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Biogeosciences Discussions

Interactive comment on "Tracing the origin of dissolved silicon transferred from various soil-plant systems towards rivers: a review" *by* J.-T. Cornelis et al.

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We would like to thank the anonymous referees #2 and #3 for the report on our review-manuscript entitled "Tracing the origin of dissolved silicon transferred from various soil-plant systems towards rivers: a review". The enthusiasms of reviewers, advices and comments will be valuable to improve the manuscript.

Referee #2, comment 1: "The reviewer suggests that the first 15 pages of the manuscript can be substantially reduced, in order to focus on the geochemical tracers and the scenario approach". The first two chapters of the manuscript are essential to

introduce the subject of the review-paper: the use of geochemical tracers to study the impact of different soil-plant systems on the transfer of dissolved Si from litho-/pedo-/biosphere to hydrosphere. However, in the revised version of the manuscript we will keep this introductive part focused on essential information needed in order to avoid distracting the reader from the review focus.

Referee #2, comment 2: "Wetlands are only briefly touched on". As suggested by the reviewer #2, we will add the available information about the recent wetland studies, since these specific environments play a key role in the Si cycling by the terrestrial vegetation before its land-river transfer. Thus, we will start the third section (transfer of dissolved Si) with a brief overview of ecosystem Si accumulation (reducing details on forests and focusing a bit more on the wetland studies). We will also add the results from the study of Struyf et al. (2007) in the discussion about the solubility of Si components.

Referee #3, comment 1: We fully agree that it is necessary to clarify the scientific innovation given by the geochemical tracers compared to the initial issues and how the tracers could be useful for the future. To clarify this point, we will give more information in chapter 5 to answer the issues of the origin of DSi, in order to prove the assumption that geochemical tracers (Ge/Si and Si isotope ratios) can be useful to decipher the origin of dissolved Si in continental waters. However, in some specific environment, the combined use of Si mass-balance and geochemical tracers can be limited to decipher the origin of DSi (biogenic or inorganic). This is why each environment needs to be well characterized to be interpreted and cannot be generalized at a large scale. The Si behavior in the soil-plant system depends on the climate, vegetation, topography, parental material and thus the release of DSi in and from one soil-plant system can have several origins such as the neoformation, dissolution of clay minerals, adsorption onto oxides and dissolution of phytoliths. In some studies (Derry et al.2005; Ziegler et al. 2005; Cornelis et al. 2010; Opfergelt et al. 2010), the environmental conditions allow us to clearly decipher the origin of DSi (e.g., phytoliths in tropical system or clay

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dissolution in forest floor of temperate forest system). These studies are crucial to better understand the biogeochemical cycle of Si and, more specifically, the Si transfer from the different pools of the soil-plant system in order to make assumptions about the origin of the DSi exported to the hydrosphere. As suggested by the reviewer #3, we will reassess the objective of the paper in order to convince the reader of the usefulness of the geochemical approach. This geochemical approach has to be combined with physico-chemical, mineralogical and biological quantification of the system to give clear answer about the origin of DSi. In other words, for each soil-plant system, there are specific observations which can lead to interpretations and discussion totally different that scientific laws established in other systems. The tracers (isotopic and geochemical data) are therefore very useful to understand the transfer of elements environment already well defined and characterized.

We also thank the referee #3 for the detailed comments, which will be taken into account in the final revised version.

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