

## FOLENS Syllabus

**Subject Title:** 地球大気化学：その科学と哲学 [Global Atmospheric Environment]

<b>Subject Category:</b>	Environmental Sciences/ Information System	<b>Department</b>	FOLENS	<b>Credit</b>	2	<b>Code</b>	
<b>Semester</b>	Second/Fall	<b>Day(s)/ Period(s)</b>	Described in "Course description"				
<b>Class Format</b>		<b>Location</b>	Main Building A-22				
<b>Instructor</b>	Hiroshi HARA						
<b>Office</b>	None	<b>Email</b>	harahrs@cc.tuat.ac.jp				

### ■ Outline & Target

The whole picture of global environmental issues is to be made by each student in terms of physics and chemistry from his viewpoints of the fields. The dialogue session is strongly encouraged in the class. Also given is a practice of Back Trajectory Analysis of air masses starting from the Fukushima plant on March 11, 2011.

### ■ Course description

Room: Honkan 22A

Time:13:00-14:30, (starting from )

- 1 Global Environment
- 2 The Atmosphere: structure and composition
- 3 Air Pollution (1) London, Ashio, Yokkaichi, China
- 4 Air Pollution (2) Los Angels
- 5 Air Pollution (3) Yokkaichi: what was done
- 6 Climate Change
- 7 Acid Deposition (1) wet deposition
- 8 Acid Deposition (2) dry deposition
- 9 Acid Deposition (3) transboundary pollution
- 10 Tropospheric Ozone
- 11 PM2.5
- 12 Nuclear Pollution
- 13 Global and International Environmental Programmes
14. Environment and Science: theory-ladenness
- 15 General Discussion

Questions during the class to the students would include:

- What controls the earth's atmosphere?
- What did the scientists perform other than his scientific research?
- Why is the problem global from the viewpoints of atmospheric chemistry?
- Draw a comprehensive picture of the problem in terms of chemistry.
- What is the relationships between chemical species in these phases?
- Explain why carbon dioxide is a greenhouse gas in terms of chemistry.
- What is the difference from "non-photochemical" reactions?
- Explain the non-linearity of ozone formation.
- Why is SO<sub>2</sub> transported over a long distance compared with NO<sub>x</sub>?
- What is the main difference between dry deposition and gravitational settling?
- Provide a scientifically sound interpretation of precipitation pH in terms of acid-base chemistry?
- What are the factors controlling precipitation pH?
- What is the intrinsic reason for the significance of this element?
- Why is the monitoring necessary?

### ■ Prerequisites

keen interest in the environment and basic physics and chemistry

### ■ Textbook(s)

None.

### ■ Reference publication(s)

Daniel J. Jacob, Introduction to Atmospheric Chemistry, pp. 266, Princeton University Press, 1999. (Japanese Translation: Taiki Kagaku Nyumon, pp. 279, Tokyo University Press, 2002)

Peter V. Hobbs, Introduction to Atmospheric Chemistry, pp. 262, Cambridge University Press, 2000.

Michael C. Jacobson, Robert J. Charlson, Heenig Rodhe, and Gorgon H. Orinans, Earth System Science: from biogeochemical cycles to global change, pp. 527, International Geophysics Series, Volume 72, Academic Press, 2000.

### ■ Evaluation standards

Discussion and Term Paper

### ■ Message from instructor(s)

"Global Atmospheric Environment" will be addressed from the viewpoint of atmospheric chemistry. Also emphasized is practice and philosophy of the global environmental chemistry on the basis of the experience of the instructor who has been involved in a couple of international programs including WMO and EANET because the present course is designated as a FOLENS course.

Personal contacts will be encouraged for the "office hours".

### ■ Course keywords

physics, chemistry, atmosphere, global and international programmes, science philosophy

### ■ Office hours

### ■ Remarks

### ■ Related URL

### ■ Last Updated