

## **Chapter 1**

# **Critical review on the chemistry, transport and budget of ozone in the troposphere**

**Yasin Elshorbany**

**Chapter Writing Team:** A. T. Archibald., Y. Elshorbany, O. Cooper, M. Coyle, R. Derwent, A. Finco, I. Galbally, G. Gerosa, P. Griffiths, R. Hossaini, L. Hu, A. Lefohn, M. Y. Lin, M. Naja, V. Naik, J. Neu, S. Oltmans, A. Saiz-Lopez, P. Saxena, M. G. Schultz, I. Shahid, D. Shallcross, T. Wallington, T. Wang, O. Wild, H. Worden, P. Young

# Chapter 1 Layout

- 1. Introduction**
- 2. Ozone Formations and Loss Mechanisms**
- 3. Transport of Ozone in the Troposphere**
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- 5. Ozone evolution in the last decades based on model and observations studies**
- 6. Ozone burden and budgets in the next 15 years**
- 7. Uncertainties in known/unknown chemistry and emission**
- 8. Summary**

## 2. Tropospheric Ozone Formation and Loss

### 2.1 Ozone Photochemical Formation (Yasin, Tao, Alex,..)

2.1.1 The role of ClNO<sub>2</sub> photolysis in ozone formations (Yasin, Tao ..)

2.1.2 The role of HONO photolysis in ozone formations (Yasin, Tao ..)

### 2.2 Loss of ozone to the surface – deposition (M. Coyle, Ian,..)

### 2.3 Diagnostics of ozone production and loss (Alex, Yasin, ...)

### 2.4 Ozone Production Efficiency (OPE) (Alex, Yasin, ...)

### 2.5 Controlling ozone – VOC reactivity (Yasin, Alex, ...)

## **3. Transport of ozone in the troposphere**

(J. Neu, M. Coyle, more?)

**Vertical and Regional transport (e.g., Pearl River Delta-Yangtze RD, Aijung Ding)**

## 4. Other Ozone Photochemical Formation Regimes

- 4.1 Ozone chemistry in the urban boundary layer ([Alex,..](#))
- 4.2 The contribution of biomass burning to ozone formations ([Yasin,...](#))
- 4.3 Ozone chemistry in the free troposphere (?)
- 4.4 Wintertime Ozone Chemistry ([Yasin,...](#))
- 4.5 Ozone chemistry in polar boundary layer ([Alfonso?](#))
- 4.6 Ozone chemistry over the marine boundary layer – the role of halogens ([Ryan?](#), [I. Galbally,..](#))
- 4.7 Ozone chemistry over tropical forests ([Mhairi](#), [Giacomo](#), [Angelo?](#))

## **5. Ozone Evolution in the Last Decades Based on Model and Observations Studies**

(J. Neu, M. Y. Lin)

**[attribution of different processes to ozone budget and trends]**

## **6. Ozone burden and budgets in the next 15 years**

(O. Cooper, V. Naik, M. Y. Lin,...)

**[Expected increase in the next 15 years if the current trends (RCPs) are correct.]**

## 7. How uncertainties in known/unknown chemistry and emission may affect the current and projected ozone evolution.

(O. Wild, Alex, Tim and J. Neu)

[Focus on areas of the chemistry of ozone we know about but are uncertain and areas we think may be important going into the future. For example, the role of climate change - what do we know, what do we need better understanding and how can we get it?]

7.1 Uncertainties of the chemistry of organic peroxy radicals. ([Dudley](#))

7.2 Uncertainties in the reaction  $\text{HO}_2 + \text{NO} \rightarrow \text{HONO}_2$ . ([Alex](#))

7.2 Stratospheric contribution to surface ozone. ([Jessica](#))

7.3 The role of climate change effecting the ozone budget. ([Jessica](#))

7.4 The role of stratospheric change effecting the troposphere. ([Tim](#))