Biogeosciences Discuss., 7, C2368–C2370, 2010
www.biogeosciences-discuss.net/7/C2368/2010/

Biogeosciences Discussions

Interactive comment on "Investigating the effect of historical treatments on wheat yield over multiple spatial frequencies" *by* A. E. Milne et al.

A. E. Milne et al.

alice.milne@bbsrc.ac.uk

Received and published: 18 August 2010

We would like to thank the referee for their constructive and helpful comments. Below are responses to the comments and suggestions, which we hope will satisfy the criticisms raised. A revised version of the paper is appended as a supplementary file.

Response to Referee 1

Comment 1. We have simplified the abstract content and highlighted the results more clearly.

Comment 2. The introduction has been improved and now includes reference to other studies on the residual effects of nitrogen.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Comment 3. The detail on the experiments has been reduced.

Comment 4. Missing word inserted on line 25 other removed in edit.

Comment 5. The cost function has been included (lines 186–188).

Comment 6. We did not include an ANOVA in the exploratory data analysis because the assumptions and requirements do not hold. There is no true replication in the wheat response experiment (only pseudo replication) and the ANOVA analysis assumes independent random errors, where as we expect some dependence along the transect.

Comment 7. We agree with the referee and have changed the headings accordingly.

Comment 8. We have tried to improve the introduction and conclusion to explain what the wavelets tells us about this example (eg, lines 324 onward) and to make clear that the point of the analysis was to evaluate the response of wheat-biomass over a range of frequencies and therefore the wavelet approach was the appropriate choice.

Comment 9. The confidence interval for the wavelet variance v is given by $[\nu v/(Q_\nu(1-p)), \nu v/(Q_\nu(p))]$ where ν is the effective degrees of freedom and $Q(p)$ is the percentage p point in the chi-square distribution. The effective degrees of freedom are become smaller as level j increases (i.e. frequency resolution improves) because of the length L of the filter increases with level (in our case $L = 3(2j-1)+1$). As we have relatively few data (158) and our basis has high frequency resolution the EDF are small and so CI can be large. In practice the EDF are estimated as a function of the number of data, the wavelet variance and autocovariances (see Lark and Webster (2001) or Percival and Walden (2000)). We have added a comment in the text on this (lines 252 – 256).

Comment 10. The negligible variation in nitrogen at high frequency is a consequence of the large spatial scale (> 7.5 m) at which the treatments were applied, higher frequency variation is an artefact resulting from the assumed step change between treatments. This has been added to the text (lines 306-308).

Comment 11. To our knowledge this is the first time that wavelet analysis has been

BGD

7, C2368–C2370, 2010

used to identify dominant historical treatments of soil and quantify their effect on the variation of a soil property. We have now written this in the introduction and concluding remarks. We have tried to make it clearer why this way of analysing residual effects is of interest.

Comment 12 reference removed.

Comment 13 Figure corrected.

Comment 14 Figure captions corrected.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/7/C2368/2010/bgd-7-C2368-2010-supplement.pdf

---

Interactive comment on Biogeosciences Discuss., 7, 2143, 2010.