

Interactive comment on “Effects of soil rewetting and thawing on soil gas fluxes: a review of current literature and suggestions for future research” by D.-G. Kim et al.

S. Marañón

smaranon@ugr.es

Received and published: 23 November 2011

I find this paper an interesting and relevant review, since it represents a complete summary of the effects of two processes (rewetting and thawing) of increasing incidence on greenhouse gas emissions under climate change. The meta-analysis of the existing data allows detecting the main general tendencies on GHG emissions and the apparent contradictions among different studies. I found particularly interesting the identification of open questions, main weaknesses and lack of information obtained as a result of this synthesis.

However, I missed the mention of a revealing paper recently published in *Forest Ecology and Management* (file attached):

C4551

ogy and Management (file attached):

Marañón-Jiménez, S., Castro, J., Kowalski, A.S., Serrano-Ortiz, P., Reverter, B.R., Sánchez-Cañete, E.P., Zamora, R., 2011. Post-fire soil respiration in relation to burnt wood management in a Mediterranean mountain ecosystem. *Forest Ecology and Management* 261, 1436–1447.

This study includes an experiment of water irrigation under natural field conditions in a Mediterranean mountain ecosystem. In this experiment, soil CO₂ fluxes were measured after the irrigation following two temporal approaches: across days and continuously every 30 min. along 24h cycles, using portable and automatic chambers. The combination of these two temporal approaches allowed the description of CO₂ pulses until the soil had dried out and a better characterization of the fast pulse and the flux changes after irrigation, including the daily pattern of CO₂ fluxes. In addition, the higher resolution data allowed a first attempt to separate between the soil CO₂ emissions associated with soil degasification (displacement of high-CO₂ air contained from soil pores by water, a physical process) and the enhancement of soil respiration associated with the alleviation of moisture limitations in the available organic substrates (biological processes).

Therefore, the results obtained could help to support some of the conclusions of this review (i.e.: rate of change, pulse duration, fitting function, effect of rain events on soil CO₂ pulses in Mediterranean ecosystems, or future implications of unevenly distributed rain events). Moreover, it could clarify some of the “obscure points” associated with the low temporal data resolution and the length of the experimental period. In addition, the natural field conditions and simulation of a natural rain event prevent the possible effects associated with substrate manipulation, leading to more realistic results.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/8/C4551/2011/bgd-8-C4551-2011->

C4552

