



University of Reading  
Department of Meteorology

# Using machine learning to predict the intensification and propagation of East African storms

Sean Kelley

*Primary Supervisor:* Dr. Eliza Karłowska

*Co-supervisors:* Dr. Kieran Hunt, Prof. Andy Turner

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the University of Reading for the degree of  
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## Declaration

I, Sean Kelley, of the Department of Meteorology, University of Reading, confirm that this is my own work and figures, tables, equations, code snippets, artworks, and illustrations in this report are original and have not been taken from any other person's work, except where the works of others have been explicitly acknowledged, quoted, and referenced. I understand that if failing to do so will be considered a case of plagiarism. Plagiarism is a form of academic misconduct and will be penalised accordingly.

I give consent to a copy of my report being shared with future students as an exemplar.

I give consent for my work to be made available more widely to members of UoR and public with interest in teaching, learning and research.

Sean Kelley  
August 5, 2025

## **Abstract**

**Keywords:** a maximum of five keywords/keyphrase separated by commas

**Word count:** 100

**Report code:** <https://github.com/seangtkelley/uor-msc-dissertation-xai-african-storms>

## **Acknowledgements**

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# List of Abbreviations

SMPCS      School of Mathematical, Physical and Computational Sciences



# Chapter 1

## Introduction

[Gebrechorkos et al. \(2019\)](#)

### 1.1 Background

Describe to a reader the context of your project. That is, what is your project and what its motivation. Briefly explain the major theories, applications, and/or products/systems/algorithms whichever is relevant to your project.

**Cautions:** Do not say you choose this project because of your interest, or your supervisor proposed/suggested this project, or you were assigned this project as your final year project. This all may be true, but it is not meant to be written here.

### 1.2 Problem statement

This section describes the investigated problem in detail. You can also have a separate chapter on “Problem articulation.” For some projects, you may have a section like “Research question(s)” or “Research Hypothesis” instead of a section on “Problem statement.”

### 1.3 Aims and objectives

Describe the “aims and objectives” of your project.

**Aims:** The aims tell a reader what you want/hope to achieve at the end of the project. The aims define your intent/purpose in general terms.

**Objectives:** The objectives are a set of tasks you would perform in order to achieve the defined aims. The objective statements have to be specific and measurable through the results and outcome of the project.

### 1.4 Solution approach

### 1.5 Summary of contributions and achievements

Describe clearly what you have done/created/achieved and what the major results and their implications are.

## 1.6 Report Structure

Describe the outline of the rest of the report here. Let the reader know what to expect ahead in the report. Describe how you have organized your report.

**Example: how to refer a chapter, section, subsection.** This report is organised into seven chapters. Chapter [2](#) details the literature review of this project. In [Chapter 3](#)...

## **Chapter 2**

# **Literature Review**

**2.1 State-of-the-art**

**2.2 Critique of the review**

**2.3 Summary**

## **Chapter 3**

# **Methodology**

## **Chapter 4**

# **Results**

### **4.1 Summary**

## **Chapter 5**

# **Discussion and Analysis**

### **5.1 Significance of the findings**

In this chapter, you should also try to discuss the significance of the results and key findings, in order to enhance the reader's understanding of the investigated problem

### **5.2 Limitations**

Discuss the key limitations and potential implications or improvements of the findings.

### **5.3 Summary**

## **Chapter 6**

# **Conclusion**

# References

Gebrechorkos, S. H., C. Bernhofer, and S. Hülsmann, 2019: Impacts of projected change in climate on water balance in basins of east africa. *The Science of the total environment*, **682**, 160–170, <https://doi.org/10.1016/J.SCITOTENV.2019.05.053>.



## **Appendix A**

### **An Appendix Chapter**