

## ***Interactive comment on “The Iso2k Database: A global compilation of paleo- $\delta^{18}\text{O}$ and $\delta^2\text{H}$ records to aid understanding of Common Era climate” by Bronwen L. Konecky et al.***

### **Anonymous Referee #2**

Received and published: 30 March 2020

Konecky et al. present a large compiled dataset of isotopic tracers of the hydrologic cycle spanning the last 2000 years. This database clearly represents a huge coordinated data synthesis effort, and the authors should be lauded for their efforts to provide a standardized metadata template to facilitate intercomparison across studies and proxy types. In addition, I appreciate the authors have gone through the effort to maintain a link between datasets and the original study/citation the data were derived from. My sense is that this dataset will be highly cited, and enable new studies of Common Era hydroclimate. Furthermore, the authors have provided a roadmap for how this dataset is to be versioned and built upon; the expectation is that it will only improve in quality and utility through time. Therefore, I recommend that this study be published after a

C1

few minor comments below are addressed.

Minor “science” comments:

1. I understand that the discussion of controls on isotope ratios of the different “archive types” in section 3 are meant to be brief, as an exhaustive discussion of controls on each proxy type would increase the length of this paper several times over! However, I would argue for a slight expansion (and correction of small errors) in the description of controls on tree-ring cellulose. First, the 27‰ offset observed by Sternberg et al. 1986 was between cellulose and water, not the cellulose precursors (L. 415-416). Cellulose synthesis from these precursors also permits exchange with water at carbonyl oxygens, so the offset between the isotope ratios of the precursors and water is likely to be different than the offset between cellulose and water, especially if the sugars are no longer in the leaf (as in tree rings). Second, I’m not sure that I understand what’s meant by “as the biosynthetic fractionation is relatively constant” at L. 416 – leaf waters certainly vary in space and time rather dramatically (e.g., West et al. 2008 Plos One), and therefore, the sugars produced using these leaf waters would also have different isotope ratios. Third, some of the signal found in the leaf is dampened before being used in tree-ring cellulose as a fraction of oxygen in leaf-exported sugars exchange with xylem water in the trunk (e.g., Roden et al. 2000 GCA). Therefore, tree-ring cellulose  $\text{d}18\text{O}$  values reflect both changes in plant water sources through time (e.g., changes in xylem water isotope ratios) as well as changes in environmental conditions (e.g., more enrichment of leaf waters/sugars via a drier atmosphere, for example). Some of Paul Szejner’s recent work has shown this clearly for the North American Monsoon, for example (Szejner et al. 2016 JGR).

2. L. 420 – could it also be the case that this cellulose  $\text{d}18\text{O}$  signal is due to changes in the  $\text{d}18\text{O}$  of the vapor that is the source of this precipitation? There’s been a fair amount of work in the past decade that has suggested the relationship between local precipitation amount and  $\text{d}18\text{O}$  is fairly weak compared to precipitation processes (e.g., microphysics) and moisture transport history (e.g., Dayem et al. 2010 EPSL, Konecky

C2

et al. 2019 GRL, Vimeux et al. 2011 EPSL, Bowen et al. 2019 among others)

Minor technical comments:

1. Supplemental Table S2 - rows 769-778 seem to be missing a full reference for pub1.
2. L. 207: publicly-available -> publicly available
3. L. 411. Seasonal to annual -> seasonal-to-annual
4. L. 451 - comma placement? The second half of this sentence doesn't seem to line up with the first.
5. L. 448 - seasonally-biased -> seasonally biased
6. L. 625 - what are these percentages based on? L. 621 suggests that the percentages in L. 625 should perhaps add to 100%.

---

Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-5>, 2020.