Review of the **resubmitted** manuscript entitled "Stable isotope ($\delta^{18}O$, $\delta^{2}H$) signature of river runoff, groundwater, and precipitation in three river basins in the center of East European Plain" written by Julia Chizhova et al.

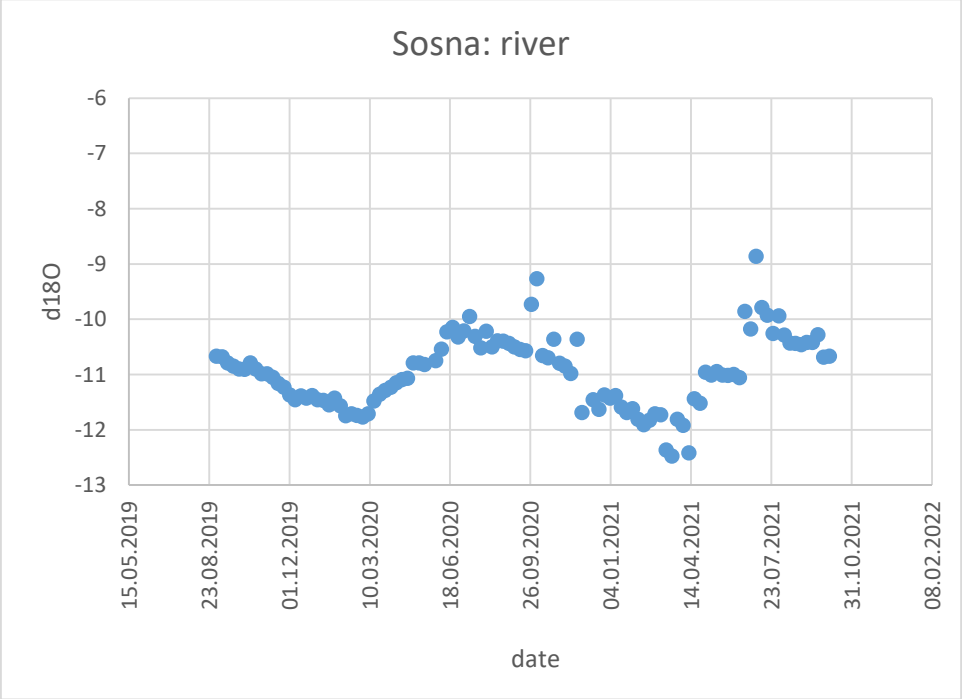
Comments

I have compared the resubmitted manuscript with the previous version and noticed that it has been corrected and extended at many places. Altogether the manuscript has improved much, but my main concern remained. Namely the reliability of the data, especially the reliability of sample storage.

There are two main points regarding water sample storage for stable isotope analysis:

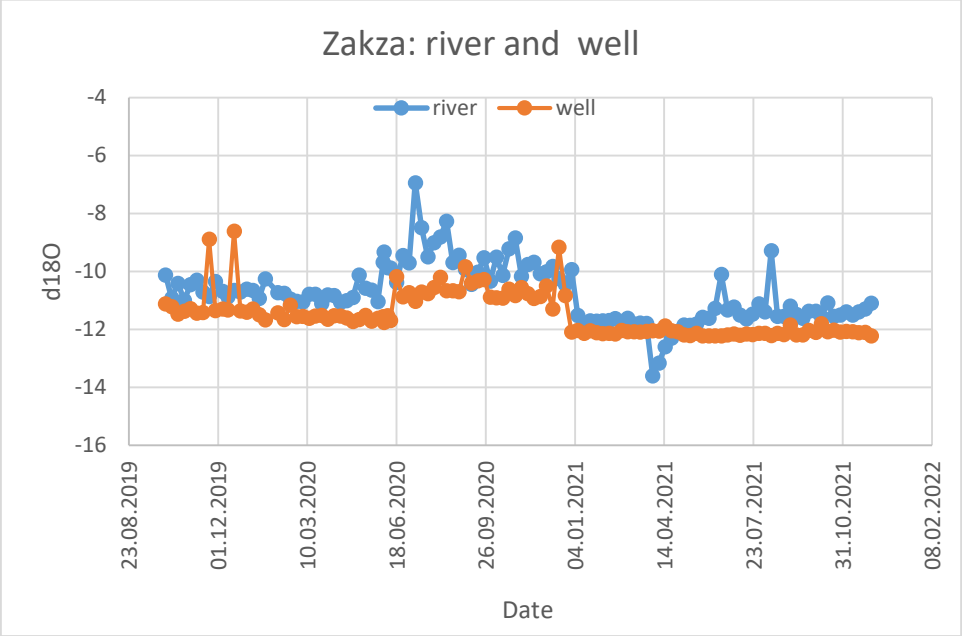
- duration of storage before analysis: no information is given in the manuscript.
- type of sample container: I have asked the authors to give information on what type of polyethylene sample containers were made of, but no information is given in the resubmitted version. For a "longer than few weeks' storage" high density polyethylene (HDPE) is a prerequisite.

