

Geosci. Model Dev. Discuss., referee comment RC1  
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## **Comment on gmd-2021-185**

Anonymous Referee #1

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Referee comment on "Comparing an exponential respiration model to alternative models for soil respiration components in a Canadian wildfire chronosequence (FireResp v1.0)" by John Zobitz et al., Geosci. Model Dev. Discuss.,  
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This manuscript is an interesting paper presenting a qualitative evaluation of soil respiration models and their parameter estimation process. However some sentences or statements need additional clarification. Some extra work is also needed on figures in order to facilitate their reading and understanding.

Moreover, there is no mention and introduction of the FireResp model in the abstract or the introduction while it is mentioned in the title.

Below the main issues that need to be addressed.

Line 20 : remove brackets "(2009)".

Line 60 : The way the hypothesis is framed confused me during the first reading. What means with "the association of autotrophic respiration with the time ..."? In line 253, the association is characterised as positive and I suggest doing so here.

Line 63 : Rs is not defined before. I assume it means soil respiration ?

Figure 1 : the used of colour either shadings or dots, makes the map difficult to read. For instance, the colour blue and green used to represent sites 1990 and 1968, are in the same tint as the forest and river of the map. Moreover the layering of shadings and dots makes the different dots hard to distinguish. I suggest using shape instead of colour for

dots. There is another red area at the north of the middle map. Is it another fire place ?  
Finally, the legend is too small.

Line 77 : "with a stand replacing fire" - I did not understand what this means.

Lines 92-93 : I am not sure to see how this was computed since incubation data is given in 5 or 10 cm depth. I suggest detailing this step a bit more.

Line 94 : It would be interesting to have reference here to support this assumption.

Figure 2 : Where does the point (1,50) comes from ? Same as the figure 1, it is hard to distinguish colour of the dots.

Table 1 : It would make the reading of the table easier if the acronyms are defined in the legend.

Line 101 : First occurrence of the FireResp model. It was not introduced before.

Line 112 : "yield" and "assume".

Line 123 : The equation 1 includes the volumetric soil moisture  $fw$ , after simplifying the equation through defining  $gx$ ,  $fw$  is not used in  $gx$  nor  $Rx$ .

Line 139 : the end of the sentence is a bit confusing.

Line 177 : This paragraph is not clear to me. I don't get why examining the effect of incubation data on the model is important. Why is it a good thing to reduce the estimation from field data ? Was it an objective of the paper ?

Line 178: even though it was defined before, I suggest specifying here again what RH refers to.

Figure 3: in the caption, "Rows refer to the chronosequence site".

Figure 4 : same as figure 3 "Rows refer to ..."

Line 264 : "We attributed the difference between figures 3 and 4 to the range ... "

Line 326 : How "overwhelmingly edge hitting" is defined ? As far as I understand, we are talking about the site 1990 and the computation of RA. Parameters associated are then  $Q_{10,R}$ ,  $k_R$  or  $g_R$ . And from what I see in figure 5 and supplementary Information,  $g_R$  and  $Q_{10,R}$  are edge hitting for all submodels. How the no impact on the near-zero values of RA was evaluated ?