Response to Editor

We greatly appreciate the editor for providing constructive comments, which have helped us improve the paper quality significantly. We have addressed all of the comments carefully, as detailed below. The original comments are in black and our responses are in blue. Major changes made in the revised manuscript are in red color.

Comment 1:

In your response to Reviewer #1, comment 1, you state that you define the error as the difference between the fire counts with the traditional method and your new one. I do not agree that this is an error calculation which implies the estimation of a statistical uncertainty. Please use a different wording.

Response:

We have replaced the term "error" with "overestimated fire spots" and revised the corresponding definition, which reads: "The overestimated fire spots are calculated as the number of fire spots identified by the traditional method minus those extracted by the novel method." We have also updated **Fig. 2** below.
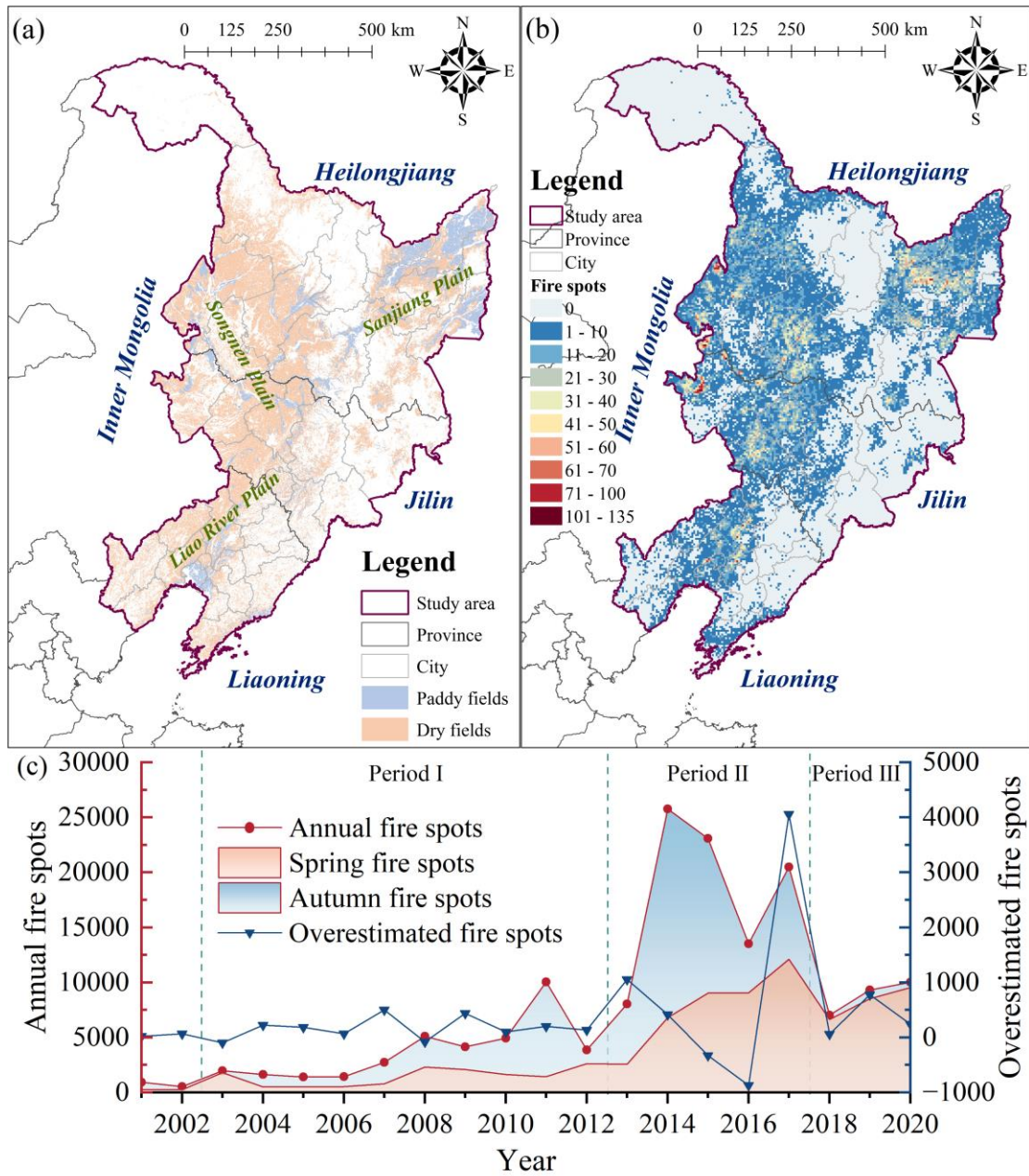
Fig. 2 (a) Spatial distributions of cultivated land in 2020 in Northeast China (https://www.resdc.cn), (b) spatial distributions of the total number of fire spots during 2001-2020 in Northeast China, and (c) seasonal distributions of the annual fire spots, and annual overestimated fire spots by the traditional method from 2001 to 2020.