Below I explain why I am suspicious of sample storage. The $\delta^{18}O$ (and $\delta^{2}H$) value of a river water, if there is no upstream reservoir, shows seasonality. This kind of seasonality is well reflected on the Sosna River data (see below).

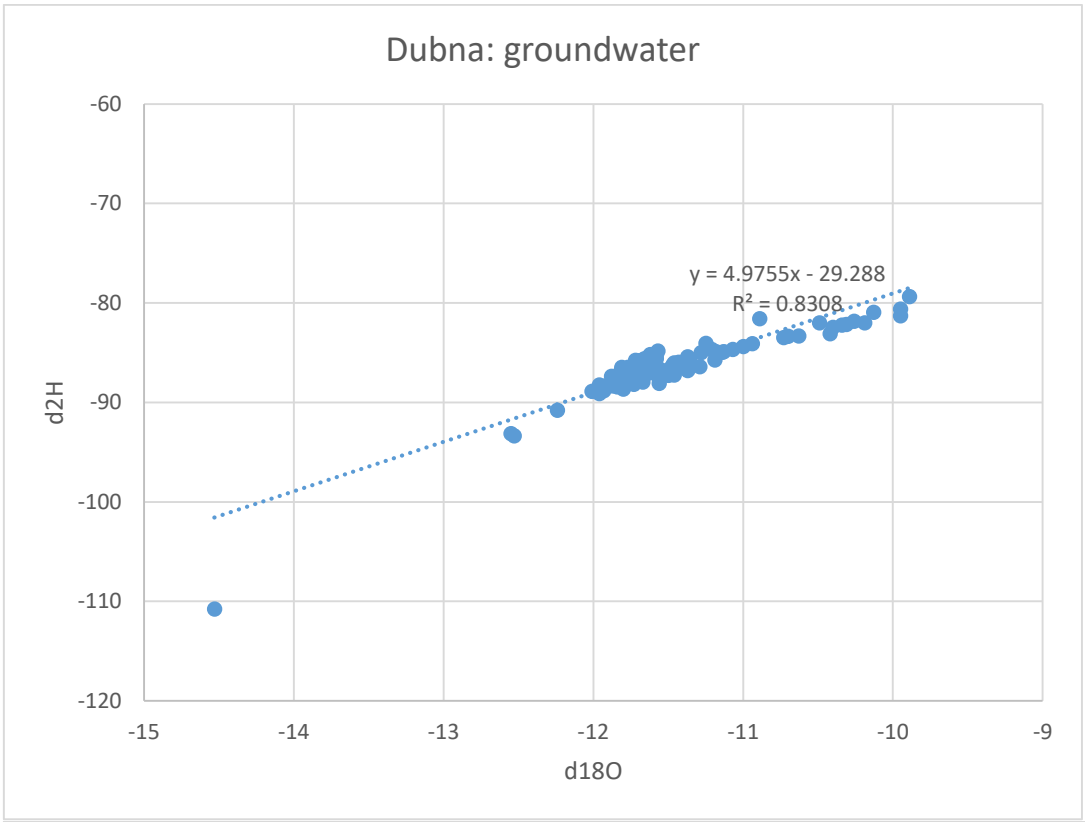


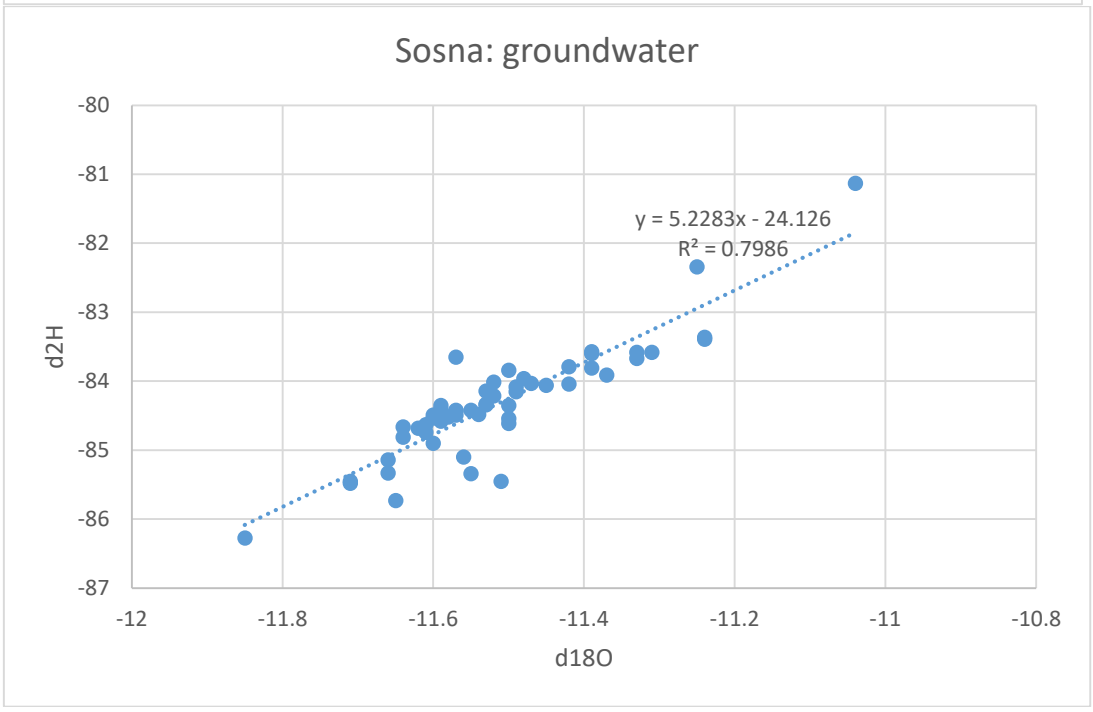
But this seasonality is missing from the $\delta^{18}O$ time series of River Zakza (see below). Although there is no exact sampling point is given in the manuscript on a map, but from the latitude and longitude we can infer that River Zakza was sampled downstream of the lakes at Lashika. If it is true than it can explain why normal seasonality is not reflected on the $\delta^{18}O$ data, because lakes damp the amplitude of seasonality. But in this case the $\delta^{18}O$ time series shows a strange correlation with the $\delta^{18}O$ time series of groundwater (well water). As I had

