Institute

Department

[Thesis title]

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

Author Name

supervised by

Prof. Dr. Supervisor Name and Dr. Supervisor Name

1st January 1234

“A quote by someone famous.”

— Their name.

Abstract

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros. Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetuer odio sem sed wisi.

Acknowledgments

Thank all the people. I used the textbf command **Hans Muster** to highlight their name in the text. I also mentioned funding and thanked those that gave me data sets.

Contents

List of Figures

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Nomenclature

General Abbreviations

AABW	Antarctic Bottom Water

Data Set Abbreviations

Argo	Subsurface ocean temperature and salinity data set

Modelling Abbreviations

ACCESS-OM2	Australian Community Earth System Simmulator - Ocean Model 2

Variables and Constants

C_p	Specific heat capacity of seawater (3992.1 J kg^{-1} K^{-1})

Units

Sv	Sverdrup (10^6 m^3 s^{-1})

Scientific Activities During the Thesis

Scientific Training

List summer/winter school attendance

- January 1234,

National and International Conferences, Workshop and Seminar Presentations

List those too, quite a bit of time/effort went into those presentations.

- January 1234,

Supporting Manuscript and Publications

The following manuscript and publications form the basis of this thesis. The published articles can be found in Appendix A.

1. **Huguenin, M. F.** [1, 2, 3], Holmes R. M.[1, 3, 4, 5] & England M. H.[1, 2] *Nature Communications*. (2022). **13**, 4921. https://doi.org/10.1038/s41467-022-32540-5

1. Climate Change Research Centre, University of New South Wales, Sydney, NSW, Australia 2. ARC Australian Centre for Excellence in Antarctic Science, University of New South Wales, Sydney, NSW, Australia 3. ARC Centre of Excellence in Climate Extremes, University of New South Wales, Sydney, NSW, Australia 4. School of Mathematics and Statistics, University of New South Wales, Sydney, NSW, Australia 5. School of Geosciences, University of Sydney, Sydney, NSW, Australia

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- Fig. 1.1 has been obtained from "Piled Higher and Deeper" by Jorge Cham. https://www.phdcomics.com

Preface

Motivation and Objectives

Background

Thesis Overview

1

Drivers and Distribution of Global Ocean Heat Uptake Over the Last Half Century

Huguenin, M. F. [1, 2, 3], Holmes R. M.[1, 3, 4, 5] & England M. H.[1, 2] *Nature Communications.* (2022). **13**, 4921. https://doi.org/10.1038/s41467-022-32540-5 *

M. F. H. performed the analyses and wrote the initial draft of the paper in discussion with R. M. H. and M. H. E. All authors formulated the experimental design, contributed to interpreting the results and refinement of the paper.

The published version of this part can be found in Appendix A.

1. Climate Change Research Centre, University of New South Wales, Sydney, NSW, Australia 2. ARC Australian Centre for Excellence in Antarctic Science, University of New South Wales, Sydney, NSW, Australia 3. ARC Centre of Excellence in Climate Extremes, University of New South Wales, Sydney, NSW, Australia 4. School of Mathematics and Statistics, University of New South Wales, Sydney, NSW, Australia 5. School of Geosciences, University of Sydney, Sydney, NSW, Australia ∗. This publication was slightly changed from its original version to ensure consistency throughout this thesis.

Abstract Text here.

1.1 Introduction

This is an equation

$$E = m \cdot c^2, \tag{1.1}$$

where E is the energy (J), m is the mass of an object (kg) and c is the speed of sound ($3.0 \cdot 10^8$ m s^{-1}).

This is a figure

Figure 1.1: Caption of the comic. With some more information.

This is how you can cite a study that said something Huguenin et al. (2022). Alternatively, you can use the parenthesis (Huguenin et al., 2022) option.

2

Chapter 2 title

3

Chapter 3 title

Concluding Remarks

Summary of Findings

Part 1

Future Perspectives

Will Southern Ocean heat uptake continue for the rest of the century?

Another open research question

Another open research question

Final Remark

One last paragraph showing that the findings presented here will lead to (1) ..., (2) ..., and (3).

Bibliography

Huguenin, M. F., Holmes, R. M., and England, M. H. Drivers and distribution of global ocean heat uptake over the last half century. *Nature Communications*, 13(1):4921, 2022. https://doi.org/10.1038/s41467-022-32540-5.

A

Appendix to Part 1