Supplementary information of:

Technical Note: Evaluation of a low-cost evaporation protection method for portable water samplers

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S1. Changes in $\delta^{18}O$ during Experiment 1

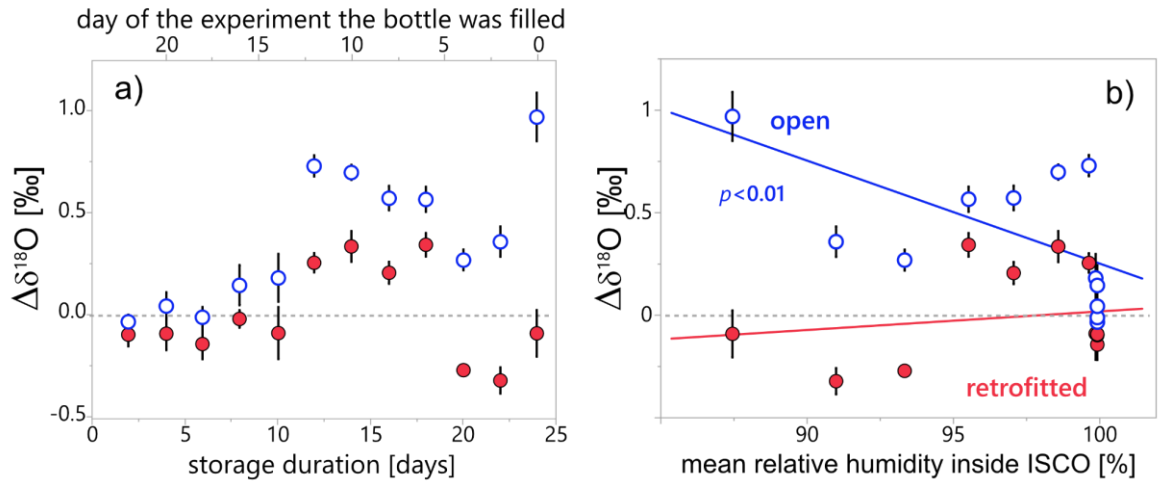

Figure S1: a) The change in $\delta^{18}O$ ($\Delta\delta^{18}O$) of sample water relative to the reference water was generally larger for samples in open bottles, and increased with longer storage durations (compare to Figure 2, which shows corresponding plots for deuterium). b) Values of $\Delta\delta^{18}O$ as function of mean relative humidity inside the ISCO autosampler during the storage duration of each sample. Solid lines show regression lines and statistically significant relationships are indicated by *p*-values. In panels a) and b), water samples in open bottles are marked with blue, open circles, whereas water samples in retrofitted bottles are marked with red, filled circles. Error bars indicate the measurement uncertainty as ± 1 standard deviation.

