

## ***Interactive comment on “Ideas and perspectives: enhancing the impact of the FLUXNET network of eddy covariance sites” by Dario Papale***

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*First let me thanks Joshua Fisher for the review and comments, that are useful and appreciated. I decided to give my answers and clarifications now, without waiting the end of the Discussion period, because I hope these could be useful also for other readers of the current version. My comments and answers are in blue italic*

1) Here a proposal for a new organization where regional and national networks become the pillars of the global initiative, organizing clusters and becoming responsible for the processing and preparation of datasets. . .” - Isn't this already the \*old\* organization? I know what you're trying to say here, but it doesn't come across clearly (essentially, those pillars aren't always under the same ceiling, and so it takes some

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moving of those pillars around in the syntheses, which is time consuming).

*It is not, otherwise it would be already implemented. . . The main differences are in the 1) agreement among all the participant to push this forward and 2) role of the different groups with distributed responsibilities. I agree that looks a simple and easy concept, but practically it does not exist. I will try to clarify better in the new version the main problems and why the current organization does not work and highlight the differences respect to the current situation.*

- Is it really a new proposal? Hasn't this been proposed for years?

*It is not, otherwise it would be already implemented. . . The main differences are in the 1) agreement among all the participant to push this forward and 2) role of the different groups with distributed responsibilities. I agree that looks a simple and easy concept, but practically it does not exist. I will try to clarify better in the new version the main problems and why the current organization does not work and highlight the differences respect to the current situation.*

2) Certainly, the author (and his acknowledged though not co-authored colleagues) have thought this through pretty thoroughly. But, why aren't there any other co-authors? Wouldn't it be more convincing if there were at least one co-author from each of the networks? It's slightly ironic that the article is about collaboration when there are no coauthors.

*I get the point and agree on the fact that it is strange. In fact, however, the proposal on how to reorganize the structure is something I developed and then presented in some meeting in a very simplified and schematic way. What I think is needed to get it moving forward and being implemented is exactly something like this paper where the concept is presented with more details and open to comments thanks to the Biogeosciences review procedure. It is a global initiative, having only some people involved at this stage would have been even more dangerous I would say. So this is an "Idea and Perspective" from me, open to discussion and modification and then to technical discussion on the implementation (hopefully)*

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3) Overall, the paper is somewhat light on specific details of how everything would work. I would guess that people are mostly on-board in theory. But, the practical systems engineering could perhaps be flushed out a bit more. Perhaps an additional figure could be useful that would reflect this.

*Good suggestion, thanks. The details on the metadata and query systems are too much technical in my opinion, but something explaining better the overall path from a PI perspective and interaction with the different components, including the data flow, could be important and useful. I will add it in the revision.*

4) Are there analog data networks that could be discussed for failures/successes?

*Not that I know with a similar structure. In my opinion FLUXNET is quite advanced and I'm always impressed when I realize this because for its nature (self-organized, not officially defined, loose structure) it is really advanced and working well (thanks to all the people that are actively participating, sharing, organizing and also using it). I would also say that this could be an example for other networks.*

5) I wonder if FLUXCOM is the best example to justify the proposal. Adding new data to FLUXCOM at this point changes it very little, as far as I would expect, and it moves without real time eddy flux data based on globally gridded inputs. I guess the justification might be better if it were for FLUXCOM-like new initiatives; or, new members to FLUXCOM.

*FLUXCOM is evolving and always open to new methods and improvements. In addition the climate-ecosystems interaction are changing with the more and more frequent climatic extremes and it is crucial to have new data to parameterize the machine learning techniques in these "new" scenarios. I will add in the revised manuscript a more detailed explanation about the importance of using measurements under climatic driven pressures (e.g. Anderegg et al. 2020 in Science).*

6) I'm trying not to be biased, though I definitely am, but a good example for the remote

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sensing need was published in Fisher et al. [2020] for the ECOSTRESS mission, focused on evapotranspiration. Here, we needed as much current eddy covariance data as possible right away (i.e., data before launch would be far less useful!) to ensure that our ET data products were good enough to release. It was a beast to deal with all the different disparate data (as you obviously know) – more than a dozen data formats alone, let alone the interfaces to access the data! We mentioned some of those aspects in the Methods section of the paper, check it out. In the end we had an amazing >150 sites contribute data (with nearly as many co-authors, because, after all, the eddy flux data were all new too). I suspect that this paper is why the Biogeosciences Editor here thought of me to ask to be a reviewer. Our validation work also followed on similar validation work done for the SMAP mission on soil moisture.

*It is not a matter to be biased, your example is of great interest and I was looking for a publication like the one you cited in the manuscript preparation. I agree that it is a perfect example and I will definitely add it in the paper. The future of FLUXNET in my opinion is strongly linked to the collaboration in initiatives like ECOSTRESS, where getting the data should not be a “MENTALSTRESS” but something smooth and clear.*

7) We're going to continue to have new missions that would benefit greatly from the proposed global standardized network. More missions that deal directly with fluxes, as well as others that deal with other variables that are useful from FLUXNET sites such as soil moisture, canopy height, fluorescence, etc.

*I completely agree. I will try to incorporate the concept more clearly in the paper.*

8) It would be good to include a statement of justification for Continental clusters. (Also, continents are not always consistently defined across the world).

*I agree, may be “Continental” is not the right way to call them, also because in the system in theory each single network can organize its “FLUXNET Version” basket. I will revise this and the Figure to better explain that this is an option to save resources if needed or to support smaller networks that don't have the possibility to maintain the*

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*system in place.*

9) L167. “wait releases of dataset” à “wait for releases of datasets”

*Thanks*

10) L188-193. Check out the little-known Fisher and Fortmann [2010], where we applied Elinor Ostrom’s design principles for sharing of natural resources to shared data with an application to FLUXNET. Keys to successful data sharing discussed therein.

*Thanks for the suggestion, I will check it.*

11) I hope to see this proposed organization a reality soon!

*Me too... thanks for the support to the idea*

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