Biogeosciences Discuss., 4, S937–S938, 2007
www.biogeosciences-discuss.net/4/S937/2007/

Biogeosciences Discussions

Interactive comment on "Biogeochemical factors contributing to enhanced carbon storage following afforestation of a semi-arid shrubland" *by* J. M. Grünzweig et al.

Anonymous Referee #1

Received and published: 23 July 2007

The plantation of Pinus halepensis into a semi-arid shrubland area around Yatir Forest, Israel 35 years ago initiated the semi-natural experiment of how carbon balance changes due to afforestation under equivalent climate conditions in this region.

By using an inventory approach, Grünzweig et al. estimate the carbon stocks of vegetation and soil organic matter (SOM) of both forest and shrubland. The comparison of these numbers shows an enhanced carbon storage (NBP=3.46 kgC/m^2) following afforestation, partly due to increasing vegetation carbon stocks but also due to increasing SOM stocks. This result is interesting and important since tree invasion into grasslands may also result in decreasing SOM content due to increasing fungi mass in other cli-

matic zones.

The additional estimation of N stocks and carbon isotope ratios, and the additional performance of litter-bag decomposition experiments allowed for disentangling biogeochemical factors contributing to this increase in SOM content.

C/N ratios of fresh litter of dominant plants nearly doubled from shrubland to forest. This should lead to reduced carbon decomposition under similar climate conditions which would be one factor for increasing SOM content, enhanced root growth being another. Grünzweig et al. prove this hypothesis by a decomposition experiment with litter bags containing both litter material from the site and reference litter.

I have no further points that should be considered prior to publication in Biogeosciences. From a climate change point of view, it would be interesting to express the uptake of CO2 in global warming potentials, and to compare it with increasing uptake of heat due to albedo change.

Interactive comment on Biogeosciences Discuss., 4, 2111, 2007.