S2. Changes in $\delta^{18}O$ during Experiment 2

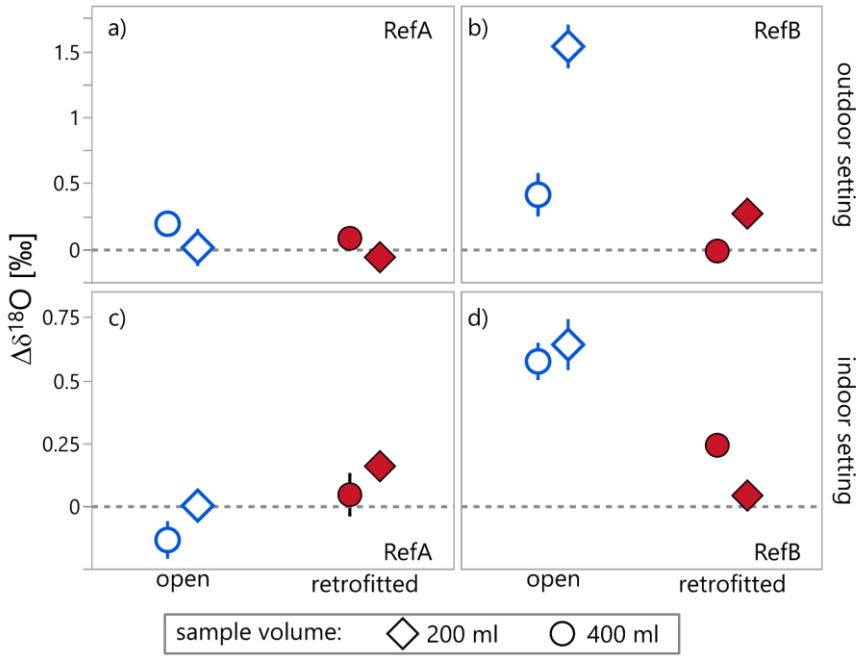

Figure S2: Change in isotopic composition of samples relative to the reference waters (compare to Figure 4, which shows corresponding plots for deuterium). Each data point is calculated from the three replicates of each condition. Please note the different y-axis scales between panels a), b) and c), d).

S3. Changes in sample volumes during Experiment 2

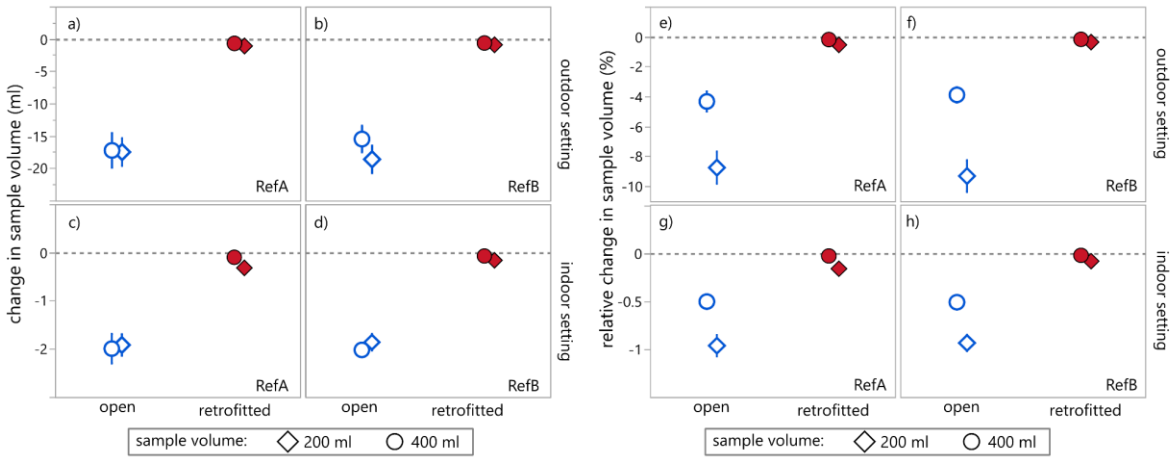

Figure S3: Absolute (left) and relative (right) change in sample volumes calculated from sample weights before and after Experiment 2. Volume changes are larger in open bottles (open blue markers) and negligible in retrofitted sample bottles (red filled markers). The relative change in volume is approximately twice as large for 200-ml samples compared to 400-ml samples. The absolute and relative changes in volumes are substantially larger in the outdoor setting than the indoor setting, likely due to the larger fluctuations in temperature and relative humidity, or increased ventilation by wind.

