UNIVERSIDAD DE GRANADA
FACULTAD DE CIENCIAS
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GRUPO DE INVESTIGACIÓN DE FÍSICA DE LA ATMÓSFERA - IISTA

Exploring aerosol-cloud interaction in the atmospheric column using improved remote sensing methods

PhD. Dissertation

María Soledad Fernández Carvelo
PhD candidate
Universidad de Granada

Thesis director: Cat. Lucas Alados Arboledas
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Thesis director: Dr. Juan Antonio Bravo Aranda
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Tribunal nombrado por el Magfco. y Excmo. Sr. Rector de la Universidad Politécnica de Madrid, el día ___ de _____ de 202X.

Presidente: PhD jury committee 1.

Secretario: PhD jury committee 2.

Vocal: PhD jury committee 3.

Vocal: PhD jury committee 4.

Vocal: PhD jury committee 5.

Suplente: PhD jury committee 6.

Suplente: PhD jury committee 7.

Opta a la mención de "Doctor Internacional"

Evaluadores de organizaciones internacionales:

Reviewer 1, Institution, Country.

Reviewer 2, Institution, Country.

Realizado el acto de defensa y lectura de la Tesis el día ___ de _____ de 202X en la E. T. S. Ingenieros Industriales.

CALIFICACIÓN:

EL PRESIDENTE LOS VOCALES

EL SECRETARIO

The research leading to this doctoral dissertation has received funding from the following programs.

Abstract

Abstract (English version).

Resumen (Spanish)

Resumen (versión en español).

Acknowledgements

Time to say thank you!

Contents

List of Figures

List of Tables

Abbreviations

EOA	Example of Abbreviation.

Part I

INTRODUCTION

1 State of the art

Background of your work.

This is an example of a reference (Croff 1983).

2 Objectives of this Thesis

Main goals and contributions arising from this Thesis.

3 Layout of this Thesis

This Thesis is divided into five Parts, with several related Chapters in each of them. Firstly, Part I establishes the framework and background of this Thesis and presents the original contributions and outcomes.

Part **??** corresponds to the description of the fundamentals that applies to this work...

Part II

FUNDAMENTALS

4 Aerosol and climate

5 Atmosphere structure and properties

6 Radiation-atmosphere interaction

7

Atmospheric aerosol characterization

8 Atmospheric aerosol properties

9 Lidar technique

9.1 Principle and ecuation

9.2 Aerosol intensive properties

9.3 Depolarization lidar

9.4 Fluorescence lidar

Part III

INSTRUMENTATION

10 ALHAMBRA lidar system

11 Setup of the ALHAMBRA lidar system

12 Quality Assurance of the ALHAMBRA lidar system

12.1 Rayleigh-fit

12.2 Telecover test

12.3 Polarization calibration

12.4 Zero bin

Part IV

METHODOLOGY

Chapter 13

13.1 Introduction

Introduction to Chapter 1 of Part Developments and Applications II. Here we go!

Let's include Figure 13.1 as an example.

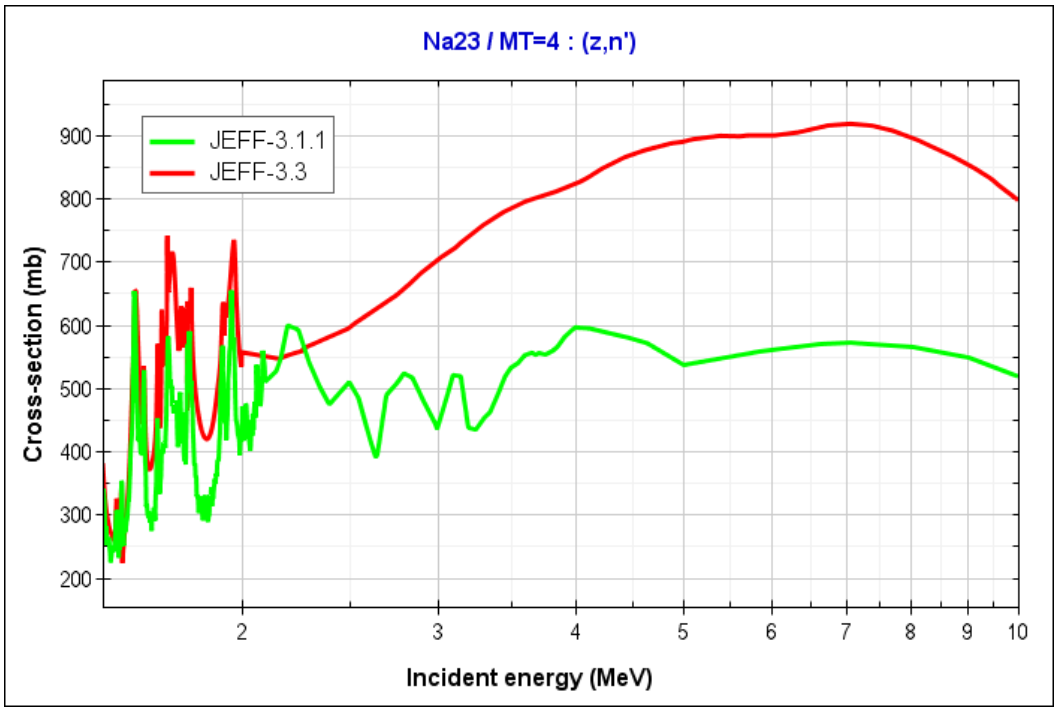

Fig. 13.1.: Figure caption.

Chapter 14

14.1 Introduction

Introduction to Chapter 2 of Part Developments and Applications II. Here we go!

Let's include Table 14.1 as an example.

Tab. 14.1.: Table caption.

X1	X2	X3	X4	X5
Y1	XY1	XY2	XY3	XY4

Chapter 15

15.1 Introduction

Introduction to Chapter 3 of Part Developments and Applications II. Here we go!

Part V

CONCLUSIONS AND FUTURE WORK

16 Conclusions

Conclusions and main outcomes of work carried out in this Thesis.

17 Future work

As a continuation of the work carried out in this Thesis, the following lines are identified for further research.

Bibliography

Croff, A. G. (1983). “ORIGEN2: A Versatile Computer Code for Calculating the Nuclide Compositions and Characteristics of Nuclear Materials”. In: *Nuclear Technology* 62.3, pp. 335–352. DOI: 10.13182/NT83-1 (cit. on p. 3).

APPENDIX A

A.1 APPENDIX I