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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Evaluating forest fire probability under the influence of human activity based on remote sensing and GIS" *by* Wei Yang and Xiaoli Jiang

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Referee #3

(1) there is a major confusion between fire probability and fire risk, which are not the same. The discussion only mentions fire risk, but the analysis is only probability. Concepts are not clear. Author's response: accepted Author's changes in manuscript: this part was revised

(2) In the abstract indicators is confused with dimensions or aspects; need to clarify what type of measurement is being provided, in the end is a clasisfication in 5 cat-

egories. Author's response: accepted Author's changes in manuscript: line 11 was revised to: 'fire probability indicators we selected from four aspects' Line 15-16 were revised to :' A natural breaks method was used to divide the FFPI into five classes: very low, low, moderate, high, and very high.'

(3) More results are needed in the abstract; for example, what is the proportion of the study area in the high and very high classes, i.e., the most hazardous ones? Author's response: accepted Author's changes in manuscript: the proportion was added in line 17-18.

(4) Introduction Purpose too general. Need to expand on the specific objetives and on the usefulness of the approach, particularly for the area where it is being applied. Introduction is missing the context of fire in the study area/country or region considered, and why is this important there. Has fire probability been analysed there before? Author's response: the objectives were revised, the importance of the region was introduced in part 2.1. Author's changes in manuscript: line 63-68 were revised

(5) The authors present ideas as "widely used" but then only provide 1 single reference; introduction needs better scientific support. Author's response: accepted Author's changes in manuscript: add references in line 54

(6) Methods - The description of unit areas has to be harmonized (km/hm/ha??). Author's response: accepted Author's changes in manuscript: harmonized to ha

(7) The description of the study area refers to very low mean temperatures and does not provide a value for annual rainfall. The number of fires in such a large region is very small, all this does not support the claim that forest fires are a concern for the region.Is it really important there? Some costs are presented for loss of trees (which depends on type and use of trees), but further arguments are needed to defend this view. Author's response: as showed in fig.1 and fig.3, the forest and the fires were distributed in the northwest and middle part of Heihongjiang province, these region belong to different cities, so we could only choose the province as the study area.

Also, Chinese government has taken drastic measures to prevent fires, but there are also so much fire happened. The study area is the most fire influenced area in China.

(8) Table 1 - Need to add detailed source of data (institution providing them, links...). Also, the units of measurement for each variable are needed Author's response: accepted Author's changes in manuscript: Table 1 was revised according to the comment

(9) How many years were used for the multi-year average of rainfall (to calculate drought?) Author's response: six years from 2000 to 2005 Author's changes in manuscript: the data were changed from 2000 to 2005

(10) The weighting of the variables is not properly supported; were preliminary tests done? Was it expert opinion? Author's response: it is from expert opinion Author's changes in manuscript: line 158 was revised to : "A numerical score were obtained from experts which is used to rank each decision alternative"

(11) Min and max values of NDVI - For the study area? in a certain time interval? Author's response: Min and max values of NDVI were revised to NDVI value in soil and vegetation pixel. Author's changes in manuscript: line 123 to line 124 were revised

(12) The last 2 columns of Table 2 are not needed, repetitive. The reason for the scores given to each variable needs to be explained, as this changes the results. Author's response: because of the variables has different unit, it can't be calculated together, so the variables were reclassified into five ranks. Author's changes in manuscript: The last 2 columns of Table 2 were deleted.

(13) The natural breaks method to classify a variable does not allow the application of the same classes in another region; have other classes been tested (mean/SD?) Author's response: mean and SD methods were both tested, and the natural breaks method showed the best result.

(14) I understood that the independent variables were obtained for 2017, at least the remote sensing ones. However, the number of fires (dependent variable) is from 2000

to 2005. There is a time lapse here that affects the results, particularly with regards to vegetation and drought conditions. It has to be taken into account, as vegetation and weather factors are not representative of that fire period. This has to be changed Author's response: accepted Author's changes in manuscript: the data can be changed to 2005

(15) The analysis of the distance is rather weak, although the authors have kept a part of the data for validation. The number of fires per distance to settlements and roads depends as well on the availiability of vegetation within those distances; at 1 kmdistance to settlements, is there enough vegetation to burn? Is it farmland, grasses or other? A deeper analysis of landcover around settlements and roads needs to be done. Also, distance classes have different intervals, it affects the results (nr. fires)? Author's response: most of the studied use the distance to settlements and roads to measure the influence of human on fire probability, different distance represent different human activity intensity, this part is just considering human influence, the vegetation is considered in the part of vegetation condition.

(16) Table 4 presents the results for regions/cities, but no further info has been provided regarding these administrative areas; what is the proportion of forest area in each region? How is the spatial distribution of fires in each region? Further conclusions cannot be drawn from here. Author's response: accepted Author's changes in manuscript: as there are 13 cities, and some of them were low fire probability, we can't further discuss each city. So, the most hazardous cities including Great Kingan Region, Yichun city and Mudanjiang City were further discussed.

(17) Even the concepts are confused, probability is not risk (L260, Different fire risk distributions at the city scale). Why city scale? Have urbanized areas been removed from the analysis? Forest fires do not occur in urban settings. Arguments are not fully supported by the analysis done Author's response: accepted Author's changes in manuscript: the part 4.2 was deleted.

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