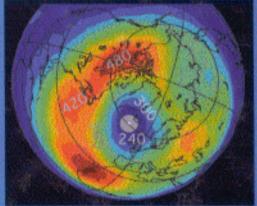
## Stephen J. Reid

## Ozone and Chimade Chimade Chimade Chimade Chiange

- A Beginner's Guide -









## **CONTENTS**

Introduction	1
Part 1: The Earth's Atmosphere	
Chapter 1.1: A Question of Balance	7
Chapter 1.2: The Zonal and Meridional Circulations	15
Chapter 1.3: Atmospheric Models	24
Appendices for Part One	
A1.1: Powers of Ten	33
A1.2: The Relationship Between Atmospheric Pressure,	
Temperature and Gravity	35
A1.3: The Pressure Gradient Force and Coriolis Effect	37
A1.4: The Electromagnetic Spectrum	40
A1.5: The Effects of Friction on Atmospheric Motion	42
A1.6: Potential Temperature and Potential Vorticity	43
A1.7: Radiative Transfer	47
Bibliography for Part One	49
Part 2: The Ozone Layer	
Chapter 2.1. The Ozone Layer and Ultra-Violet Radiation	53
Chapter 2.2: Ozone Loss in the Polar Regions	64
Chapter 2.3: Ozone Loss over Mid-latitudes	81
Chapter 2.4: The Future of the Ozone Layer	90
Appendices for Part Two	
A2.1: Mendeléev's Periodic Table of the Elements	111
A2.2: Definition of Total Ozone and the Dobson Unit	113
A2.3: The Planck Constant, h	115
A2.4: The Chemistry of Ozone Production and Loss	116
A2.5: Ozone Depletion Potential	120
Bibliography for Part Two	128

Part 3: Climate Change	
Chapter 3.1. Climate and the Greenhouse Effect	129
Chapter 3.2. Sun and Climate: A Message in the Ice	135
Chapter 3.3. Oceans and Climate: El Niño and La Niña	147
Chapter 3.4: Possible Futures	158
Appendices for Part Three	
A3.1: Global Warming Potential	179
A3.2: Radiative Forcing	181
A3.3: Errors in the Surface Temperature Record	184
Bibliography for Part Three	187
A Personal Perspective	191
Glossary	199
Acknowledgements	203
Index	207