

Interactive comment on “Holocene land-cover reconstructions for studies on land cover-climate feedbacks” by M.-J. Gaillard et al.

S. Mooney (Referee)

s.mooney@unsw.edu.au

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General Comments

This manuscript provides a good summary of the European land cover models that have appeared over the last decade or so. The manuscript describes the importance and applications of these models, and particularly highlights their relevance to a more complete understanding of climate dynamics. The authors also highlight the inconsistencies in the output (viz. maps) from the existing land cover models and they then outline one potential method to overcome these problems (using quantitative palynology, LRA). The reconstruction of land cover using such techniques is a relatively new development in palynology, and coupled with database compilation/regional networks, potentially provides exciting new ways of addressing several relevant issues

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which not only includes drivers of climate at regional scales, but also those associated with human-environment relations and prehistory/history. The manuscript thereby addressed relevant scientific issues within the scope of CP.

Specific Comments

In some cases the written expression could be slightly improved upon (see below): these are minor matters that could be used to make the manuscript more readable.

In other areas the manuscript spends some time on the plans for the future (this even extends to the Acknowledgements (viz. “and will contribute”))! This is perfectly acceptable but it is potentially dangerous to set out ambitious plans! This is most obvious on page 320: it is possible that this ‘wish-list’ could be trimmed slightly, leaving (and thereby placing greater emphasis on) the overall aims.

Finally: too much detail on the protocols for the compilation of data in the pollen networks is included on pages 320–321. This could be profitably reduced for the intended audience.

Technical Corrections

These suggestions are offered with the aim of improving the written expression in some places. Please feel free to disagree or use where you see fit!

Page 309 Line 19 (P309 L19 in future) has “The REVEALS model is proved to provide...” This would be better as “The REVEALS model is demonstrated to provide...”

P309 L20 The sentence “Thus, the application of REVEALS opens up the possibility of achieving a more robust assessment of land cover at regional to continental-spatial scale throughout the Holocene.” Could be re-expressed as:

“This will achieve a robust assessment of land cover at regional- to continental-spatial scale throughout the Holocene.” (The changes do not include the colloquial ‘opens up’,

removes the dubious 'more robust' and is shorter to boot.)

P310 L7 includes "Land ecosystems" where "Terrestrial ecosystems" would be better.

P311 L1 The first sentence could be better expressed as: "Objective long-term records of vegetation/land-cover of the past are, however, limited."

P311 L2 could be re-expressed as: "Palaeoecological data, particularly fossil pollen records, have been used to describe vegetation changes regionally and globally (e.g. Prentice and Jolly, 2000; Williams et al., 2008), but unfortunately, they have been of limited use for the assessment of human impacts on vegetation and land cover (Anderson et al., 2006; Gaillard et al., 2008)."

P311 L11 "the most used databases.." is a little clunky. Perhaps: "the most popular databases"?

P311 L15 The sentence: "But all these datasets show discrepancies between them in their estimates of land cover during key time periods of the past." Could be re-expressed as: "Notably, all these datasets show inconsistent estimates of land cover during key time periods of the past."

P311 The statement "All ages below are given in calendar years AD/BC or BP (present=1950)" could be deleted as there is little confusion in the manuscript. (If it is left in then "calendar" is mis-spelt.)

P312 L3 first sentence could be "As human population and density are generally..."

P312 L5 The sentence starting "Existing databases..." gets confusing: I suspect that the 'database' on line 8 is redundant.

P312 L13 on This is presumably a description of output from Brovkin et al. (2006) however the text does not make this clear.

P313 L 16 This could be "In the most recent version of HYDE (3.1)...".

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P314 L1 "was caused almost as much by..." is colloquial and would be better as "This transformation resulted from the development of almost equal proportions of pasture and cropland."

P314 L13 The sentence could be cut into two sentences as follows: Recently, Kaplan et al. (2009) created a high resolution, annually resolved time series of anthropogenic deforestation in Europe over the past three millennia. Their model was based on estimates of human population for the period 1000 BC to AD 1850 and the suitability of land for cultivation and pasture."

P314 L19 The text refers to "major differences", presumably between the model with and without technological developments. The sentence starting "The latter produces major differences..." should include what the differences are with.

P314 L20 The sentence starting "Lemmen (2009)..." seems like a good place for a paragraph break.

P315 L1 "turned into" is colloquial: 'developed as' might be better?

P315 L4 "centers" should be 'centres'.

P315 L5 is "extensification" really a word? What does it mean?

P316 L15 This sentence would be better as: "The differences between the maps of Kaplan et al. (2009) and the HYDE database at AD 1800 are striking."

P316 L16 This sentence could be: "The results of Kaplan et al. (2009) provide estimates of deforestation in Europe around AD 1800 that compare well with historical accounts (Krzywinski et al., 2009; Gaillard et al., 2009), whereas this is not the case for the HYDE database."

P316 L14 "and could state" would be better as 'and found...'.

P316 L17 Fossil pollen is also used to reconstruct vegetation at a local scale: this sentence could include this scale and a reference at the end might be apt.

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P316 L22 could be “In northern Eurasia, Tarasov et al. (2007) developed a method. . .”

P317 L6-9 This is a clunky section that could be shortened to: The pollen-vegetation relationship in percentages is not linear because of percentage calculations and the effects of long-distance pollen from regional sources. Therefore 0% and 100% of a taxon in the vegetation cover will not necessarily correspond. . .”

P317 L12 the sentence could be: “In spite of the problems described above, theoretical analyses (Andersen, 1970; Prentice, 1985; Sugita, 1994) have recently contributed to development of a new framework of vegetation/land-cover reconstruction, the. . .”.

P317 L28 the use of lists is a little overdone in the manuscript. The numbered list could be profitably removed from this sentence.

P318 L8 “The share of” is a little colloquial and could be “The proportion of. . .”.

P318 L20 NW, W and N should all be written out.

P319 L 5 “at the relatively coarse resolution of Global Circulation Models. . .” (added relatively and deleted ‘the’).

P322 L11 obliquely refers to the IPCC Fourth Assessment Report (2007): this should be explicit and included on reference list.

P322 L12 is clunky and could be better as: “The REVEALS model provides better estimates of the regional vegetation/land-cover changes, and in particular for open, herb-dominated (NAP) areas.”

P322 L15 is clunky and could be better as: “REVEALS thus allows a more robust assessment. . .”.

P322 L 18 includes the statement that the resulting networks are ‘expected’ and ‘valuable’: it could be better expressed as: “The LANDCLIM project and NordForsk network are designed to provide databases on the regional changes in vegetation/land-cover in north-western Europe that should prove to be useful to fine-tune LPJ-GUESS and

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evaluate RCA3.”

P323 L12 could say “This implies that the approach of the LANDCLIM project could, in future, be applied to regions other than Europe.”

P323 L18 “never go back in time” is colloquial: the sentence could be: “these estimates do not extend beyond AD 1700. . .”

P324 last line could say: “will be available in the near future.”

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