This paper reports the Si isotopic compositions together with TOC, TN, TP and BSi concentrations in papyrus from the Okavango Delta. The data were measured from different plant parts (umbel, scales, culm, rhizome, roots) and for both mature and juvenile plants. The Okavongo Delta is a unique environment where the silicon cycle has already been studied, including with Si isotopes, but not on this type of samples. The topic is therefore original and suitable for publication in Biogeosciences.

The number of data reported is relatively limited (10 in total: 5 plant parts for juvenile and mature), which partly justifies this short article. However, there are a significant number of missing information, approximations and limitations to general statements that make the paper not ready for publication yet and would require another round of review. The main points - detailed below – are: 1) explanations of the number of samples collected and how they were processed; 2) some issues related to the methods: cleaning for diatoms as well as dealing with the DOC matrix effect; 3) lack of reporting and discussion of the standard deviation / range of variation throughout the paper (tables, figures, results and discussion sections); 4) some vague statements and inappropriate references that makes the study mostly descriptive limiting its interest despite the originality of data.

Detailed comments

L51-53, please refer at least to Opfergelt et al. 2008 biogeochemistry which precisely reports BSi isotopic compositions of different plants parts in Africa.

L52-54 The last sentence of this paragraph is vague, and the specific questions the authors wish to address could be more appropriately listed here. There is already a body of field work on Si isotopes in plants that has proven to be a useful tool for Si cycle (papers by Ding et al., Opfergelt et al., Riotte et al. ….).

L93-94 The wording is unclear. It appears as if high temperature combustion has been used for Si isotopes as well as for TOC and TN. However, in section 2.3.3. on Si isotope digestion, there is no mention of combustion to remove organic matter. This sentence should be removed as it is confusing and should not appear in the sampling section since the methods are detailed elsewhere.

Sections 2.2, 3 and supp mat.
The actual number of samples/replicates is unclear. In the sampling section, the authors refer to the collection of 10 samples at 60 m distance, but when looking at the Supp. mat. there is only mention of 2 ID samples per category. Does this mean that leaves from 5 plants at the same site were split into 5 different parts (umbel, culm, scale, rhizomes and roots) and then combined to measure a composite geochemical and isotopic characterisations for each plant part at one site? And then the same method for the second site which is 60m from the first? If this is the case, please clarify and detail how were the composites prepared?
Or is it that only two plants were collected at each site, so the 10 samples would mean only 5 different parts of 2 plants? In this case the number of samples is minimal and may not meet the standard for a journal such as Biogeosciences.

This confusion extends to every method used. In sections 2.2, 2.3.1, 2.3.2, 2.3.2, 2.3.3: the term subsample is used: what is a subsample of 2-3 mg e.g. for TOC? Is it an aliquot of a composite of leaves (or other parts) from 5 plants? Or is a subsample a 2-3 mg aliquot of leaves from 1 plant at 1 location? How the representativeness of a 2-3 mg (composite or not?) subsample has been ensured?

Similarly, the Supp Mat table is unclear.
- There is no need to have three columns that are the same for every row (sampling date, location and site),
- In contrast, there is no explanation in the sample ID, with _2 and 'dup'? What do the 2 duplicates in the SuppMat stand for? Also, there is no duplicate for Si isotope, is there?
- The data are given as % SiO2 or uM SiO2. See also comment on Fig. 4: what does the unit uM represent in a plant part? Moreover, it's written BSi in the text and figure and % SiO2 in the table. If the unit of mass is BSi, the concentration is about half that of BSiO2, so is it SiO2 or Si? This needs to be homogenised and clarified. If the concentration is given for silica mass unit then use BSiO2, if it's silicon then use BSi.

2.3.3
If high-temperature combustion was not performed prior to alkaline digestion, did the authors check for residual DOC that could induce a matrix effect (Hughes et al. 2011)? If this was done, it needs to be written more clearly.

