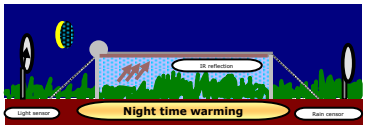
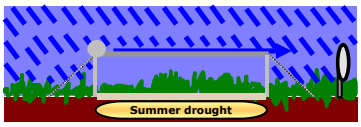
EU Vulcan Project – Assessing the vulnerability of European heathlands to climate change.

[1/2]Alwyn Sowerby (asowe@ceh.ac.uk)

Partners - [3]C. Beier., [1]B. A. Emmett, [8]A. Gorrisen, [2]G. Edward-Jones, [11]O. Kull, [9]E.K. Lang, [10]G.S. Mugnozza, [6]J. Penuelas, [4]I.K. Schmidt, [7]A. Tietema.



Night warming
Infra red radiation absorbed by the community through the day is reflected back into the community at night by a curtain that automatically draws across the moor when dark. The curtain automatically rolls back when it rains.



Repeated drought
A transparent curtain automatically draws across the plot when rain is detected. The different sites each run the drought treatment at different times of year for different durations to represent locally significant drought events.

Studying effects of warming and repeated drought on:

- ecosystem functioning
- ecosystem vulnerability
- socio-economic implications

for heathlands from six European countries…

A UK perspective…

Impact of warming on heather moorland in Wales

- Treatment only produces a small increase in temperature (Figure 1) - however gradual incremental change is a realistic simulation of climate change.
- Despite this, plant growth increased with the warming treatment (Figure 2)
- The below-ground community showed no signs of being affected
- In the short-term, under the small increase in temperature, the moorland seems to be increasing carbon storage rather than releasing it into the atmosphere – Figure 2 - how long this would last as temperatures continue to rise is uncertain.

Impact of repeated summer drought on heather moorland in Wales

- Year round decrease in soil moisture (Figure 3); despite drought treatment only cutting out 8% of annual rainfall
- Indications that drought is improving conditions for heather growth, other species showing no effect (Figure 4).
- Signs that carbon fixation at the plant canopy level is improved by drought (Figure 4).
- Unlike warming treatment however, there are signs that the drought is steadily increasing C flux from soil respiration (Figure 5); despite short-term temporary decreases in litter decomposition (Figure 6).

Figure 1 – Temperature changes in Wales resulting from the warming treatment

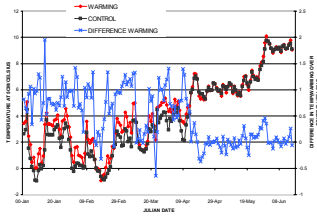


Figure 2 - Effect of warming on plant growth in Wales
Error bars show the standard error of the mean, n=3.

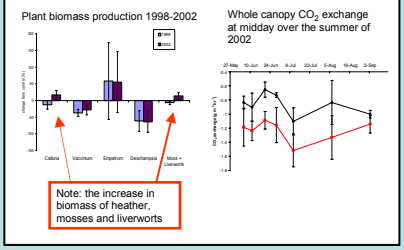


Figure 3 – Effect of drought on soil moisture.
Error bars show the standard error of the mean, n=3.

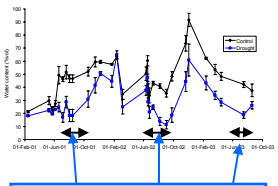


Figure 4 – Effect of drought of plant growth in Wales.
Error bars show the standard error of the mean, n=3.

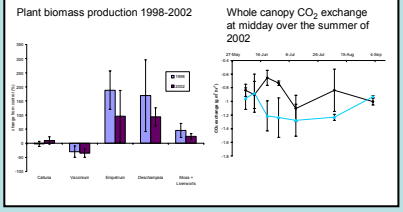


Figure 5 – Effect of drought on soil respiration
Error bars show the standard error of the mean, n=3.

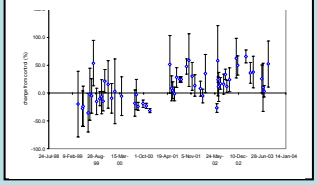
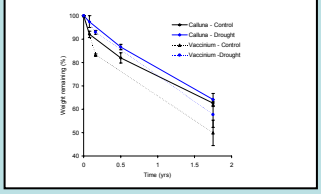


Figure 6 – Effect of drought on rates of litter decomposition.
Error bars show the standard error of the mean, n=3.



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Addresses
[1] Centre for Ecology and Hydrology, Bangor, UK.
[2] School of Agriculture and Forest Sciences, University of Wales Bangor, UK.
[3] RISØ National Laboratory, Denmark.
[4] Danish Forest and Landscape Research Institute, Denmark.
[5] Natural History Museum, Denmark.
[6] CREAF (Center for Ecological Research and Forestry Applications), Spain.
[7] Center for Geo-ecological Research (ICG), University of Amsterdam, the Netherlands.
[8] Plant Research International, the Netherlands.
[9] Institute of Ecology and Botany, HAS, Hungary.
[10] University of Tuscia, Italy.
[11] University of Tartu, Estonia.

Vulcan homepage
http://www.thevulcanproject.com