

Interactive comment on “The effect of drought on dissolved organic carbon (DOC) release from peatland soil and vegetation sources” by Jonathan P. Ritson et al.

Anonymous Referee #1

Received and published: 23 January 2017

The paper reports amounts of DOC extracted from peat and from 4 different plant species (5 sources) after these samples were subjected to different irrigation intensities followed by water extraction. In addition SUVA spectra of the extracts were determined and the coagulation potential of DOC was measured. The aim was to investigate the effects of drought on DOC release and properties. The authors draw far reaching conclusions on the effects of drought and vegetation change on peatlands DOC budgets. I am not in favor of publication of this study because of methodical shortcomings, the small data base, inconsistent presentation of data, and over interpretation of results. 1 The study is based on the analysis of only 100 water samples for easily measurable parameters. Hence the data base is very small and the interpretation of the patterns

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of DOC release and DOC quality suffers from the lack of measuring any explanatory variable like e.g. CO₂ release, data on microbial or enzymatic activities in the different treatments, chemistry of the plant material used, pH or other relevant chemical parameters of extracts, etc. Overall, the paper remains highly descriptive and - for an international audience - provides too little innovation on DOC dynamics in peatlands. 2 Moreover, the experimental approach is strange: Samples were subjected in the lab to irrigation at different rates for 6 weeks to induce different drying intensities. The degree of desiccation after and during the 6 weeks was not measured, nor the biological status of the samples. Only for the peat samples some data on water contents at the end of irrigation (unit?) are given in line 251. 3 The different intensity of irrigation should induce different leaching rates and different DOC fluxes from the samples. No information is given on that. 4 Following the 6 weeks of irrigation, all samples were air dried before water extraction (line 148) which does not make sense to me: If all samples were air dried before extraction, the pre irrigation to induce different degrees of desiccation seems meaningless. The rewetting of air dried soil samples cause specific effects (Birch effects) that my override the aimed irrigation effect. 5 The data presentation needs substantial revision: The content of tables 1 – 6 and the main message can easily be given in text form (tables 1-6 can be omitted). Fig. 1 gives DOC release from the 5 sources, Fig. 2 gives drought effects on only peat samples, Fig 3 gives SUVA only for Molinia, Fig 4 gives removal efficiency for the 5 sources, but without drought effects. Hence, the presentation is confusing and inconsistent. 6 The conclusions on effects of climate and vegetation change on peatland biogeochemistry are highly speculative in view of this short term laboratory study.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-517, 2017.

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