

Interactive comment on “Calibration of FARSITE fire area simulator in Iranian northern forests” by R. Jahdi et al.

R. Jahdi et al.

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Reviewer #1: General comments The article is not innovative because it consists in the calibration of a well-known fire behavior model (FARSITE) to a set of 4 fires in Iran. For this reason I think it should not be accepted in NHESS. In addition, this is an article: (i) very extensive that needs to be reduced by removing a large part and unnecessary repetition of text information displayed in tables and figures; (ii) repetition of the same information in different parts that also need to be removed; (iii) confused and needing to be rearranged because of the dispersion of information across different sections. There are a lot to explain and too many corrections to make. Most of the discussion section is composed by general aspects (e.g. lines 380 – 394), a repeated presentation

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of results (e.g., lines 410 - 422) but misses the true discussion/interpretation/validation of the obtained results. At this stage, the manuscript cannot be accepted for publication and should only be reconsidered after a major revision.

Thank you for the comments. We improved the manuscript taking into account the points highlighted.

Specific comments 1. Lines 40 – 50, It does not seem to follow the nheess rules for the citations We corrected the citations.

2. According to the nheess “Informal or so-called “grey” literature may only be referred to if there is no alternative from the formal literature.” With this in mind please remove citations on lines 150, 162, 783, 788 and 798; We removed the informal literature.

3. Line 102, please replace “We tested different standard fuel models” by “We tested two sets of different standard fuel models”; Done

4. Lines 104 – 105, I believe that the authors did not analyzed this aspect; We do not agree with this comment. For instance, Table 5 reports rate of spread, fireline intensity and flame length for each standard fuel model, for the best simulation, and for each case study.

5. Please avoid relative or imprecise concepts. For example, in line 111, please replace “This study was carried out considering a set of fires” by “This study was carried out considering a set of four fires”; what is a “not too strong” wind (line 361)? What are “relatively moderate values” (line 423)? Done. We also specified the wind speed conditions and better explained the sentences.

6. Line 116, please provide a definition of “xeric weather conditions” or substitute that concept by a more known concept by the general reader; We replaced the term “weather” with “climate”. We do think that the concept of xeric does not need further explanations.

7. Line 117, Guilan, as well as, other provinces mentioned in the manuscript are not

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shown in Figure 1. Please remove these references in the manuscript or include the names of the provinces in Figure 1; Done.

8. Line 117, the same for the South Caspian forest belt; Done

9. Line 122, please remove the "(0_C)"; unless the air pressure is very different from the normal atmospheric pressure, it is unnecessary; the space between the temperature value and the degree symbol should be removed; Done

10. Lines 124 – 130, please see comment n._ 1; Done

11. Lines 131 – 134, please see comment n_ 7; Done

12. Lines 144 –147, did the author computed the trends? How? Were these trends statistically significant? If not please do not use the term "trend"; We rephrased the sentence.

13. Line 147 – 148, provide values to prove the sentence or a citation; Done

14. Line 150 – 152, what is compatibility of this sentence with the sentence of lines 118 – 120? Please explain; Although most of the annual rainfall occurs in autumn, there is a short period before the most relevant precipitations when hot and dry winds desiccate the light surface fuels and many fire ignitions, associated to anthropic activities, cause a large number of short duration and small fires (< 10 ha).

15. Line 155, Why "March to December"? Why not "Jun to December"? please explain end replace "with the peak of ignition and area burned in June and November" by "with two peaks of the number of fires and burnt area in June-July and November-December" Done

16. Lines 156 – 157, it is not clear the meaning of the burnt area value. It corresponds to annual averaged? Averaged fire size? Please explain. The same in line 160; Done

17. Lines 159 – 160, please replace by the size of the largest fire; We added this information.

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18. Line 166, please do not start this section with "FARSITE simulations" because you are just defining the fires/case studies; The initial phrase of the paragraph was revised.

19. Line 170 – 173, the information from all these sources was concordant? The reader do not know how (exactly) the fire ignition locations and real fire perimeters were determined; please explain; We rephrased the sentence.

20. Lines 174 – 213, most of this text can be removed because it is already shown in the figures/Tables; We shortened this part of the text.

21. Lines 218 – 220, what does this mean? It means that the map is not sufficient accurate/useful? Please explain exactly how the fuel mapping and canopy were produced; We rephrased and better explained the sentence. The existing land cover maps of the study area do not provide detailed information on the vegetation (especially for forest types, where we had no information about forest understory, fuel depth, canopy cover, etc.). This is the reason why we carried out the field sampling focusing on different land use land cover types.

22. Lines 222 – 223, please explain why different number of line transects and transect length in the two regions; This choice was related to the very complex topography of one of the study areas (Siakhal) and the related difficulties in carrying out the sampling activities.

23. Lines 228 – 229, is this the only/best method? Please explain; As the reviewers know, various methods can be used for sampling fuels. The line intersect sampling method (LIS; Marshal et al., 2000; 2003) was considered the most appropriate for the purpose of this work. About the visual estimation of cover canopy in fuel sampling, "Visual estimation is the most used method to estimate the canopy cover when we lack of other more detailed information like high resolution aerial photographs or LIDAR. The accuracy and error of the canopy cover estimate is more than acceptable for fire spread and behavior modeling (see Fiala et al., 2006)."

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24. Lines 236 – 251, most of this information is repeated because it is already provided in Tables; We shortened this paragraph.

25. Lines 260 – 262, there are two weather stations for GNP in Figure 5. Data from both stations were used to simulate fires in this region? It seems so. Please explain how; what is the altitude of the weather stations? Did you correct the data? How? Please provide evidences that the weather stations are representative of the fire locations (please see lines 392 – 393); The altitude of the weather stations was presented in Table 2. In Golestan National Park we used the two nearest weather stations due to the lack of wind data from the nearest weather station (Dasht-Golestan climatology station). So we used only the second nearest weather station (Robate-GharehBil automatic weather station). For this reason, we removed the reference to the Dasht-Golestan station from the table 2.