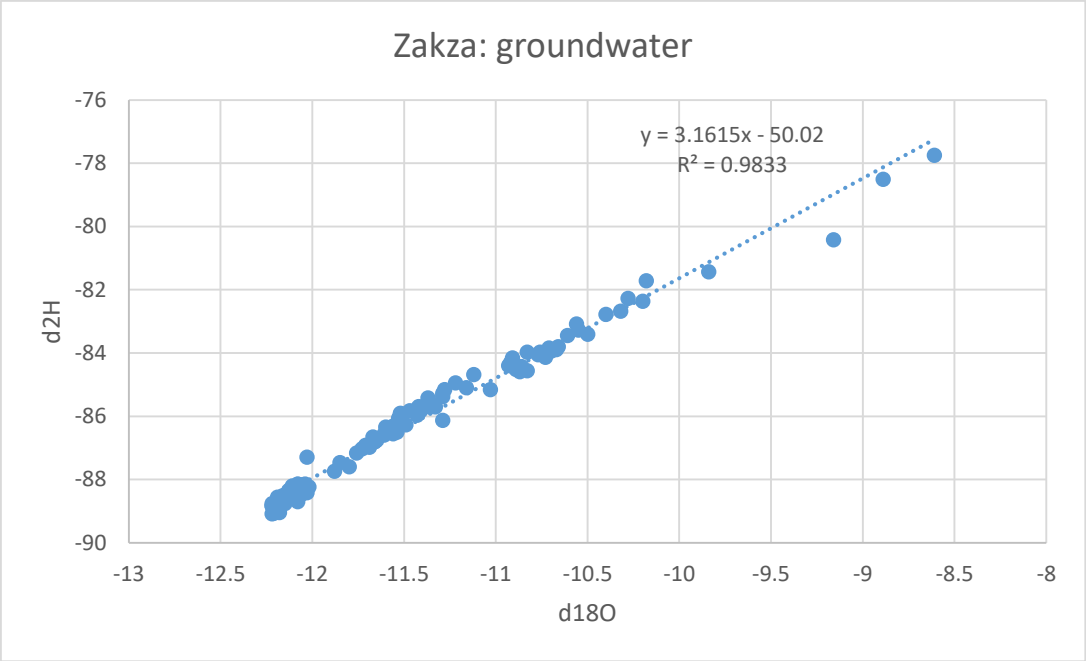
stated in my previous review, no variation in delta values of groundwater from a well of 80-meter depth is expected. Especially not in this case where the well is artesian, which means that the deep water ascends (flows upward). So surface water cannot have effect on the groundwater at 80 meter depth. But there is an unexpected variation (see below). Between 11 June and 31 December 2020 the $\delta^{18}O$ values of the groundwater varies highly, and it is much higher than before or after this period of time. And what is very unusual, exactly in this period of time the $\delta^{18}O$ value of river water is higher than before or after this period of time. Although authors state that "The runoff of Zakza River is regulated by the discharge of household water from a residential complex", latter originates from the wells exploiting groundwater from the depth around 80 meters, and this way we may think that $\delta^{18}O$ variation of river water reflects that of well water. But question arises why the elevated $\delta^{18}O$ values of groundwater taken on 21 November 2019 and 19 December 2019 are not reflected on the river water. I have a feeling that something went wrong with the sample storage.



There is another strange phenomenon (I described it already in my previous review). Looking at the δ-δ plots of the three groundwater time series we can see that the slopes of the groundwater lines are significantly less than 8 at all three stations (see the plots below), and it seems that two different groundwaters are mixing at every cases, and one component is a non-meteoric water (of very low d-excess). This is very strange. In the case of Dubna, where the well is probably a dug well, this mixing can be explained by a direct effect of the infiltrating surface water (this well is 10-meter deep only). But in the case of the other two wells of 80-meter depth any kind of mixing may happen if a well taps two aquifers. The authors have not provided information whether this is true or not. But I hardly believe that mixing happens at all three cases. Authors should give examples of wells exploiting non-meteoric water of very low d-excess somewhere in the study area. Otherwise I think that a part of the data is false.


Dubna: groundwater
y = 4.9755x - 29.288
R² = 0.8308
d2H
d18O
-60
-70
-80
-90
-100
-110
-120
-15
-14
-13
-12
-11
-10
-9


Sosna: groundwater
y = 5.2283x - 24.126
R² = 0.7986
d2H
d18O
-80
-81
-82
-83
-84
-85
-86
-87
-12
-11.8
-11.6
-11.4
-11.2
-11
-10.8



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