Examining bushfire risk across Jamaica's rainfall zones using the Keetch-Byram drought index

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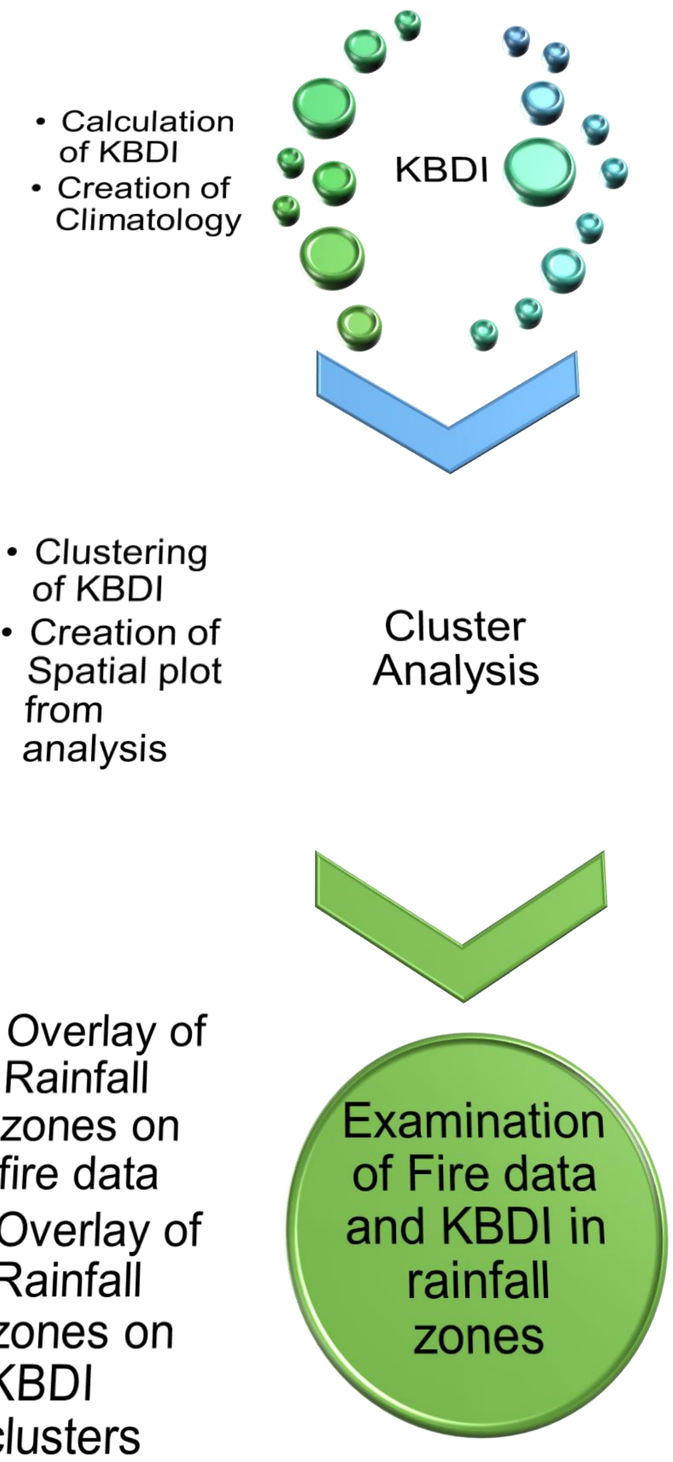
INTRODUCTION

There has been an increasing need to create a wild/bushfire early warning system for Jamaica and the Caribbean given the rising frequency of fire and drought occurrences. The first aim of this study is to characterize fire activity across Jamaica. Satellite fire activity data for 2010-2015 are obtained from the NASA FIRM MODIS 6 to identify areas with higher wildfire frequencies. Potential for fire incidences is investigated using the Keetch-Byram drought index (KBDI). The KBDI climatology is calculated over 2013-2015 and is used to infer risk of fire outbreak for a number of locations. Analyses are presented for Jamaica's 4 rainfall zones (State of the Jamaican Climate 2015).

METHODS



RESULTS

Figure 1: Showing 2010 – 2015 bushfires in Jamaica's rainfall zones- Zone 1/Interior zone in red, Zone 2/East zone in blue, Zone 3/West zone in yellow and Zone 4/Coastal zone in brown.

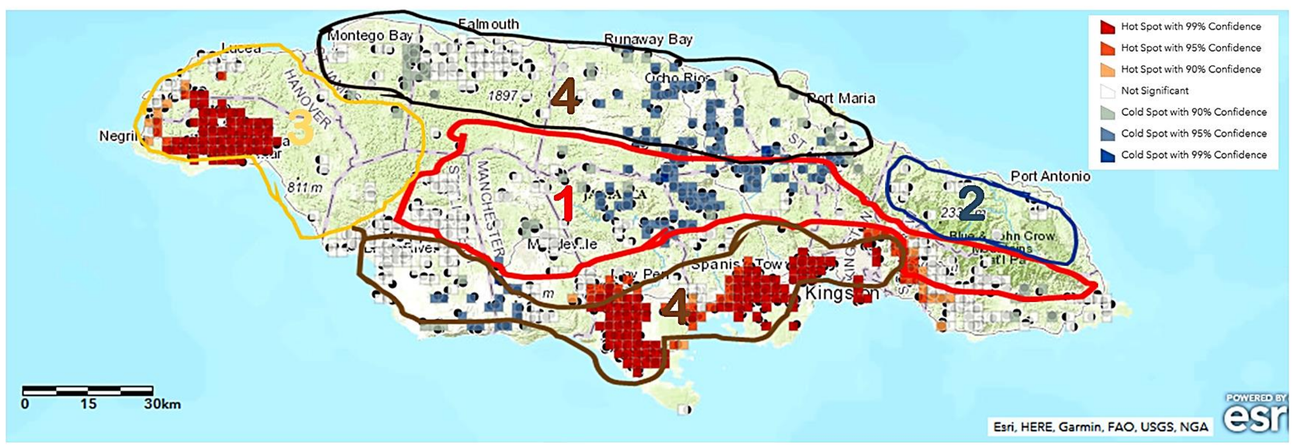


Figure 2: Showing GIS hotspot analysis of 2010 – 2015 bushfires in Jamaica's rainfall zones- Zone 1/Interior zone in red, Zone 2/East zone in blue, Zone 3/West zone in yellow and Zone 4/Coastal zone in brown. The key on the upper right hand side, shows the different significance levels for the bushfire clusters across the island.

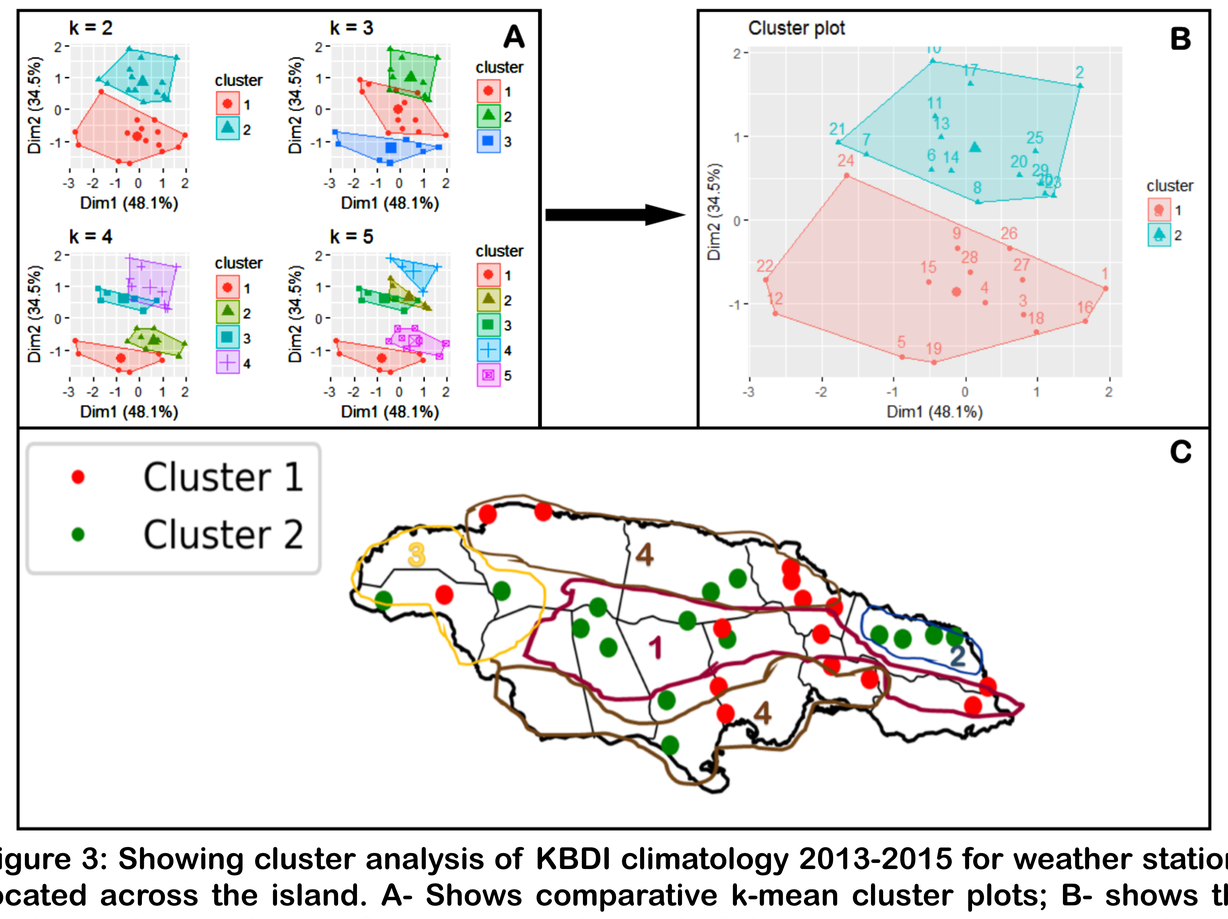


Figure 3: Showing cluster analysis of KBDI climatology 2013-2015 for weather stations located across the island. A- Shows comparative k-mean cluster plots; B- shows the best-selected clustering; C- shows a spatial plot of B (cluster 1- medium/severe threat, cluster 2- no/low threat)

CONCLUSION

- Largest clusters of remotely sensed fire activity and highest intensity fires for 2010-2015 are shown to occur in zone 4 (southern coast) and Zone 3 (southwestern coast).
- KBDI cluster analysis for 2013-2015 climatology has mostly medium-severe threat on the eastern side of the island spanning zones 1 and 4.
- All zones show a mixture of threat levels except Zone 2 (north eastern section of the island) which is consistently a no/low threat area
- Future work involves the use of climate projections from statistical or dynamical models to suggest future fire potential across Jamaica.