**Biogeosciences
Discussions**

Interactive comment on "Inverse method for estimating respiration rates from decay time series" *by* D. C. Forney and D. H. Rothman

Anonymous Referee #1

Received and published: 3 May 2012

General Comments The authors present an excellent detailed overview of an inversion approach to calculating decay rates using litterbag decomposition data. The analysis of the methodology is quite extensive and shows that typically, the best fit to decomposition data comes in the form of a log-normal distribution of decay rates.

Overall I found the paper very well written with a good flow. The methods are explained well and their application is well demonstrated.

I would be interested to see, or have the authors comment on other inversion/regularizations approaches, which may allow for more roughness in the solution but keep the solution well constrained when noise is present (this may be a pipe dream). I ask about this mainly because I am curious about what would happen if the decomposition were in fact happening at several discrete rates rather than a continu-

ous distribution of rates. This regularization approach would obviously smear the result into a log-normal curve rather than the true solution (perhaps several delta functions or a bimodal distribution?).

Specific Comments P 3802, line 4 – discuss the benefits/drawbacks (if any) of the discretization method you chose to use

Technical Comments Lines 1-5 – rather than having these references interspersed in the text, it would make it easier to read if they were all at the end

Section 2 – equation numbering is confusing (some equations have numbers, some don't). Also make sure that equations are being referred to correctly within the text.

P 3804, line 29 – reference to figure 1c which is not included in the manuscript (maybe a typo, Figure 1b maybe?)

3808, line 13 – "well handles" is awkward, perhaps "this method handles the constraints on p(ln K) well."

P 3814, line 4 – add a hyphen between multi and pool.