

General comments

The paper “A comprehensive data acquisition and management system for an ecosystem-scale peatland warming and elevated CO₂ experiment” by M. B. Krassovski et al. describes the instrumentation for the control and monitoring of a complex ecosystem set up in northern Minnesota, USA. In connection with the climate change debate and the possible influence of CO₂ on the development of forest plants this well written description of a controlled test environment is an important contribution to the understanding of quantitative results used to evaluate the effects of greenhouse gas changes on certain aspects of our environment.

The article covers the important aspects of the implemented mechanisms for data quality control, quantitative environment manipulation and the collection of the relevant metadata needed to put the data into a correct context. Also the strategy for the archiving of data, metadata and relevant documentation as well as for the general access to these data sets is covered, outlining the involved difficulties, possible alternatives for data access implementations and their selection criteria.

Some information to the calibration of the system and the recording of possible errors would have been a useful addition and should perhaps be added before the final publication.

Specific comments

Page 179, line 21, in section 1.1: The term “ambient” is used here for reference temperature and CO₂ contents without unambiguous definition. Are these the conditions measured at any given time in the “ambient plots without enclosure” mentioned later, or the conditions in the “fully constructed, non-heated control enclosures” mentioned also in this section?

As the environment is open-top enclose (page 179, line 21) how is a controlled environment maintained and how is the temperature increase achieved: by soil heating, IR irradiation (from above, the sides ...?) Page 180, line 7 claims a raised dome peat bog: does this insulate the test site from the environment? If so, what does the line-21 reference to an open-top enclose refer to? Several details are given in the following paragraph. Slightly rephrasing the introduction in line 21 could make the setup clearer. In the current description it remains unclear how the critical parameters (temperature and CO₂ contents) are monitored, controlled and manipulated and what height-dependent variations are to be expected. The details are described later including a rough description of a feed-back loop.

The experimental setup description starting on page 180 at line 12 and continuing to the end of this section could benefit from restructuring to allow the reader to estimate which aspects of the described sensor and data handling environment might be applicable to own similar test set-ups. My interpretation of the text is as follows, but I am not certain that it is correct:

17 plots of 12 m diameter are completely open to the environment; each of them has a 10m- high instrumentation tower with environmental sensors. What is the height distribution of these sensors? How are they situated relative to the following enclosed plots? What are the distances from the greenhouse walls, are they affected by wind shading?

8 plots are thermally insulated from the environment by 8-m high side walls, open above, which can be heated at ground level. 2 plots have identical enclosures, open above but without heating option as reference plots. 5 of the 8 heatable plots have additional CO₂ injection equipment.

Another 6 plots without enclosure are also used for reference monitoring. How are they related to / different from the 17 12m-plots mentioned in the first group? Also the different heating systems – one for soil heating from underneath the surface, the other for air heating above the surface – would be useful to highlight in the text. This information is currently only available from thorough studying of figure 2.

Page 182 line 10 mentions 16 instrumented plots, I count 33 plots based on the description on page 180. Probably several plots are mentioned more than once according to their various equipment types. Figure 4 lists 17 network nodes numbered up to 21. Where do the discrepancies come from? Perhaps the numbering scheme used in figure 4 should already be mentioned as references in the set-up description of pages 180 to 182 where possible. Another possibility could be a table with 1 line per plot and different columns for the various properties, then just across if a property is applicable.

Page 189 line 23: A list with the detailed evaluation criteria for a network service provider is fine, but the name of the finally selected company does not belong into a journal article and should be removed.

Page 192 line 22: Time is mentioned as important. The means of time synchronization should be mentioned here: via GPS, radio time server, local clock standard? How is time-synchronization provided in the LAN to the local data loggers?

Technical corrections

Page 182 line 16: is meant “experimental reference” rather than “experimental control”?

Walter Schmidt