

*We would like to thank Anonymous Referee #4 for their helpful comments and suggestions. We address the referee's general and specific comments below:*

### **General comments:**

This paper explored the development of a percentile-based calibration and evaluation of the Canadian Forest Fire Weather Index (FWI) System. In general, the research is very well justified, the methodology is properly demonstrated, and the results are carefully discussed. The datasets used, however, are limited in time. The work can be further improved in the future by employing a more extended historical archive of the FWI climatology data and fire data aiming for a better statistical significance. Accordingly, I suggest elaborating more in the current discussion on the use of limited datasets and their possible impact on the analysis and the results.

***Response:** We indicate that there are limitations to using <4 years of FWI data to create a climatology in section 5.2, namely that it may miss longer term fire danger extremes. This issue will be discussed more explicitly in the revised manuscript, and discussion of the limited nature of the IRS fire dataset will also be added. These points will be reiterated in the final discussion section.*

### **Specific comments:**

**Comment 1:** Page 7009 (Line 10): What is the average size of wildfires in the UK (especially between 2010 and 2013). What is the percentage of “minor” wildfires in comparison to “major wildfires”? Please discuss how the use of one or more of the Scottish Government criteria to define wildfire is statistically and analytically acceptable within the context of this research.

***Response 1:** The average fire size during the study period is between 0 and 5 m<sup>2</sup>, as all fires recorded in the IRS < 1 ha in size are reported as being within one of several broad size ranges, rather than to the nearest m<sup>2</sup>. Between January 2010 and December 2012, 195,125 vegetation fires were reported and 2,921 were then classified as wildfires. Wildfires accounted for 1.5 % of all fire occurrences, and 97.5 % of total burned area.*

*There is no particular statistical significance to using the Scottish guidelines to define a wildfire, however this definition is widely used within the UK wildfire community, and therefore can be easily understood within a policy/operational context, while allowing the smallest wildfires (that are unlikely to be influenced significantly by meteorological factors) to be filtered from the dataset. All of the above information will be added to the manuscript in section 3.2.*

**Comment 2:** Page 7013 line 5: The UK does not normally suffer from large wildfires, but in some years (e.g. in 2013) fires can burn areas larger than 500 ha. How was the size/extent of fires (especially that of exceptionally large burned area) taken into account in the analysis? Why the criterion “largest number of fire fighting appliances in attendance” was essentially selected to identify the cases of largest fire incidents.

**Response 2:** *Size/extent was not taken into account in this analysis. We originally used 'number of appliances' rather than burned area to identify particularly large wildfire events, as we believe that there is likely to be less uncertainty associated with the 'number of appliances' data. IRS burned area is fairly roughly estimated on site, whereas FRS' know well the number of appliances attending any given event. We have however investigated the use of burned area data as an alternative criterion for this selection. These results are broadly similar to those obtained when the 'number of appliances' criterion is used – while individual FWI component percentile values vary between incidents, at least one component exceeded the 95th percentile for 8 out of the 10 incidents (compared to 10 of 10 incidents when 'number of appliances' were used as the selection criterion). As burned area is a more widely used metric for indicating wildfire size, we will change the manuscript to make use of this criterion, and state that to account for the potential of added uncertainty with this metric, we also checked using the 'number of appliances' criterion.*

**Comment 3:** Page 7036: Citation Kitchen et al 2007 is not referenced. Please double check citations and references in the text.

**Response 3:** *Citations to Kitchen et al. (2007) are a mistake - they should refer to Kitchen et al. (2006). These will be corrected throughout the manuscript.*

**Comment 4:** Page 7034. It is also important to see and discuss the distribution of burned areas and not only the number of wildfire event in the UK by land cover types.

**Response 4:** *We propose adding a summary of burned area during the study period by landcover type to Table 1. Figure 2(c) will also be amended to indicate the monthly distribution of burned area relative to fire occurrence. The spatial distribution of burned area has been investigated, however this was found to be extremely similar to the spatial distribution of wildfire counts. We will include a statement to this effect, and discuss more generally these findings in Section 5.1.*

**Comment 5:** Pages 7034-7051: I suggest reducing the extent of the text in the Table and Figure captions. Large parts of the titles can be embedded in the text.

**Response 5:** *We acknowledge that the captions used are long; however this is intentional in order to allow the figures/tables to be better interpreted independently of the main text.*