

Interactive comment on “Do successive climate extremes weaken the resistance of plant communities? An experimental study using plant assemblages” by F. E. Dreesen et al.

Anonymous Referee #2

Received and published: 5 August 2013

General Comments

This paper examines the effects of sequential extremes on grassland communities. The main question the authors investigate is whether exposure to a prior extreme impacts resistance to a subsequent event, either negatively or positively. They also hypothesized that a short duration between extremes would have the greater negative effect on the second extreme due to a lack of recovery time. To accomplish this, the authors exposed artificial communities to two heat waves and droughts, alone and in combination, and varied the time between events. Additionally there were controls for both time and extreme treatments. In general they found that the effects of the preceding event were minimal if any. The only time they observed an effect of the first event was in

C4020

the most stressful treatment (heat + drought), with the shortest recovery time between events, and this only manifest in leaf mortality.

Overall I think this paper examines an important topic that has received little attention in the ecological literature. The experiment is well designed, and the results are convincing. However I question the role of treatment intensity in the minimal effect of the first event on the second one. The authors used a 50-year return interval to define extremity and establish their heat and drought treatments. But using this approach, the authors state that the drought and drought + heat treatments were not intense enough to bring the soil below the wilting point. I think this may be an important factor that could use attention in the discussion.

Specific Comments

- Throughout the paper, especially in the figures, it was difficult to keep track of which scenario was which. Perhaps the authors could use a different and more intuitive way to label these timing treatments.
- It's not clear to me how the authors assessed plant survival, but I assume this means the plant was entirely senesced aboveground. This seems problematic because aboveground senescence does not necessarily mean mortality as the authors point out later in the paper “regrowth or plants previously appearing dead”. Perhaps a term like “whole plant senescence” would be more accurate.
- Why is there such a large difference in plant survival in the DH treatments in scenario IV, with scenario II showing half the loss, and III showing none?
- I'm not convinced that the leaf color data needs to be included. The authors might be making a stretch to connect leaf color to chlorophyll content to nitrogen content to a mechanism by which dry soils and translocation increases plant nitrogen.
- There are several times in the results sections when the authors interpret their data: “findings suggest that, despite the greater leaf and/or plant mortality, the remaining

C4021

leaves in these treatments contained more chlorophyll".

- While I like the ideas in the last paragraph of the discussion, the content seems to come out of nowhere. Prior to this there was very little mention of community-ecosystem dynamics. I suggest either eliminating this paragraph, or discussing this earlier.

Technical Corrections

- Table 1 is difficult to follow, adding vertical lines would make it easier to understand when the rows are connected.

Interactive comment on Biogeosciences Discuss., 10, 9149, 2013.