Comment on hess-2021-195

Anonymous Referee #3

Referee comment on "Seasonality of density currents induced by differential cooling" by
Tomy Doda et al., Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2021-195-RC3, 2021

In this manuscript, the authors use a unique year long time series to estimate the
frequency and strength of the thermal siphon in lakes and the influence on flushing of the
littoral zone. This is an interesting dataset and addresses an important concept in physical
limnology. The writing and presentation are mostly very good. I have a few general
comments that I would like to see addressed though:

1. What is the magnitude of the outflow near the study site? Is it important relative to
magnitude of the flushing rates?

2. What influence does the three-dimensionality of the littoral zone play? From my
understanding, the entire framework here is 2D, but how uniform do you suppose q is
across the lake? What are the limits of your results for other lakes in that context? It
appears that Rotsee is about 2D as it gets, but is there a littoral zone aspect ratio where
this all falls apart?

3. Given the time of year where TS is most prevalent, does this play a role in accelerating
autumn turnover?

4. TS is stronger in the summer, but less frequent. As noted, the summer is when this
physical process might have the most impact on ecological and biogeochemical processes.
Is there a way to compare TS across the months in a more quantitative fashion, for
example, the total volume of water flushed in each month?

Figure 3d - the contours on the upper right corner look more like an artefact of the
contouring than anything that might possibly be real?

Figure 6 - are you forcing the intercept here? From the equations that seems the case (an intercept of 0), but that doesn't look like the best fit line, at least for (b)