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Interactive comment on "Silicon isotope fractionation and uptake dynamics of three crop plants: laboratory studies with transient silicon concentrations" *by* Daniel A. Frick et al.

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The manuscript " Silicon isotope fractionation and uptake dynamics of three crop plants: laboratory studies with transient silicon concentrations" by Daniel Frick et al. brings out two important points: (a) Si isotope fractionations during plant uptake are similar no matter the Si is taken up actively or passively with water flux; (b) contrasted Si isotopes fractionations at the root-shoot interface reveal different plant Si accumulation strategies. Until now, this could only be speculated from data in the literature and for once it is clearly demonstrated. This conclusion is of great interest for the community and I'm convinced that this study will be really helpful for a large number

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of studies. Also, I would like to thank the authors for the high quality of their study at all steps. The experiment is well-designed and fit-for-purpose, the dataset is of high quality, the manuscript is very well written and easy to follow. It's a pleasure to read this work that is perfectly adapted to Biogeosciences. Overall, there is very little to suggest in terms of improvements but here are some minor comments.

Title: I'm not sure that the term "transient" is the best one. To me, it's not appropriate but I'm not a native speaker. I would prefer something like "exhaustible" or "finite". Also, I would have loved a title less technical to attract more readers but it's a safe choice.

Material and methods: I agree with Reviewer 2 that it would be useful to add details on how transpiration was measured. L89: Have you checked the Si solubility limit at 15°C? No sign of polymerization? Section 2.5.1 and 2.5.3. Why don't you analyse Si isotopes of nutrient solutions directly after a cationic purification? The content of anions is too high? As salts are not detailed in section 2.1 it's not obvious what could compromise the analysis. It's worth mentioning what you feared with these samples. I guess you did not choose the easy way for a reason. L126: It might be useful to rephrase this sentence that is a bit confusing. I had to read the sentence a few times to understand that the important thing is the amount of NaOH/μg Si and not the molarity of the solution. It's worth explaining why you add a solution and not a powder directly as for solid samples. I guess it's to recover Si left on the crucible sides. Have you tried this protocol with dissolved references like a solution of BHVO-2? There are so many different protocols for solution with a complex matrix that a quality check is useful. Alternatively, it is worth mentioning that your protocol is equivalent to the one of Steinhoefel et al 2017 (excluding the destruction of DOC) as you both use 1mmol of NaOH / 100μg Si (if my calculations are correct).

L 150: It would be useful to add some references (e.g., Savage et al., 2014 for BHVO-2 and Delvigne et al., 2019 for ERM-CD281) Camille Delvigne, Abel Guihou, Jan A. Schuessler, Paul Savage, Sebastian Fischer, Jade E. Hatton, Kate R. Hendry, Germain Bayon, Emmanuel Ponzevera, Bastian Georg, Alisson Akerman, Oleg Pokrovsky,

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Frank Poitrasson, Jean-Dominique Meunier, and Isabelle Basile-Doelsch (2019). An inter-comparison exercise of the Si isotope composition of soils and plant reference materials. Geophysical Research Abstracts, Vol. 21, EGU2019-18488, 2019.

L338: It is hard to find its way with all these data as you mix 30/28 and 29/28. It would be less confusing for the reader if you stick only to 30/28 fractionation factors and just specify when it is recalculated from 29/28. Also, it may be useful to remind here your own 30/28 fractionation factors to directly see that your data are within the literature range. It's also worth mentioning that all species in your list are Si accumulators.

L384-392: The link with the previous section is a bit poor. It's too bad to end the discussion with a weak paragraph. . .

L 394: It would be more careful with the "species-specific" term as your study demonstrates that your fractionation factors are rather similar despite your 3 plants have very different Si strategies. This might be confusing and sounds contradictory.

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