

## ***Interactive comment on “Assisting the Evolution of the Observing System for the Carbon Cycle through Quantitative Network Design” by Thomas Kaminski and Peter Julian Rayner***

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The paper is a useful and easy to read reference to the increasing amount of QND. The authors are both experts and adequately describe the basic concepts and summarise the state of the art well.

The novelty is the discussion of individual verbs integrated design, even though this is rather simple, as the authors themselves agree. I would like to stress this aspect, as after Paris the scientific world may be faced with having to devise a observation system that can cope with multiple variables (reduction targets, IND's etc). It would be nice to know what implications this would have for QND (think for instance of CO2 reductions

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and ocean acidification limits).

I have a general, more philosophical, problem with QND that is not completely solved with the quantification of the model error, although it is the main part of the a priori input into the QND. Basically QND assumes that all the key processes are modelled in such a way, that constraining them with data becomes possible. The SIF case presented is an example of that: only after addition of a fluorescence model one can use the data. That means that that we can optimise the network only to our current perception of the system (and to the adequate formulation of the target quantities). My feeling is that this uncertainty is not fully covered in the model uncertainty ( I think sometimes it is just a convenient way to hide it) and should be stated more explicitly in the paper.

In general I think it could be published without major corrections.

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