

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

Anonymous Referee #1

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General Comments This is a nice treatment and synthesis of carbon flow data, conveying a credible and persuasive argument in support of the importance of lateral transport flux as a vital element of C budgeting. It meets the three goals that the authors postulate, indeed, three important goals in the current carbon-climate debate. In doing so, the authors provide an interesting and transparent synthesis for Europe that will allow amendment as additional data are acquired. Further, the ms highlights key spatial and thematic areas requiring additional process understanding and measurement. Perhaps of greater importance, are the implications for the policy arena with regard to issues of carbon trading and application/shaping of Kyoto and other protocols.

Specific Comments Maybe an additional comment of the relevance of this synthesis to C trading concepts would assist (through keyword flags) in promulgation of this re-

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search into the C policy area.

While the ms is well researched and has an appropriate bibliography, there could be merit to refer to any related aggregated database that the authors or the CARBOEUROPE project has developed; on a couple of occasions in reading the ms I felt a need to supplement to data presented herein.

P1537, line 25 The Nile is not in Europe; provide an alternate example

P1541, line 18 “..over long distances..” consider inserting the words or idea of {with resultant increased variability in estimates for temporal storage and transformation}. Many of the pieces of the wider jigsaw picture developed in this ms deal with the minutae and specifics of variability in storage and transformation as small scales. This ms is picking up these pieces and putting them together on a large canvas; the suggested text insertion notes that wide small scale variability as an important metric but also one that is but a part of a larger process.

P1541, line 21 “..transport creates” consider inserting “..creates {and accentuates}”. I think this is in keeping with the diverse scales issue the authors are discussing here.

Table 2 Uniformity of metric formats. Either give + sign to all positive metrics or do not use the + sign for positive metrics. I prefer the absence of + sign for positive metrics.

Technical Corrections P1530, line 18 delete commas {Janssens, et al.} and {Peylin, et al.} P1532, line 12 replace {On} with From Line 13 replace {by} with from Line 14 insert minus sign {-9} Line 20 superscript {yr-1} Line 25 move superscript 1 inside the bracket (2006) Line 26 lower case for {northern} and {southern} P1533, line 11 delete {dejections of} Line 12 delete comma {water, and rivers.} Line 27 delete {in} prior to reference Line 29 delete comma {2000}, at P1534, line 14 insert h {anthropogenic} P1535, line 9 insert colon {RCC: 1)} Line 10 insert and {VOCs, and 2)} P1536, line 11 subscript {org} Line 17 insert in {Particulate inorganic} Line 26 lower case {northern}, {central}, {southern} P1537, line 13 subscript 2 in {CO₂} Line 16 delete in {into} and subscript

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2 in {CO₂} Line 17 caps R {Rhine River} Line 24 delete {been} P1538, line 21 insert space {CO₂is} Line 23 caps R (Loire River) P1539, line 9 lower case {central}, {northern} Line 21 insert x {(183 x 10³)} Line 22 change {as} to {to} Line 25 insert x {(112 x 10)}, replace {higher} by {greater}, insert x {(36 x 10)} Line 26 insert and {(2004), and 2)} Line 27 delete {in majority} insert {mainly}, insert in {wherein} P1540, line 2 change {in} to {for} Line 3 change {fluxes} to {flux estimates} Line 4 insert {source estimate}, delete {close} insert {similar}, insert {the estimate for organic carbon transported by} Line 5 change {before} to {into} Line 11 insert {ocean waters.} Line 25 change {overall} to {on an annual basis} P1541, line 5 change {across} to {within} P1542, line 7 insert/change {Within Europe, northern} Line 23 change {large when compared with the carbon} P1543, line 2 delete of, {is +90} Line 17 change {significant (but not yet quantified) bias} Line 19 delete {e.g.,} Line 22 delete {In conclusion,} P1544, line 7 italics {a priori} Line 9 insert space {CO₂ emissions} Line 10 change to {economic and land use drivers, and to} P1545, line 24 subscript {CO₂} P1547, line 16 give full citation {et al.} Line 29 subscript{CO₂} P1548, line 2 subscript {CO₂} Line 5 lower case {carbon} P1549, Table 1 caption line 2, delete in, hence {N latitude}, (E longitude) P1551, Table 3, header superscript (Drainage area 103km²) P1552, Figure 1 caption, penultimate line {freshwaters} as one word P1558, Figure 7 caption, subscripts and superscripts {CO₂ fluxes (FCO₂ in mgC m⁻² d⁻¹) and the partial pressure of CO₂ (pCO₂) in}

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3, S844–S846, 2006

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