

## Table of Contents

List of Authors and Contributors	ix
Executive Summary	1
<b>Chapter 1: Introduction</b>	17
<b>Chapter 2: Urban Air Pollution Phenomenology</b>	21
2.1 Space and time scales in the urban context	21
2.2 Flow, dispersion and chemistry / street and receptor scales	24
2.3 Flow, dispersion and chemistry / neighbourhood and city scales	26
2.4 The interaction between the city and regional scales	29
2.5 Connecting the scales	30
<b>Chapter 3: Air Pollutant Emissions in Cities</b>	31
3.1 Introduction	31
3.2 Requirements for urban emission inventories	31
3.3 Methodological approach	34
3.4 Quality assurance	37
3.5 Uncertainty	37
3.6 Applications	40
3.7 Intercomparison of urban emission inventories	47
3.8 Summary	50
<b>Chapter 4: Urban Field Campaigns</b>	51
4.1 Introduction	51
4.2 Local scale (street scale) campaigns	52
4.3 Urban scale campaigns	69
4.4 Other related urban experiments	85
4.5 Summary	87
<b>Chapter 5: Particulate Matter in Urban Air</b>	91
5.1 Introduction	91
5.2 Sources and emissions of particulate matter	95
5.3 Spatial and temporal variation – temporal trends	99
5.4 Field campaigns involving particulate matter	102
5.5 Modelling of particulate matter in urban areas	113
5.6 Exposure to urban particulate matter	117
5.7 Conclusions	119

<b>Chapter 6: Modelling Urban Air Pollution</b>	121
6.1 Introduction	121
6.2 Classification of urban air pollution models	122
6.3 Urban scale models	132
6.4 Local scale models	137
6.5 Model systems	148
6.6 Future perspectives for modelling urban air pollution	154
<b>Chapter 7: Quality Assurance of Air Pollution Models</b>	155
7.1 Introduction	155
7.2 Fundamentals of Model Quality Assurance	156
7.3 Evaluation of urban scale models	161
7.4 Evaluation of local scale models	171
7.5 Summary	182
<b>Chapter 8: Photochemical Smog in South European Cities</b>	185
8.1 Introduction	185
8.2 Meteorological conditions favouring photochemical smog	187
8.3 Scale interactions and ozone formation	193
8.4 Regional and local emissions of ozone precursors	197
8.5 Indicators of photochemical pollution	205
8.6 The role of aerosols	211
8.7 Real-time ozone forecast models	217
8.8 Long term modelling simulation for ozone exposure assessment	219
8.9 Conclusions	222
<b>Chapter 9: Integrated Urban Air Quality Assessment</b>	223
9.1 Introduction	223
9.2 Purposes and scopes of integration	226
9.3 Integration of elements	228
9.4 Urban Air Quality Management Systems (UAQMS)	234
9.5 Outlook	242
Annex: Description of UAQMS participating in SATURN	244
<b>Chapter 10: Conclusions</b>	265
10.1 Achievements of SATURN	265
10.2 Remaining gaps of knowledge	268
<b>References</b>	271
<b>Subject Index</b>	293