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Biogeosciences Discussions

Interactive comment on "Carbon allocation and carbon isotope fluxes in the plant-soil-atmosphere continuum: a review" *by* N. Brüggemann et al.

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I was interested if this article would also deal with VOC emission and indeed found a paragraph that included BVOC in the title (3.3). However, what was said about this topic was rather disappointing: Two statements are made

1. "It can be a considerable drain, especially under stress such as drought" but there is not even a hint of how much that could be (see e.g. Tingey et al. 1980, Westberg et al. 2000, Sharkey and Yeh 2001). Even those references might be biased given the strong emission from flowering or attacked (damaged) plants that have not yet been quantified in relation to assimilation to my knowledge (see e.g. Loreto and Schnitzler 2010, Laothawornkitkul et al. 2009, Hietz et al. 2005). There is also no reason given why emission may continue after assimilation has ceased and how this time-scale depen-

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dency influences the C budget, which does not reflect the current state of knowledge (see Holopainen and Gershenzon 2010, Niinemets et al. 2010, Grote and Niinemets 2008, Sharkey et al. 2008).

2. "BVOC emission rates differ strongly among plant species and thus only play a role for the C budget of particular species". This is certainly true but provokes a lot more questions rather than finishing the topic. What are these differences and where are they listed (e.g. Kesselmeier and Staudt 1999, Geron et al. 2001, Karl et al. 2009)? Under which circumstances are they likely to play an important role in the future. Since the emissions are highly dependent on temperature, the importance of emissions might increase (e.g. Penuelas and Staudt 2010, Schurgers et al. 2009, Lathiere et al. 2005). Drought and increasing CO2 concentrations may counterbalance this response (e.g. Grote et al. 2010, Fortunati et al. 2008, Monson et al. 2007, Rosenstiel et al. 2003).

Both sentences focus on direct plant emission, not differentiating between emissions from production (which is more or less tightly coupled to photosynthesis) and pools (which is not). Furthermore, there is no mentioning of VOC emissions coming from the soil (e.g. Hellen et al. 2011, Gray et al. 2010), although this might be a rising topic in the future. It might be small in amount but the same is true for the plant originating compounds.

It seems that the authors intent to say that the second sentence is a reason not to deal with the subject anymore. I cannot follow this logic. In fact, I can imagine that the influence on the carbon balance might be considered as too small to deal with it here. In this case, this exclusion should be mentioned in the introduction. However, if it is considered in parallel to respiration, processes, at least the state of the art should be referenced.

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