S4. Mixing and evaporative fractionation as calculated from $\Delta\delta^{18}O$ for Experiment 2

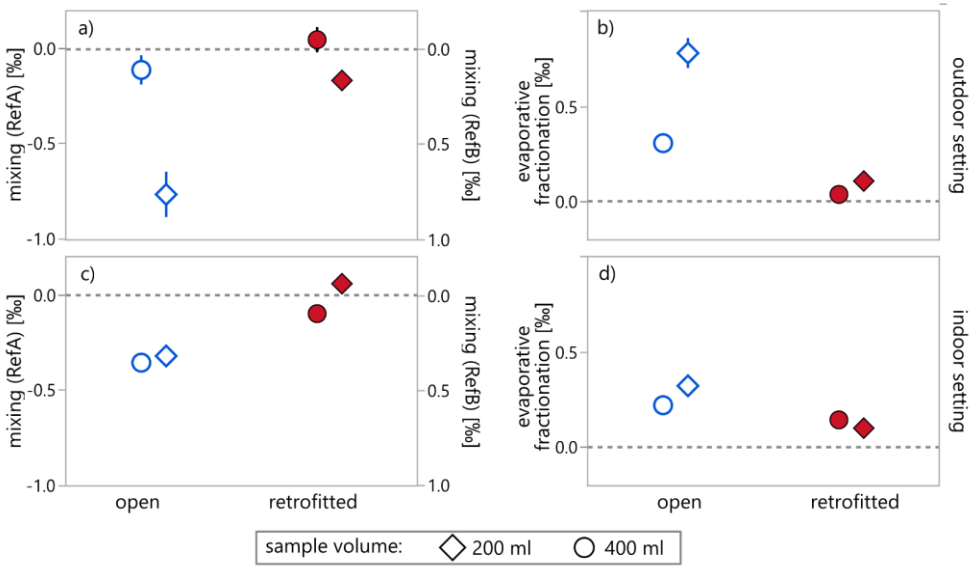

Figure S4: A comparison of the isotopic change due to mixing (panels a and c) and evaporative fractionation (panels b and d) in water samples stored indoors (panels a and b) and outdoors (c and d) calculated from $\delta^{18}O$ (compare with Figure 5, which shows corresponding plots for deuterium). Both mixing and evaporative fractionation effects are small in samples from retrofitted bottles (filled red markers), and larger in samples from open bottles (blue open markers). In addition, the isotope effects were larger for the 200 ml samples (diamonds) than for the 400 ml samples (circles).

S5. Effects of temperature, relative humidity and vapor pressure deficit on isotopic fractionation ($\Delta\delta^{18}O$) during Experiment 3

