

Interactive comment on “Every Apple has a Voice: Using Stable Isotopes to Teach about Food Sourcing and the Water Cycle” by Erik Oerter et al.

Anonymous Referee #2

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General Comment: This was a really interesting approach to teaching about stable isotopes and the water cycle. The exercises and supplemental materials were sufficiently detailed and of high quality and I would consider using some of the prepared slides myself if they were available. I tried to be more critical than I am below considering that I took longer than I should have to complete this review. With that being said, I only have some minor comments that I hope are helpful to the authors.

Specific Comments: The authors write that the exercise is designed to promote "experiential learning" (page 7, line 11), and I'm curious about the motivation the students and teachers had to complete the exercises. Based on my reading of the literature, this is not experiential learning, and I would be interested to see some citations or some elaboration on why the authors think it is. Beyond that, it would be informative to know

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how motivated the students and teachers were to engage in the exercise. After all, as you stated, the origin of fruits and vegetables is often indicated in the grocery store, and the isotope method does not necessarily yield a single result. In fact, the underlying question is whether or not isotopes create a “fingerprint” of origin (page 7, lines 5-6), but the answers will often be inconclusive (page 9, lines 22-27). I would caution against overselling this as experiential learning, and would suggest that this otherwise well-designed exercise could use a better framing for student engagement. For example, the isotopic fingerprint could be a method for revealing dishonest labeling practices (perhaps unscrupulous tomato vendors at a farmer’s market).

On page 2, line 20, it states that revealing the geographic origin through isotope analysis makes “the distance to the point of purchase and consumption becomes more apparent.” I don’t know what is meant by this. Is it more apparent than looking up the origin on the sticker and then looking at a map? Also, in the same paragraph (line 23), what is the magnitude of the water flux via “trucks and trains” relative to other fluxes?

After reading the title, I thought this would be more focused on apples than it was. For example, Figure 2 is a tomato, Figs. 3 has data for oranges, apricots, bananas and tomatoes. Fig. 5 is about the geographic origin of a tomato. Apples only appear in Table 1. The title seems like a bit of false advertising.

Technical Corrections: The MWL line in Fig. 1 should be labeled as GMWL because that’s how you refer to it throughout the manuscript. In Fig. 3 it’s labeled as the “Global Meteoric Water Line” and in Fig. 4 it’s labeled as the GMWL. You should be consistent. Even in the legend of Fig. 1, you use both MWL and GMWL to refer to the same line.

The sentence on line 23-25 of page 3 is an incomplete sentence. So is this one on page 4 “These $\delta^{2}\text{H}_{\text{vap}}$ and $\delta^{18}\text{O}_{\text{vap}}$ values were then plotted in $\delta^{2}\text{H}$ and $\delta^{18}\text{O}$ space and fitting a least-squares regression line through the fruit water $\delta^{2}\text{H}_{\text{liq}}$ and $\delta^{18}\text{O}_{\text{liq}}$ values (Figure 4).”

page 4, line 13: delete the second "method" page 4, line 31: delete the "it" prior to

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"the GMWL" page 6, line 11: it may not be "intuitive" to many that heavier molecules will evaporate less easily page 10, line 9-10: that last sentence is poorly phrased or incomplete. Is there a phrase missing after "largely"?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-115>, 2017.

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