

***Interactive comment on* “Time-variability of the fraction of young water in a small headwater catchment” by Michael P. Stockinger et al.**

Anonymous Referee #3

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Stockinger et al. presents a study to evaluate the temporal variability of young water fraction (Fyw) based on 189 sine curve fits of 1-year subsets of a 4.5-year rainwater and streamwater 18-O isotope dataset. The Fyw, developed by Kirchner 2016, has become a powerful descriptor of streamwater flow path as the substitute for mean transit time. It is important to test the how Fyw change with different timing and sampling time coverage of water isotopes. The results showed “high” temporal variability of Fyw but no seasonality of Fyw based on the criterion defined by the author. The variability due to sampling time chosen is very useful for the isotope hydrology community. This study sheds new light on the development and application of Fyw, which is interesting and suitable for HESS. I find this paper is generally well-written but not strong enough. One of my concern is that how and why the 2% difference was defined as significant for

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the three hypotheses? This threshold value is introduced in the paper but not clearly explained. The discussion section lacks the discussion of the importance of the results. It would be a stronger paper if the author can explain the cause of the Fyw time-variability, which is ambiguous in the current form. Other specific comments on this paper are listed below.

P3-L27: change “8” to Eight

P5-L14: Add “reciprocal of” or similar phrase before “24 hours...” since frequency (f) should be 1/T.

Figure 1: It would be nice to add latitude and longitude to the map. An alternative way is giving the latitude and longitude of the sampling location in the text. Square brackets with “-” can be removed, it may be misread as minus.

Figure 4a: Which line represent the R2?

Figure 7, 8, and 9: The hypotheses should be explained in the captions.

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