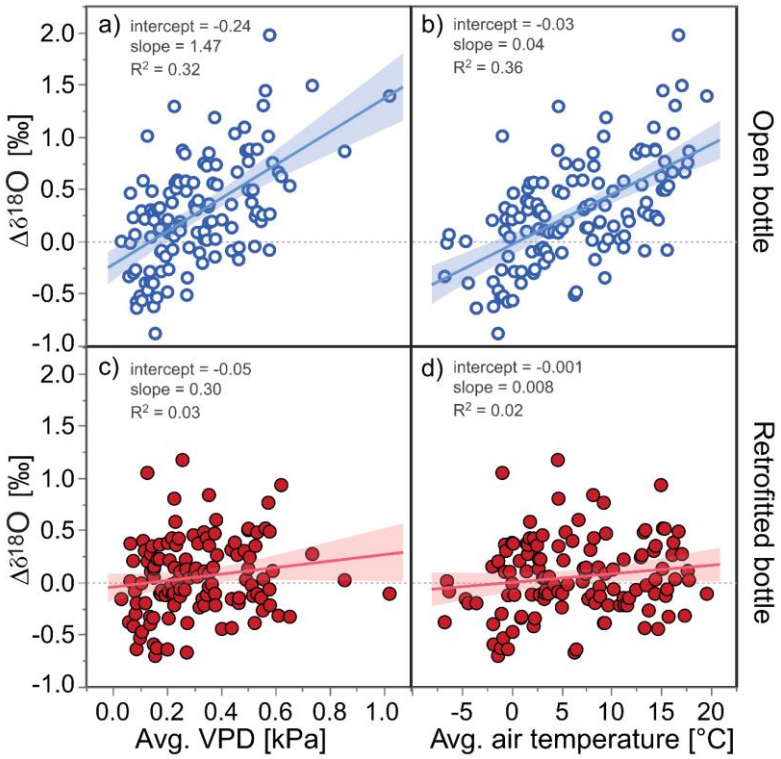

Figure S5: Differences in $\delta^{18}O$ ($\Delta\delta^{18}O$) in samples stored in open and retrofitted ISCO bottles relative to a reference water and their relationships with the average vapor pressure deficits (VPD) and average air temperatures during the respective storage periods at the EIN and ERL sites. Samples in open bottles (open blue circles) show a substantial isotopic enrichment with higher VPD and air temperature (panels a and b), whereas samples in retrofitted bottles (filled red circles) do not indicate a systematic fractionation effect (panels c and d). No relationship with relative humidity was found (not shown). The uncertainties of the individual $\Delta\delta^{18}O$ values were on average 0.15 ‰; linear regression fits are indicated with solid lines and slope, intercept and R^2 values and the shaded areas represent the 95% confidence intervals of the fitted lines.

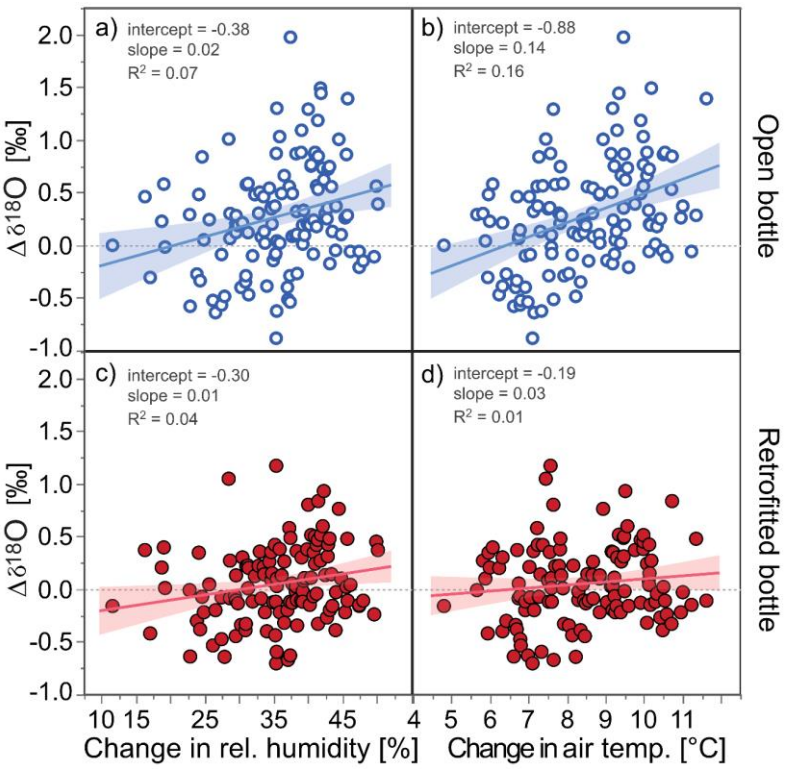

Figure S6: Differences in $\delta^{18}O$ ($\Delta\delta^{18}O$) in samples stored in open and retrofitted ISCO bottles relative to a reference water, and their relationships with the maximum change in relative humidity and air temperatures within the respective storage periods at the EIN and ERL sites. Relative humidity did not seem to affect $\Delta\delta^{18}O$ values in samples stored in either open (open blue circles) or retrofitted (filled red circles) bottles (panel a and c). Samples in open bottles showed strongest isotopic enrichment when temperature contrasts were large (>10°C, the linear regression is statistically significant with Pearson's r=0.40, p<0.0001; panel b). Samples in retrofitted bottles were unaffected by temperature changes (d). The uncertainties of the individual $\Delta\delta^{18}O$ values were on average 0.15 ‰; linear regression fits are indicated with solid lines and slope, intercept and R^2 values, and shaded areas represent the 95-% confidence intervals of the fitted lines.