

# ATMOSPHERIC CHEMISTRY

R Jones and Others

*Interdisciplinary Course within Part III of the Natural Science Tripos  
This course is given by the Department of Chemistry*

This course looks at global change from the perspective of atmospheric composition and its linkage to the climate system. Issues covered include the fundamental photochemical and dynamical processes which control atmospheric composition and structure, and how they would differ in a modified climate. The course is designed to complement the material covered in Course I2 The Earth system and Climate Change, although either course can be taken independently. The course will be lectured and examined in a way that assumes no prior knowledge for those taking the course. Examination questions will be based on both core and specialist lectures.

Atmospheric composition and structure. Stratospheric and tropospheric chemical processes. Climate change.

Major stratospheric catalytic cycles of NO<sub>x</sub>, HO<sub>x</sub>, ClO<sub>x</sub> and BrO<sub>x</sub>. Atmospheric aerosol and heterogeneous chemistry. Ozone depletion in the Antarctic, Arctic and middle latitudes. Future O<sub>3</sub> trends.

Tropospheric ozone and tropospheric oxidation processes, including the importance of the OH radical. The ozone balance -the role of NO<sub>x</sub> and hydrocarbons.

Role of the oceans in controlling the structure and chemical composition of the atmosphere. Ocean-atmosphere interactions.

Past climates – how this influenced the composition of past atmospheres and what they can tell us about future changes.

Greenhouse gases. Radiative balance. Climate change and the links between atmospheric chemistry and climate.

## SPECIALIST LECTURES

The impact of volcanic eruptions on the atmosphere and climate. (*M Edmonds, Earth Sciences*)

Ice cores and global change (*E Wolff, British Antarctic Survey*)

Air quality and climate change (*T Cox, Chemistry*)

The Role of aerosols in climate (*M Herzog, Geography*)

## BOOKS

*Chemistry of Atmospheres*, Wayne R P (Third edn OUP 2000)

*Atmospheric Chemistry and Global Change*, Brasseur G P, Orlando J J and Tyndall G S (OUP 1999)

*Atmospheric Change -An Earth System Perspective*, Graedel T E & Crutzen P J (W H Freeman & Co – New York 1993)

*Chemistry of the upper and lower atmosphere*, Finlayson-Pitts B J & Pitts J N (Academic Press)

*Introduction to Atmospheric Chemistry*, Jacob D J (Princeton University Press 2004)

The following two items contains useful introductory material:

*Global warming, the complete briefing*, Houghton J T (CUP 2004)  
<http://www.ipcc.ch> International Panel on Climate Change