26. Lines 267 – 268, as before, what were the values used: from the literature, from observations of a mixture of the two? Please explain; Literature data were used to estimate the live woody fuel moisture content of a few shrub and tree species (e.g. *Juniperus* spp., *Quercus* spp.).

27. Line 272, why mentioned Table 5 before Table 4? Corrected

28. Line 275, why? Please explain; The adjustment factor is used to tune the fire spread rate in case the simulated ROS does not match the observed values, if some measurements of the observed ROS for given fuel models and environmental conditions are available. Setting the adjustment to 1.0 means that we did not modify the simulated ROS. Using adjustment factors would have supposed analyzing thousands of possible fuel model adjustment scenarios and combinations. In that work the aim was to identify the standard fuel models that better replicate observed fire events without the modification of the adjustment factor.

29. Lines 276 – 277, it is not clear if suppression activities were present during the studied fires. Please explain (please see lines 414 – 416); During the real events, some

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suppression operations were carried out, mostly in the rear and in the rear-flanks. We did not simulated suppression using barriers or fuelbreaks due to the lack of accurate information regarding suppression activities.

30. Lines 281 – 282, so, why repeat? We removed the repeated sentence.

31. Lines 284 – 285, repeated in lines 270-271; please remove; We removed the sentence in lines 270-271

32. Lines 290 – 303, unnecessary but: :OK.

33. Lines 306 – 307, these are “results”; The sentence was moved to the results.

34. Lines 312 – 313, How to define the best simulations? A definition should be provided here and not let the reader wait until line 320; A short explanation about what is the best simulation was added in the "Results".

35. Line 319, what is the definition of “4.1 ha and 5.5 ha were respectively underestimated and overestimated by FARSITE”? How were these values computed? Please explain in the text and also in Table 4 and 5; In lines 277-278, "Material and method", we defined the meaning of "underestimation" and "overestimation", and we made reference to other previous papers for more detailed information (Arca et al 2007; Salis et al 2013). The burned area agreement, underestimation area and overestimation area, were computed in GIS environment spatially combining simulated burned areas (FARSITE simulation outputs) and observed burned areas (observed fire perimeters).

36. Line 317 -355, most of this information is a repetition of the information already provided in tables; We think that highlighting the most relevant results from tables (where all the results obtained are shown) helps the reader to follow the paper and is necessary for a better understanding of the text.

37. Lines 357 – 358, the acronyms ROS, FLI and FML were already defined; please avoid repetitions; however, a better definition of those concepts (for example the units could be provided in the first time they appear in the text; We added the units when we

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defined the acronyms for the first time, and therefore we deleted the units from lines 357-358. We prefer to maintain the definition of the acronyms ROS, FLI and FML in these lines.

38. How do the results of section 3.2 differ from those obtained in other studies with (or not) similar conditions? Comparison of the results with other studies on fire behavior parameters was added to the discussion.

39. Line 381, what do you mean by the fire "itself"? please explain; We replaced "itself" by "environment".

40. Line 385, please replace "calibration protocol" by "calibration process"; Done

Tables and Figures

41. Table 1, please complete the table caption; for example, see caption of Table 5; It is not clear that the spatial coordinates respects to the fire ignition point; The elevation is the altitude of the ignition point or the averaged altitude of the burnt area? We modified the table caption to clarify this point

42. Table 2, please be coherent with the altitude information of the weather stations; Done

43. Table 3, please provide a definition for FMC in the Table caption. Once again, please see caption of Table 5; Done

44. Table 4, please provide a definition/explanation for the "FARSITE underestimation" and "FARSITE overestimation"; the observed burnt area could be provided in Table 4, for example, in parenthesis below the "fire name"; We added the observed area burned in parenthesis as suggested by the reviewer. See line 277-278 in "Material and method" for "underestimation" and "overestimation" definition, and also previous papers for more detailed information (Arca et al 2007; Salis et al 2013).

45. Table 5, please replace "Wildfire Area" and "Simulated Area" by "Observed fire

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size" and "Simulated fire size"; I believe that there is a mistake in line 770, and "Table 5" should be replaced by "Table 4"; We replaced the caption of the columns in the Table 5. Regarding the second point, in line 770 the reference to Table 4 is correct.

46. Figure 1, the north arrow is not necessary if the map is N-S oriented; remove the plots of the right hand side (province of Siahkal and GNP), they are in Figure 5; and try to consider highlighting the borders of the Siahkal province and GNP, include their names in the left hand side plot and remove the reference from the legend; why "Azerbaijan" appear twice? Why the words "Turkey" and "Azerbaijan" are plotted over the Iranian area? Done

47. Figure 4, please move the legend to the top of the figure; change the x-axis to "Fire size class (ha)", and the yaxis to "Burnt area (%)" Done

48. Figure 7, please explain and change the caption (and the text) to explain which simulation are being plotted; the same for Figure 8; Done

49. Figure 8, why the results for the other two fires are missing? Regarding the Figure 8 we added the other two fires.

Technical corrections 1. Line 70, please remove the extra space; Done

2. Line 89, why use the ":"? Please consider rewrite the entire sentence. Done

3. Line 130, please remove the dot. Done

4. Line 257, please replace "for each case study" by "for each study area"; Done

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/2/C2894/2015/nhessd-2-C2894-2015-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 6201, 2014.

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Answers to Reviewers

EDITOR

COMMENTS FOR THE AUTHOR:

Editor's comments:

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Fig. 1.

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