

***Interactive comment on* “The impact of lateral carbon fluxes on the European carbon balance” by P. Ciais et al.**

Anonymous Referee #2

Received and published: 1 December 2006

Overview:

This paper represents an interesting twist on the carbon flux/balance study. As we delve deeper into carbon fluxes, carbon cycling, and carbon budgeting we must refine our models and add information about fluxes that have previously either not been considered or poorly quantified. I would view this paper as a potentially significant step in that direction. The focus of the article is on quantification of horizontal fluxes of carbon in four general categories: 1) trade of food, feed, and wood products, 2) emission, transport, oxidation, and deposition of reduced carbon compounds, 3) transport, deposition, oxidation of carbon by/in freshwater systems, 4) CO₂ fluxes in coastal seas. The first of these (trade) is inherently anthropogenic and to my knowledge has not been studied in detail at this scale with specific emphasis on lateral carbon flux. The others

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

represent natural processes that have been modified/affected by human activities to varying degrees and that have been studied by others at varying scales. The significant twist is the geographic analysis of all four categories of fluxes to determine spatial patterns of source versus sink for Europe. Europe as a whole is shown to be a net carbon sink balanced by other unquantified sources but within Europe various areas are sources or sinks with regard to the first three fluxes studied.

General Critique:

1. There is an explanation of how wood is converted to carbon but not an explanation of the conversion methods from grains to carbon.
2. With respect to wood products I believe there are two types of sinks. The first is essentially a transport and replacement sink. Trees are harvested and then replanted so that the carbon stored in the harvested trees is transported out of a region while new trees will be grown to replace them. The other sink is really storage in the wood usage areas. Unlike grain which will probably be consumed relatively rapidly (human or animal consumption) many wood products are used as building materials that will not be returned to the carbon cycle for decades to centuries or more. There needs to be a discussion of this. What percentage of the annual harvested wood product lateral flux is actually returned to the atmosphere relatively quickly (within a few years) and what percentage remains in storage as building material, furniture, etc. ?
3. The use of the terms project and projected bother me a little. Phrases like “ Statistical data (FAO, 2004) on feedstuff and food producers is projected on a 1° by 1° map” I do not believe that is geographically correct terminology. Essentially the statistical data were converted to a geospatial data layer that can be used along with other geospatial data layers to perform some basic GIS analysis on where the major source and sink areas are in Europe.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

4. The text has quite a few grammatical and spelling errors. For example in the quote above the word data is plural therefore it should read 'data are projected'.
5. Need to go through the references more thoroughly. Formats of cited literature are not consistent. Sometimes spelled out completely other times abbreviations are used. Needs to be consistent and correct according to journal specifications.
6. I looked at figure 1 for quite awhile and I am still not exactly sure what the authors are trying to show. It seems a little muddled and not easily understood without a very careful reading of the figure caption. Even then it was not clear to me.
7. Not sure that the assumptions listed for Table 2 are valid/realistic.
8. Conclusions seem a little weak. To borrow from a colleague what is the cosmic significance of the findings of this paper? How might these findings affect our greater understanding of lateral carbon fluxes and carbon cycling? Also, they should reflect the three main goals of the paper described in the introduction.

Specifics:

Page 3, line17, indicates that no strong correlation was found but no statistical results are shown. Just a visual comparison or was a form of formal correlation used??

Page 3 lines 28 and 29, Sentence needs some rewording. "Such a large net. . ."

Page 4, lines 5-8, several grammatical/spelling errors e.g. farmed should be farm, area should be areal, should be according to the animal density, etc.

Page 5, line19, should read sequence of an RCC

Page 8 lines 13 and 16 should be subscript on CO₂

Page 8 line 27, I don't know why but stream gaging is not spelled stream gauging.

Page 11, line 2, fjords and fjards are two spellings of the same feature I think.

Page 12, line 12 need to drop the of before (Janssens et al., 2005)

Page 13, line 23, should read sink is large compared to (there is an extra the in the text now)

Page 14, line18, estimated should be estimates

Page 15, line 8 freshwater should be freshwater.

Page 15, line 9 should be a space after CO₂ and last sentence needs to be re-written. I would suggest, 'In future work, investigations of lateral carbon fluxes should reflect changes in economic and land use drivers in the context of implications for future climate change.'

Recommendation:

After some revision I think this paper has sufficient merit for publication.

Interactive comment on Biogeosciences Discuss., 3, 1529, 2006.

BGD

3, S853–S856, 2006

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper