

How Have Past Fires Affected Today's Vegetation and Soil Quality in Mediterranean Climates?



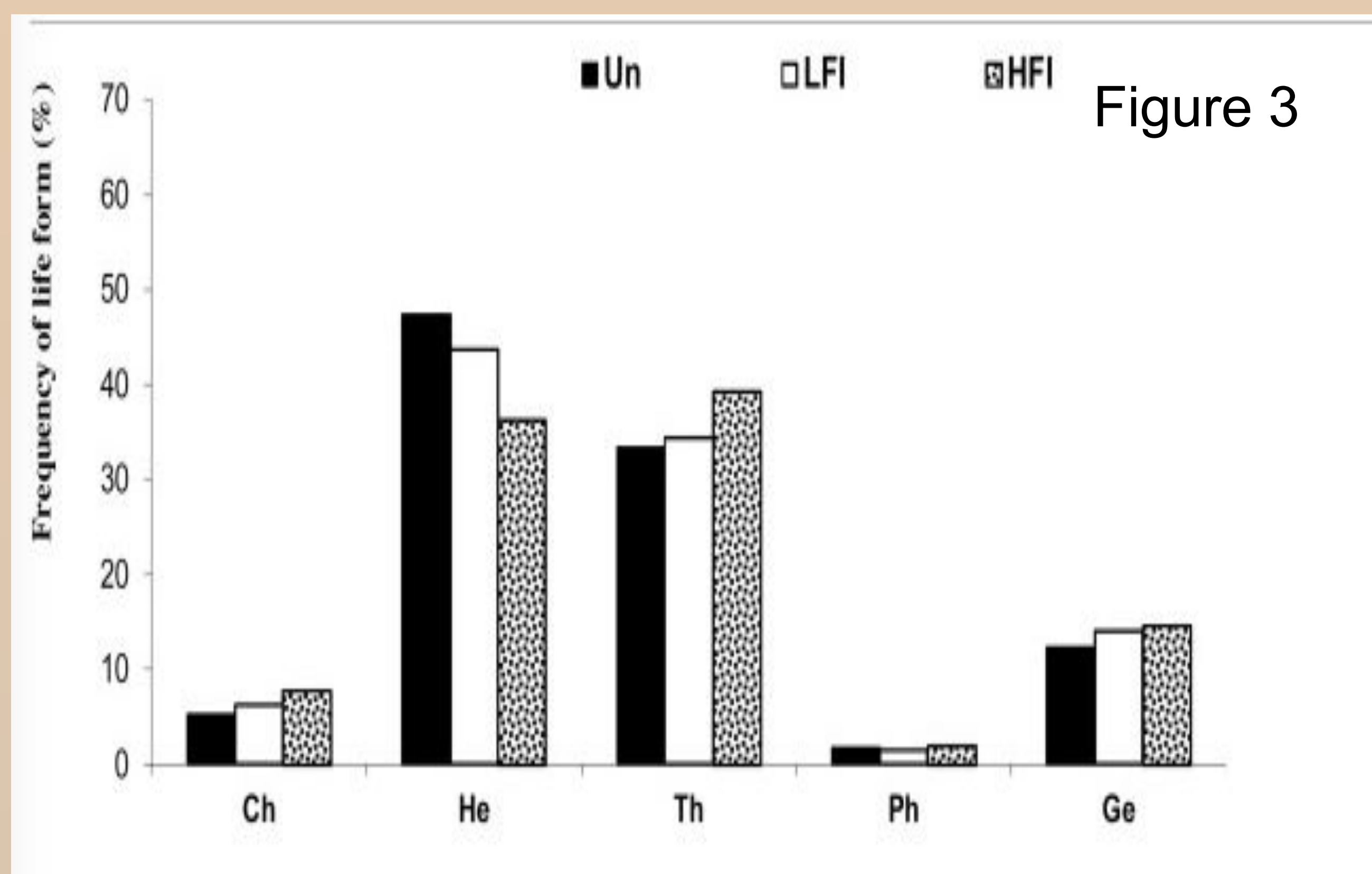
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Introduction

Throughout mediterranean climates, fires have effects on vegetation regrowth and soil quality. Recovery of vegetation after fires depends on the levels of burn severity, fires effect on soil and post-fire drought. Across California, climate change, drought stress, and forest management practices have caused increases in fire severity, however the characteristics of regrowth from more severe burns isn't fully grasped. We conducted a case study of existing literature to determine the effects of fire on vegetation regrowth in mediterranean climates across the globe. We found fires appear to have many effects on vegetation regrowth and soil quality. Studies show negative impacts to the soils thermal variability, but others show positive impacts with increased diversity of regrowth for future seasons. The results give us an understanding of how long vegetation takes to regrow post-fire and how this affects soil quality. This helps us to see the resilience in mediterranean climates post-fire.

Materials & Methods

We set up our case study by starting with a topic, fires, and narrowing our search with keywords. Once we found all of our sources and narrowed our question in on something specific, we compiled the various data from them to analyze it. We analyzed the data by looking at the graphs and captions in each source. We then determined if this was a positive set of data for vegetation regrowth and soil quality of if it wa a negative set. As we analyzed the various data and what it means, we came up with our conclusions.



This figure show the life form frequency of herbaceous species for each fire intensity. Un - unburned, LFI - low fire intensity, HFI - high fire intensity CITE

Heydari, M., Faramarzi, M., & Pothier, D. (2016). Post-fire recovery of herbaceous species composition and diversity, and soil quality indicators one year after wildfire in a semi-arid oak woodland. *Ecological Engineering*, 94, 688-697.

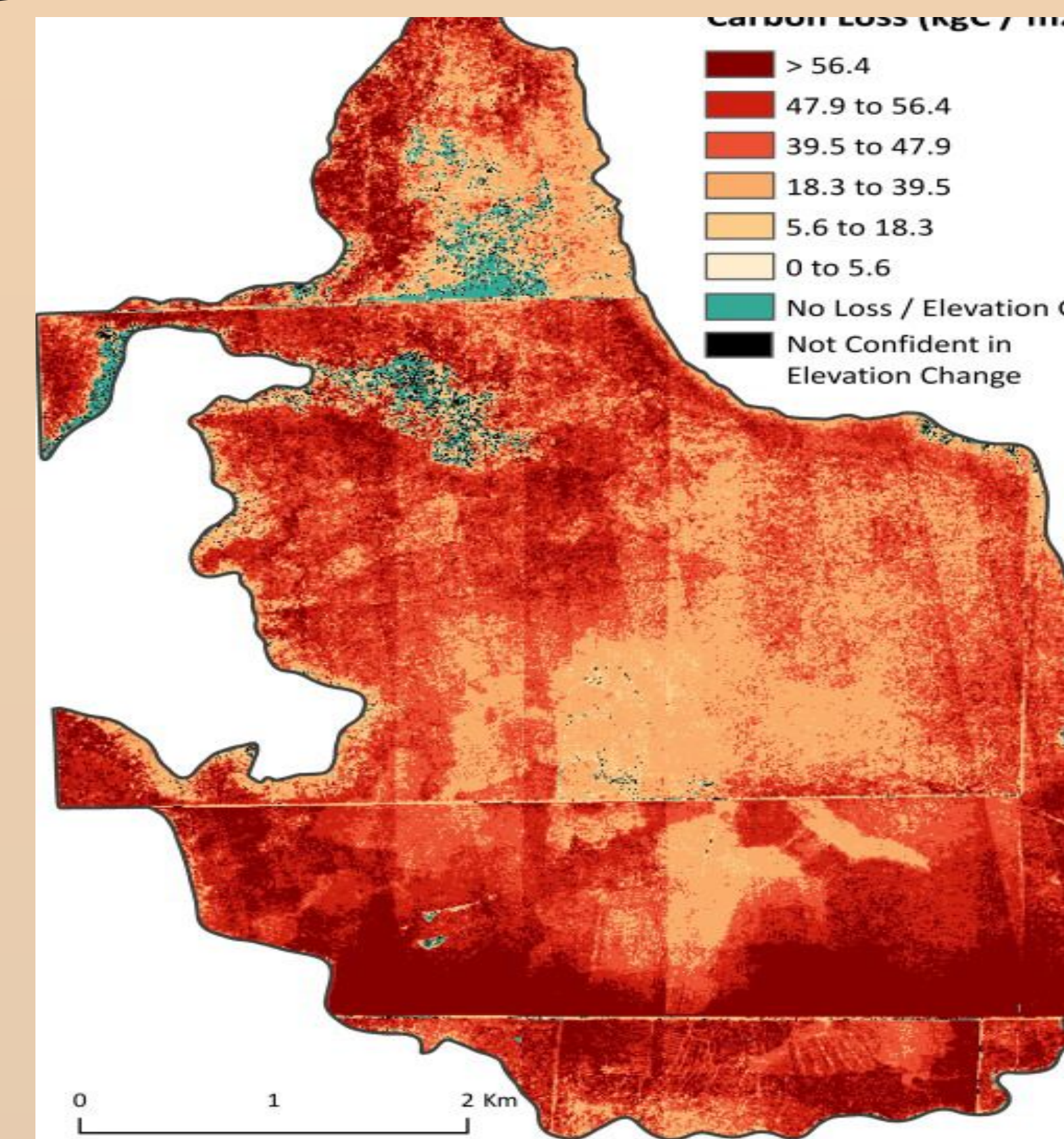


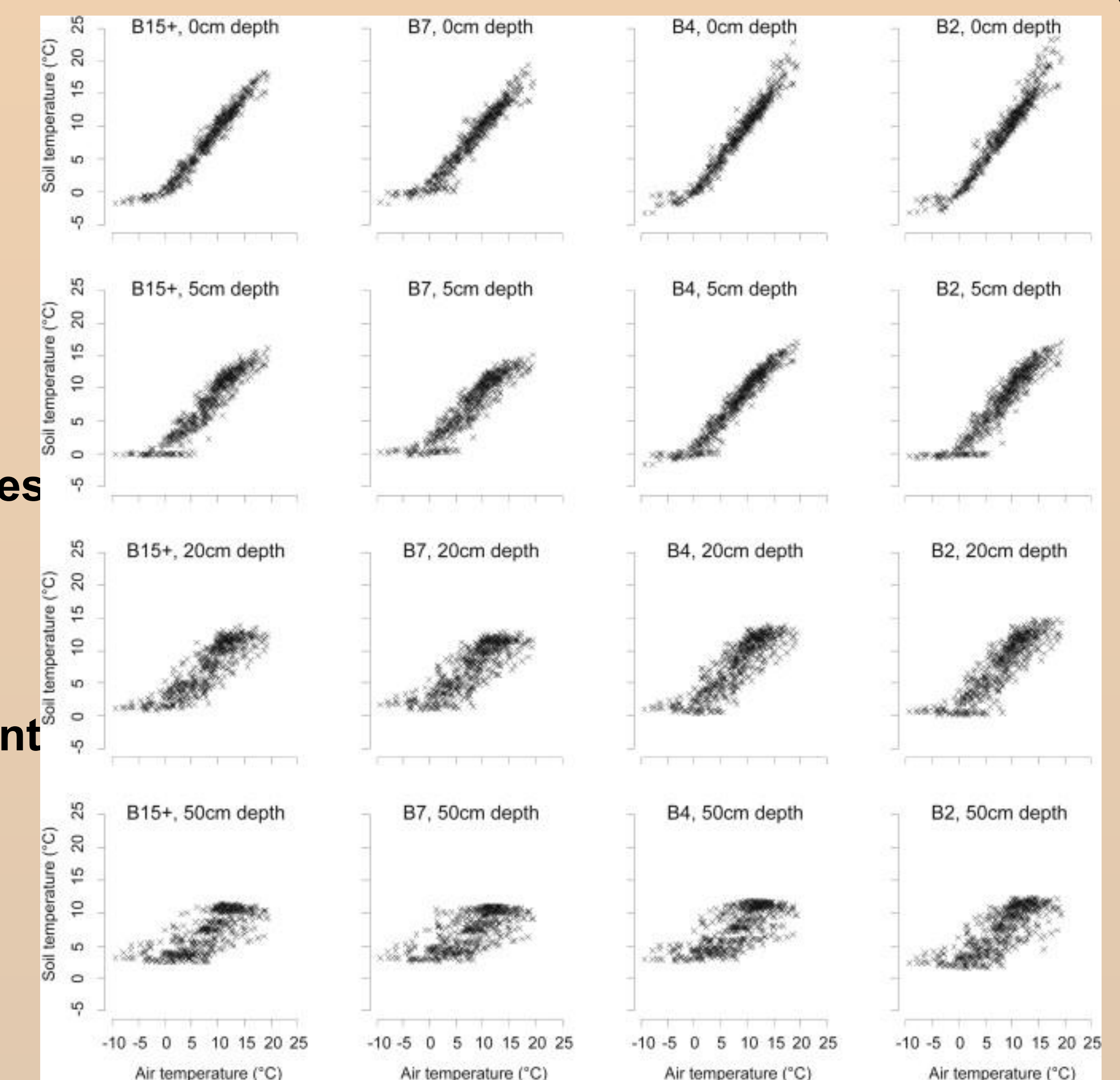
Figure 2

This figure shows the different levels of carbon loss in the soil within the fire perimeter. Over time the effect of carbon loss had a positive impact on vegetation regrowth.

Reddy, A., Hawbaker, T., Wurster, F., Zhu, Z., Ward, S., Newcomb, D., & Murray, R. (2015). Quantifying soil carbon loss and uncertainty from a peatland wildfire using multi-temporal LiDAR. *Remote Sensing of Environment*, 170, 306-316.

Figure 1

This figure shows the mean daily air and soil temperatures at four different depths and four different lengths of time post-fire.



Brown, L., Palmer, S., Johnston, K., & Holden, J. (2015). Vegetation management with fire modifies peatland soil thermal regime. *Journal of Environmental Management*, 154(C), 166-176.

Discussion and Conclusion

Across Mediterranean climates, fires tend to have a negative impact on soil quality, particularly in time frames directly following the event. As time passes, however, soil quality can improve as a direct result of nutrient cycling triggered by the fire. Our results indicate that vegetation is less likely to grow back in higher burn intensities.

Our results also show how certain plant species prefer burned areas and others do not. He, shown in figure 3, stands for hemicryptophytes, which shows the growth decreasing as the fire intensity increases.

The highest air and soil temperatures were in the plots that were burned more recently, Therefore, the closer the date to the burning, the higher the daily air and soil temperatures were. This means that time after burning is an important factor in vegetation health.

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