Comment 2:

I do not think that your answer (i.e. the change of the caption of figure 3) is what the reviewer asked for. They suggested a comment added to the caption, stating that the colorbar is different for each crop. I believe that this is reasonable and needed. Same applies to Figure 7 with regard to regions and crop and to Figure 4 and to supplementary figures. My impression is that no other figure captions were modified taking into account the reviewer's comment. Please revise captions of all figures to which this applies.

Response:

We have added notes to the figure captions, stating that each colorbar is different and indicating the respective range each represents, which reads: "**Fig. 3** The daily frequency distribution of fire spots from various straws burning: (a), (b), (c), and (d) represent corn, rice, bean, and wheat straw, respectively. Note: The x-axis is Year; the y-axis is DOY; and the range of colorbars (indicating fire spots) is different for each crop, with values ranging from 1 to 1,029 for corn, 1 to 615 for rice, 1 to 345 for beans, and 1 to 35 for wheat."; "**Fig. 4** The cumulative GHGs emissions from open straw burning in Northeast China from 2001 to 2020 for CO_2 (a), CH_4 (b), N_2O (c), and CO_2-eq (d) emissions, respectively. Note: The range of colorbars (indicating emissions) is different for each GHG, with values ranging from 0 to 225 Gg for CO_2, 0 to 597 Mg for CH_4, 0 to 17.4 Mg for N_2O, and 0 to 245 Gg for CO_2-eq."; "**Fig. 7** Annual CO_2-eq emissions, yield of straw, rural residential coal consumption, and straw burning bans in (a) Northeast China, (b) Heilongjiang, (c) Jilin, and (d) Liaoning from 2001 to 2020.

Note: The range of y-axis is different for each region. The blue y-axis indicates CO_2-eq emissions, with values ranging from 0 to 50 Tg for Northeast China, 0 to 35 Tg for Heilongjiang, 0 to 10 Tg for Jilin, and 0 to 6 Tg for Liaoning; the green y-axis indicates yield of straw, with values ranging from 0 to 160 Tg for Northeast China, 0 to 90 Tg for Heilongjiang, 0 to 60 Tg for Jilin, and 0 to 40 Tg for Liaoning; and the red y-axis indicates rural residential coal consumption, with values ranging from 0 to 7 Tg for Northeast China, 0 to 2 Tg for Heilongjiang, 0 to 3 Tg for Jilin, and 0 to 4 Tg for Liaoning."; "**Fig. S2** (a) Spatial distribution of atmospheric monitoring sites in straw burning areas in Northeast China; (b) and (c) represent the variations of fire spots and particulate matter (PM_{10} and $PM_{2.5}$) concentrations (http://www.cnemc.cn) during the period of open straw burning in spring and autumn, respectively, in Northeast China from 2014 to 2020. Note: The range of y-axis is different for each season. The red y-axis indicates fire spots, with values ranging from 6000 to 14000 for spring, and 0 to 20000 for autumn; the blue y-axis indicates PM concentrations, with values ranging from 40 to 120 $\mu g \cdot m^{-3}$ for spring, and 30 to 150 $\mu g \cdot m^{-3}$ for autumn."