L135-140. The authors here honestly refer to some diatom contamination in the samples and describe their method to remove it, which consists of 2 hot alkaline leachings (0.1M Na2CO3 then 0.2M NaOH). Such leaching should dissolve not only diatoms but also some plant BSi, but no mention is made of whether this was considered and tested. How many samples were affected by the presence of diatoms? Are they mainly from root/rhizome samples? Is it possible to estimate the potential loss of plant BSi by this method and its effect on the Si isotope, e.g. if the BSi pool of the plant organ is not isotopically homogeneous? Can we also neglect the diatom contribution to plant BSi estimated by another digestion (§2.3.1)?

Results sections 3.1, 3.2 and Figures 3 and 4 give average concentrations per tissue type and d30Si, but do not give the st dev and number of samples for each category. Please provide these - and keep the figures to significant digits only. St. dev. is only given for TN and TOC in roots in Fig. 3. For the other items, is the st. dev. within the symbol size? This must be mentioned in the caption. Significant differences in concentrations between juvenile and mature plants and between tissue types must be appropriately reported.

The legend for Figure 4 is incomplete, e.g. panel (c) is not listed. It is unclear what BSi refers to in the abscissa of panel c: units are uM, does it refer to BSi concentration in water? Why would this be relevant? This unit is different from panel (a) where the BSi concentration is given as % of dry weight. The reference to Frings et al. 2014 data is also unclear, particularly the shaded rectangle in (c). It would be more appropriate to present the Frings et al. data as a single point representing the mean +/- st dev in panel (c) and add the mean as a horizontal line in panel (b). Finally, the choice of different symbols (size, color, type…) could be improved to better differentiate the series.

L195 this section should be 3.2, not 3.1

Section 4 – Discussion
Differences should only be discussed if they are significant, so either mention / add st dev and limit the numbers to the significant digits.

L234: There is another discrepancy between the text, figure and table. Here the authors refer to a BSi concentration of 6.61% in roots corresponding to the Supp mat, but in the figure it is less than 5%? This again causes a lot of confusion.

Fig. 5: It's a very nice illustration to identify the location of the phytolith, but it's a pity there's no close-up, as we miss a focus on a single phytolith scale to see the "conical morphotypes with satellites".

L241-244. Unclear, please rephrase.

L267-260 Since it's unclear what the x-axis of Fig. 4c represents, this sentence is also unclear. How could we expect a linear relationship between d30Si and 'plant part', which is not a numerical value, and/or why would we expect a linear relationship between d30Si and BSi in a plant?

L290-292. The statement that '*heavy Si isotopes were found to be more mobile than light isotopes in plants, contradicting the belief that the transport of light isotopes is favoured in plant biological processes (Dawson et al. 2002*)' is seriously flawed.

- First, contrary to what is written, there are no Si isotope data in Dawson et al. 2002, which focuses on C, N, O, H isotopes.
- Secondly, after a quick look at the paper, it doesn't seem there is reference to mobility and associated isotopic fractionation within the plant. There is a discussion of C transport and bidirectional exchange between root and fungi, but nothing related to preferential transport of heavy isotopes within the plant. Note that comparison of C and O with Si isotopic systematics is difficult and should be justified because of the multiple processes and sources at stake in a plant for C and O. Comparison with N isotope could perhaps be more straightforward and useful if done properly since the N source is acquired via the roots as Si.
- Third, it's not a "belief" that biological processes favour the transport of Si light isotopes. There is plenty of data on Si isotopes (as well as on other isotopic systems) and the rationale is based on physical theory and isotopic fractionation data which clearly show that light isotopes move and react faster. Enrichments of heavy isotopes do exist, but they are related to bidirectional exchange with preferential incorporation of the heavier isotopes into the product due to the formation of more stable chemical bonds.

So either delete this sentence or provide appropriate references and discussion.

Table 1 and associated discussion should provide ranges or st. dev. to be useful

L302-303. It is true that this study provides evidence for a high concentration of BSi in the roots, which could lead to this pool being overlooked in previous studies. The authors could strengthen this statement by calculating the BSi fraction in each plant part relative to the total BSi content of the plant, if the biomass of the plant parts is known. Root biomass may be difficult to obtain accurately, but at least a range could be known. Do we expect the root biomass of papyrus to be significant compared to other parts?