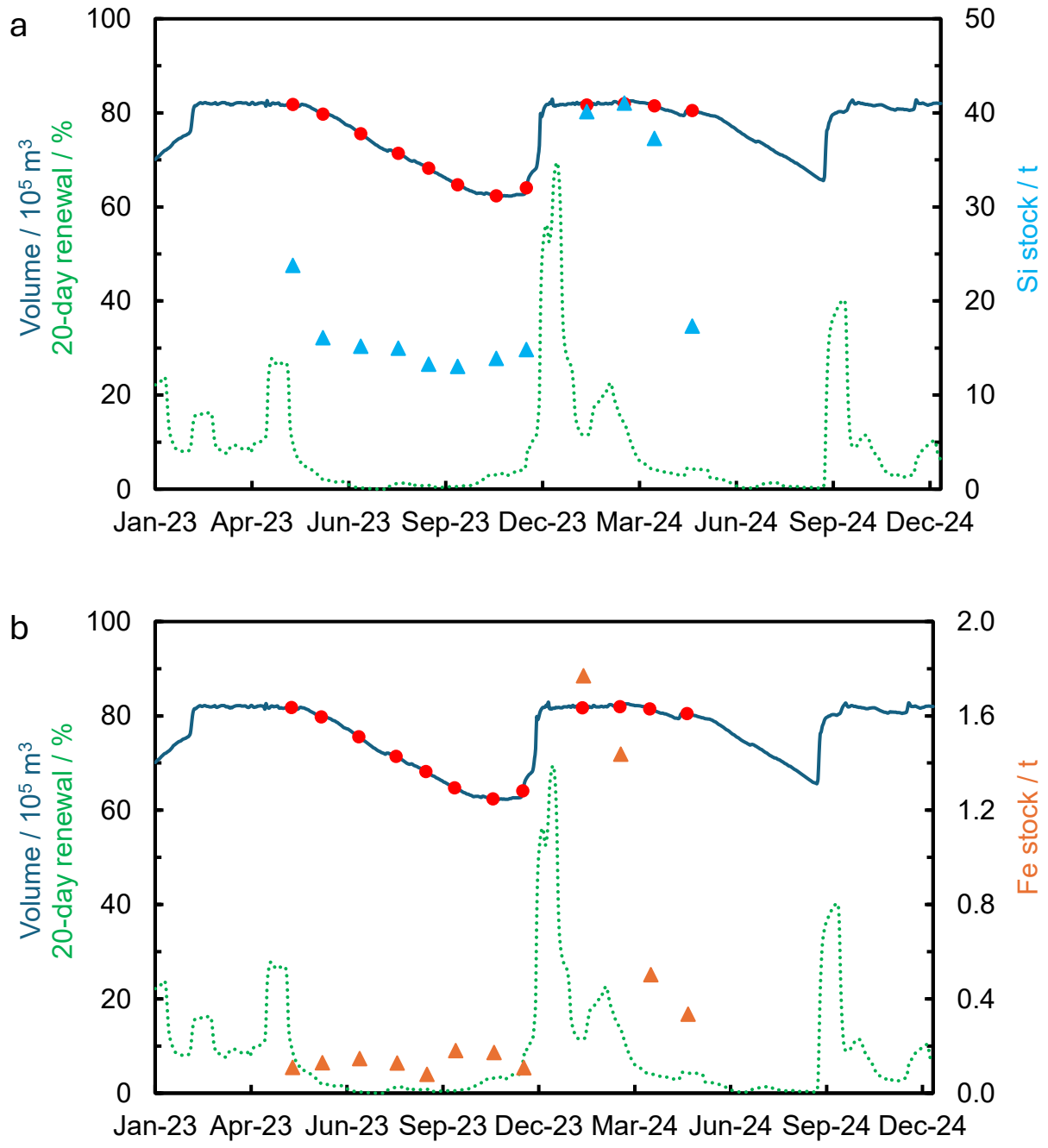

Ge/Si / µmol mol^{-1}
3.0
2.5
2.0
1.5
1.0
0.5
0.0
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Apr-24
May-24

Figure SI6. Vrchlice standing stocks of silicon (a) and iron (b) and Souš standing stocks of silicon (c) and iron (d). As in Figure 6, water volumes are shown in blue and 20 days water renewal in green. Red points show the sampling dates.



