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Midterm report
November 2006



Report from the advisory group



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CLIMAITE mid-term assessment**22nd November 2006**

Advisory group

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Overall summary

CLIMAITE is a world-class integrated whole-ecosystem experiment on the effects of global change on heathland ecosystems. The experimental design is excellent as are the technical solutions chosen. The experimental set-up appears to be functioning as designed, and the project has now successfully completed one full year of background data and one year of treatment without major technical failures.

All of the various scientific aspects appear to be running as intended, with only a few exceptions. Publication of scientific results is now in progress; the project should perhaps make more firm publication schedules for the future. The project has yet to have in place functioning modelling expertise, but this has not hindered progress to date, and the project management is now seeking to remedy this.

CLIMAITE is at the front edge of international science and the experimentation involving the interaction of three major climate changes (CO₂, warming and drought) is a unique aspect, not available at any other site in the world. CLIMAITE thus places Copenhagen as one of the most active centres for climate change research. The site at Brandbjerg is, in addition, an excellent environmental demonstration for school classes, students and interest groups.

We strongly urge that CLIMAITE be extended for a second 5-year period (2009-2013).

Introduction

The advisory group was founded 22 June 2004, several months after the official start of CLIMAITE. We met with the CLIMAITE project on 2 occasions, January 2005 and September 2006 (Dr Emmett was unable to attend the September 2006 meeting). These meetings included visits to the site at Brandbjerg, presentations by the principal investigators of progress and plans, and by the project leader on overall management. We prepared short statements following each of these 2 meetings, including several recommendations. In addition we received written material from the project, including “self-assessments” from WPs 2, 3 and 4 in October 2006. We base our mid-term assessment here on the original work plan for CLIMAITE (dated March 2004), these 2 meetings, and the written material we have received.

WP1 - Experiment

The basic design is extremely sound, and the experiment is located at an excellent and well-chosen site, with sufficient and appropriate replication of the treatments. We consider the experiment to be at the front edge of international science, and the experimentation involving the interaction of three major climate changes (CO₂, warming and drought) is a unique aspect, not available at any other site in the world.

The experimental set-up appears to be functioning as designed, and the project has now successfully completed nearly 1 year of treatment without major technical failures. We were particularly impressed by the IT setup, which encompasses online recording of the incoming experimental data, and a separate set of programmes to digest the data and present them in easily understandable manner. The operators can thus monitor the experiment via internet at all times.

WP2 - Species response

- 2.1 Plant physiology. The progress is satisfactory and work should continue. The publication plans are good.
- 2.2 Soil fauna. We are unsure if there are measurements being made at Brandbjerg (or perhaps only one sample per year), as the report indicates that most of the work is in the laboratory or at the VULCAN site at Mols. We urge the project to try to shift the focus of this work to the site a Brandbjerg, such that the results can more readily be integrated with the results from the other groups. The study of effects of copper toxicity seems to be of limited relevance for the experiment at Brandbjerg.
- 2.3 Trophic interactions. The progress is satisfactory and work should continue.

WP3 - Community response

- a) Response to N+P addition. This is apparently a new set of treatments (lab study), not directly related to the experiment at Brandbjerg. We wonder why these were added and whether the resources might be better used at Brandbjerg.
- b) Model for plant competition. This is a good addition to the ongoing work.
- c) Root studies. This is a good addition to the ongoing work, and we hope that this will be funded.
- d) Ecosystem C and nutrient pools. There is a need to re-evaluate the data collection requirements with a new modelling group when that is in place (as apparently the Lund group is no longer involved in the modelling).
- e) Soil microfauna. Here there should be a closer link to the work in WP2.2 Soil fauna. The collaboration between these 2 tasks needs to be strengthened. This could be enhanced by a common publication plan.

WP4 - Ecosystem response

The progress is satisfactory and work should continue. We received no information on the progress or preliminary results from soil leachate measurements. Task 4.6 joint publications is a good idea.

WP5 - Synthesis

Too early to expect any work here.

Project management.

The project is clearly being managed extremely well, with the overall experimental structure in very sound health and the research teams all engaging with the site. It is clear that there are good communication structures within the project, which will become increasingly important as the experiment enters the next, more productive phase. Thus, there is now a need to develop a more formal and regular reporting and publication plan. This is particularly important for the effects work, and especially because of the overlapping and interdependent nature of much of the research necessary to produce an integrated study.

The project's plan to include modelling via collaboration with Lund Institute of Technology has apparently not worked out as well as anticipated. The project

recognises the need for a strong modelling component. The Advisory group urges that modelling be started as soon as possible, and preferably conducted at the post-doctoral level involving one or more of the research teams in the Copenhagen area.

Relative to the work plan, CLIMAITE has generally achieved the milestones set. The timing has been altered somewhat due to the decision to have one full year of background data prior to starting the treatments. We strongly feel that this was the correct decision.

CLIMAITE for a second 5-year period

Within the advisory group we have discussed the future potential of CLIMAITE and the possibility of extending the project beyond the 5 years already planned. The combination of the effort spent to develop the Brandbjerg site and the CLIMAITE research group, the quality of the experimental facility and the scarcity of such experiments in the world makes CLIMAITE unique, and we strongly advise that the project will be extended for a second 5-year period (2009-2013). Among reasons to continue beyond the currently planned 5 years are:

1. Time lags in response – the ecosystem will not have fully responded to the step changes in temperature, CO₂ and drought.
2. The initial responses may differ from the longer-term response.
3. Different components of the ecosystem will respond at different rates. Determination of the relative rates requires longer time. For example, the higher CO₂ will result in altered foliage chemistry, which in turn will alter litterfall. Soil effects must wait for the fresh litter to be affected by the higher CO₂. Community response will require at least 5 years of treatment.
4. Seasonal patterns may mask general response. Year-to-year natural variations in climate may mask response to treatment. The more years of treatment the easier the determination of noise from signal.
5. PhD students require minimum 3 years. Extension of the project will allow additional PhD students to join.
6. A long-term project will allow the scientists to become “specialists”, with much of the learning curve being in the first few years.
7. The experiment becomes scientifically more interesting with time, and CLIMAITE will become more and more well-known within the scientific community and general public if it continues over many years. Regrettably, very few climate experiments have continued over many years.
8. The site provides a platform for collaboration within Denmark. It is world-class research and provides opportunities for international cooperation (e.g. EU project).
9. Long-term treatment opens up possibility for use of new techniques (e.g. isotope tracers although there needs to be careful consideration of the use of enriched tracers as this may prevent natural abundance work in the future).
10. If the project has long-term perspective, it will be easier to hold on to key personnel. Personnel employed by the project will naturally begin to look for new positions towards the end of the project.