Dear Editor,

We are thankful for the valuable comments by K. Minkkinen, who has pointed out an unfortunate mistake by us, setting the soil C content too low (pp 19692 in the manuscript, more details see his comments). We have checked this thoroughly and explained this in my published reply to his comments. This was an error by us using numbers for 10 cm depths as it was 50 cm, thus too low. Now I have rerun the model with the updated soil C content (being about 5 times larger in 2007) and found that this error would not much affect our results and conclusion. In the following, we show some of the important simulated results with the updated model, and compare this with earlier model settings and discuss this.

First, CoupModel handles the soil biochemical and physical processes in separate module routines which are uncoupled in the current version, therefore the soil physical properties will not change by our error in the setting of soil C content. The simulated abiotic variables then remain the same, like ground water level. The erroneous setting of soil C content thus mainly influences the size of the C and N fluxes. Figure 1 below shows the simulated results, for both the earlier and corrected model, including peat decomposition (a), and NEE (b).

The correction of the soil C content in 2007 needed back calculation to 1951, made linearly by use of IPCC EF. This needed a change of the decomposition coefficient (rate constant), which we obtained by calibration. In the updated model we find the peat decomposition to be more realistic, with less decrease over time than earlier, which then fell by >70%, mainly due to exhaustion of soil C, see table 1 below. Table 1 shows the soil C budget of each modelled soil layers (down to 1 m) from 1951 to 2011. The soil C content at the uppermost 5 cm layer increases due to the addition of plant litterfall. The other soil layers all lose soil C and the amount of losses during the 60 years shows a decreasing trend by depth. This is due to soil water content increase, and when the soil is saturated (like the 90-100 cm layer) the decomposition is zero. Our updated model shows the soil still to contain large amount of C after 60 years which is also more realistic than earlier model settings.

The average NEE is now slightly smaller in the updated model than in the earlier, due to a higher peat decomposition and a smaller plant growth. An increased N_2O emission was however found This together makes our conclusion still valid, that forest on drained fertile peatlands are potential large GHG sources and possibly an even stronger source compared to earlier model settings.

Again we are awfully sorry for this mistake and we will surely correct this in great detail during our revision of the manuscript.

Sincerely,

Hongxing He

On behalf of all the authors

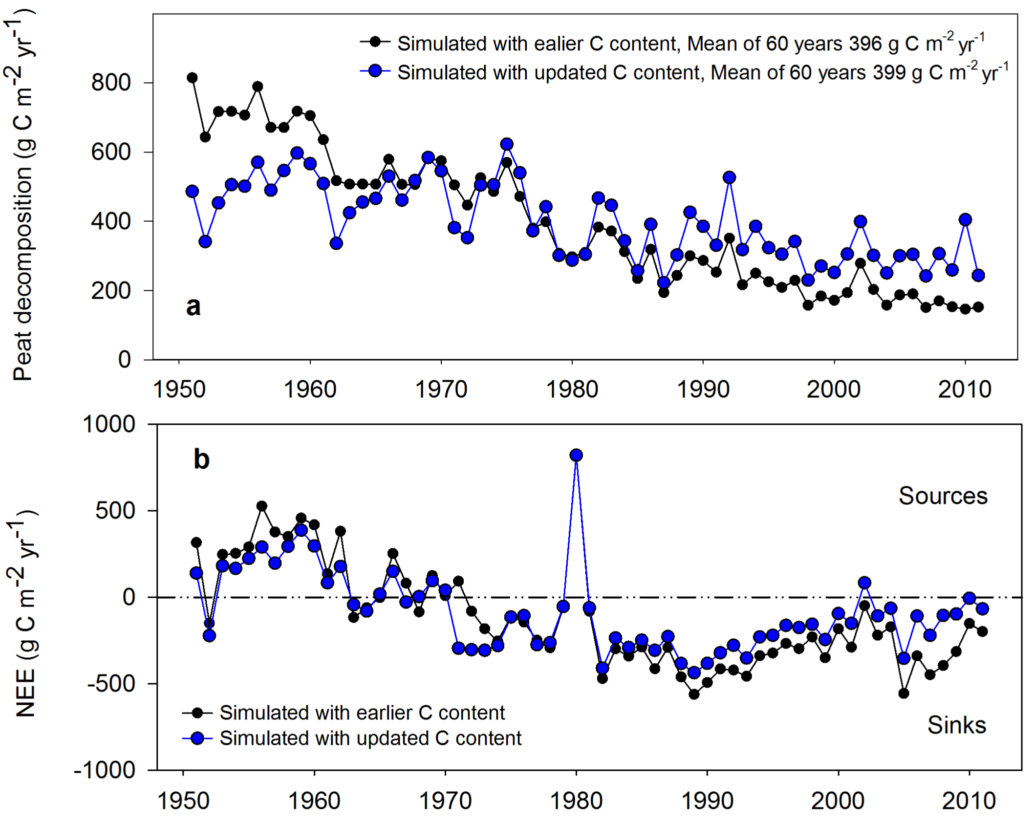

Figure 1. Modelling results of (a) peat decomposition and (b) NEE, with earlier initial soil C content (black) and updated soil C content (blue)

Table 1 Soil C content in the soil profile during 1951 to 2011

Soil layers (cm)	Layer thickness (cm)	Updated model			Earlier model		
		Soil C 1951 (gC m^{-2})	Soil C 2011 (gC m^{-2})	Losses in soil C (gC m^{-2})	Soil C 1951 (gC m^{-2})	Soil C 2011 (gC m^{-2})	Losses in soil C (gC m^{-2})
0-5	5	6268	7776	- 1508[1]	1343	938	405
5-15	10	12536	7497	5039	2686	468	2218
15-25	10	12536	7682	4854	2686	331	2356
25-35	10	12536	7943	4593	2686	268	2418
35-50	15	18804	14749	4055	4029	798	3231
50-70	20	25032	22108	2924	5333	2145	3188
70-90	20	25032	24299	733	5333	3855	1478
90-100	10	12516	12516	0	2133	2121	12

Note: [1] negative change means an increase of soil C