

K.002 The science of atmospheric composition and chemistry: past, present and future.

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Abstract:

The science of atmospheric composition and chemistry is based on three essentials: fundamental knowledge, observations and modelling. The study of this has passed from mainstream physical research in the 18th century to an adjunct of meteorology in the 19th and early 20th century, and then to a recognised field of chemistry in the late 20th century. Today, in the 21st century, it is a core component of Earth systems science, the multidisciplinary study of the Earth in all its facets.

In the 18th century, eminent scientists investigated the composition of air identifying nitrogen, oxygen, carbon dioxide, hydrogen and other atmospheric gases. In the late 19th century William Ramsay identified Argon from the distillation of air.

The broader development of the science of atmospheric composition and chemistry included: the need for understanding of the nutrition of plants and the production of food by de Saussure, Liebig and others in the 19th century, the coupling of urban air pollution and health concerns by RA Smith in the 19th century and Haagen-Smit in the 20th century, the desire to probe the then inaccessible upper atmosphere by remote sensing and modelling by Dobson and Chapman in the early 20th century, and concerns about continental scale and global pollution including global warming and ozone layer depletion by Callendar, Keeling, Oden, Johnston, Crutzen, Rowland and Molina in the 20th century. This history will be reviewed and then a perspective on several questions relevant to the 20th and 21st Century will be presented:

How has the study of atmospheric composition and chemistry changed in the last 60 years?

What are the key features of atmospheric composition and chemistry science today?

How has the global distribution and gender balance of scientists in this area changed?

How will the future of atmospheric composition and chemistry science be realised?