

Interactive comment on “An Overview on Isotopic Divergences – Causes for instability of Tree-Ring Isotopes and Climate Correlations” by Martine M. Savard and Valérie Daux

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MMS & VD - Here we only include replies to comments that we have updated.

Referee 1 - General comments I also suggest the authors adding one section discussing uncertainty. Isotopic dendroclimatology is a subject based on chemical experiment. Unlike tree-ring width or density, the result of tree-ring $d^{13}C$ or $d^{18}O$ measurements are different to verified again from their core or disk samples, due to time consuming and great expense. It is possible to introduce mistakes during many steps of experiments, for example, impure cellulose and unreliable measurements caused by bad condition of the isotope ratio mass spectrometer. REPLY - Uncertainties do exist

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for any kind of physical measurement, including tree ring width or density determination. We agree that in isotopic dendroclimatology, the chemical extraction of cellulose and the spectrometric measurements are critical steps. Impure cellulose and unreliable measurements yield bad data, which indeed more than likely diverge from climate. We will introduce a sentence of caution at the beginning of section 2.2 and refer to several papers devoted to good analytical practices. The text will read as follows: “A preliminary word of caution on tree-ring isotopic series is that the chemical extraction of cellulose and the spectrometric measurements are critical steps. Impure cellulose and unreliable measurements may yield erroneous data, which more than likely will diverge from climate. It is understood here that dendroisotopists should make sure to follow good analytical practices (see for instance Loader et al., 1997; Boettger et al., 2007; Wieloch et al., 2011; Kagawa et al., 2015; Andre-Hayles et al., 2019) but we do not think this subject has to be extensively discussed in this paper. Special comments are as follow.

Line 32, need a reference REPLY -We will add D’Arrigo et al., 2008. The text will read as follows: When correlations between climatic parameters and tree-ring proxies show periods of instability such that correlations weaken, become non-significant or change in signs, the relationship between proxies and climatic data shows a ‘divergence’ (D’Arrigo et al., 2008).

Lines 399-412 – multi-proxy approach and more climate noise? REPLY - We do not understand what the reviewer means. We write the contrary in the text: ‘Indeed, combining proxies with the same dominant control, but different secondary controls, tends to accentuate the common climate signal’.

Table 1, check which one use pooling method. REPLY – good point. We identified the studies using pooled series (asterisks in Table 1 below), without identifying any specific common factors. Note that many of these studies validated that the use of pooled trees gave similar results to treatment of individual trees then merging mathematically. We will modify the end of section 3.1 : Note that when the pooling approach is en-

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visaged for producing series of a specific tree species in a given region, verifying its reliability by comparison with averaged individual series is required prior to embracing the approach. This validation appears to allow produce isotopic series devoid of methodological artefacts (Table 1).

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