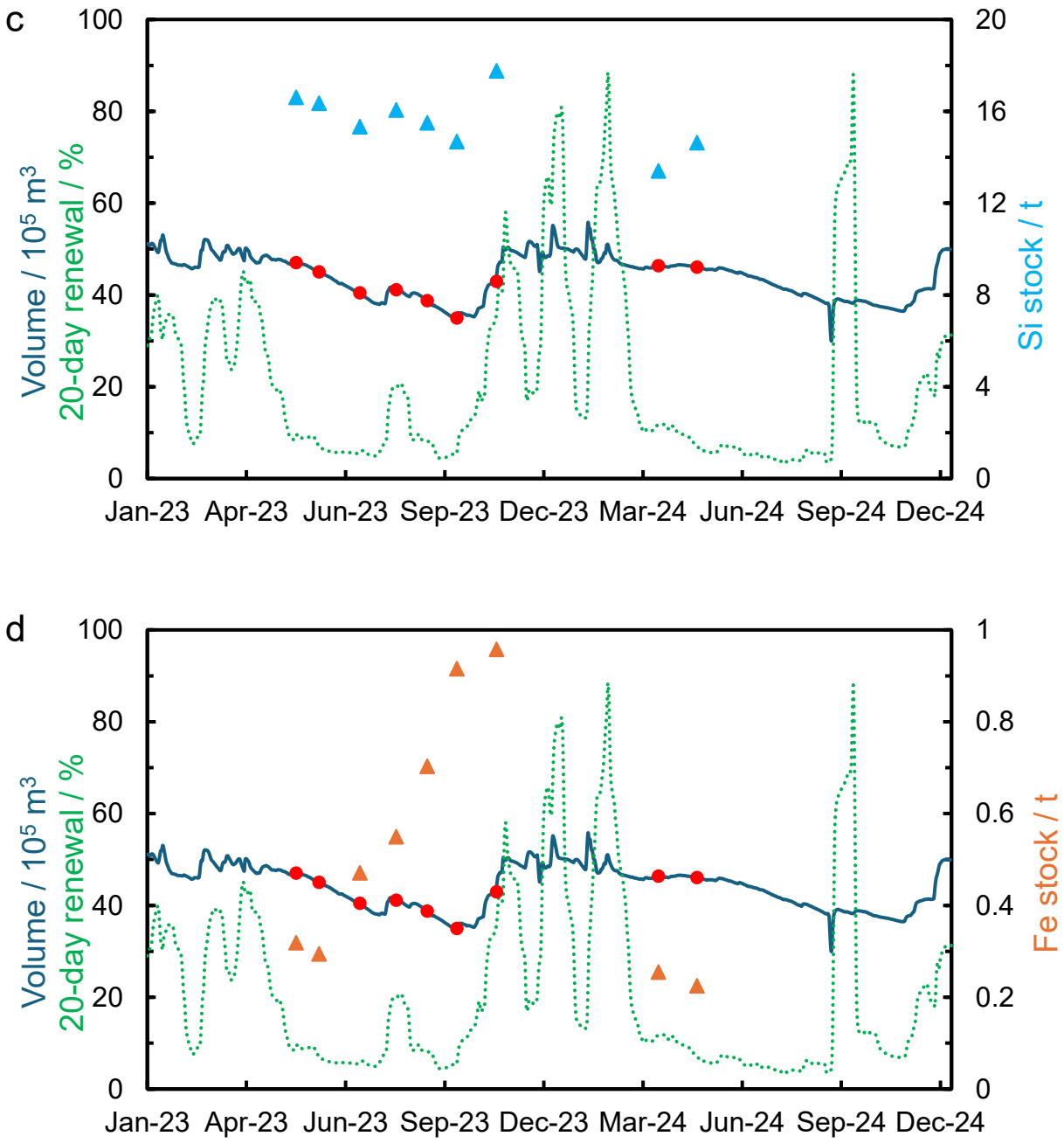

c
d
Volume / 10⁵ m³
20-day renewal / %
Si stock / t
Fe stock / t
0
20
40
60
80
100
4
8
12
16
20
0.2
0.4
0.6
0.8
1
Jan-23
Apr-23
Jun-23
Sep-23
Dec-23
Mar-24
Jun-24
Sep-24
Dec-24

Figure SI7. Principal component analysis (PCA) of redox-sensitive variables (iGe, Fe, Mn, and dissolved oxygen) for the Vrchlice and Souš reservoirs. (a–b) Scores plots showing the distribution of samples in the space defined by the first two principal components. (c–d) Corresponding loadings plots indicating the contribution of each variable. In Vrchlice, the first principal component reflects a clear redox gradient, with iGe, Fe, and Mn opposed to dissolved oxygen. In Souš, the structure is less coherent, indicating weaker coupling between iGe and redox-sensitive elements.