Greetings from the Environmental Management II Instructors and Teaching Assistants:

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This week's lecture presentation from Harvard Hall is now online in streaming audio-video format with synchronized slides. Follow the links below to view the current lecture and assignments.

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W E E K 08

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STRATOSPHERIC OZONE
Professor Petros E. Koutrakis, Ph.D.

A thin wispy layer of ozone (O3) only 3 millimeters thick, set 20 kilometers high up in the stratosphere is all that protects life on the surface of the Earth, blocking 99% of the Sun's deadly ultraviolet radiation. Both long and intermediate wavelength ultraviolet radiation is absorbed by the ozone layer. Ozone is continually formed and depleted in the upper atmosphere. Energy from sunlight binds together molecular oxygen (O2) and atomic oxygen (O) to form ozone (O3). The same energy can break the bonds holding O3 together, depleting stratospheric ozone.

As the importance of this protective layer of ozone came to be recognized by the scientific community, research began to indicate that the layer was thinning. "Ozone holes" (where the ozone layer is up to 50% thinner than normal) were discovered over both poles. Earth orbiting satellites were used to conduct detailed atmospheric studies into the cause of ozone layer thinning. Research revealed several anthropogenic contaminants that catalyze the ozone depletion reaction. Nitric oxide (NO), is released by high-flying supersonic aircraft directly into the ozone layer. Chlorine (Cl) and Bromine (Br) ions can be traced to CFCs (chloroflorocarbons). CFCs are used internationally in thousands of products from air conditioners to asthma inhalers. Thousands of tons of these chemicals are released into the atmosphere each year. CFCs are relatively inert and can survive all the way up into the stratosphere where they catalyze the ozone depletion reaction. Since these catalysts are not consumed in the reaction, a single ion of Chlorine or Bromine can break down ozone molecules over and over again. Residence times for these chemicals in the upper atmosphere can be a long as 140 years in the case of CFC-12! Even if all CFC production were banned today, it would take generations to be completely removed from the atmosphere.
The thinning ozone layer has led to higher exposures to ultraviolet radiation and increased skin cancer rates. There are over 400,000 new skin cancers in the US each year. Concerns over human health effects of have led to several international agreements in an effort to control the manufacture and use of ozone depleting chemicals. The Montreal Protocol, London Ozone Agreement and the US phase out of CFCs have been successful in reducing the amount of these chemicals released annually. The United States and Europe have turned to the use of less ozone depleting HCFCs. The search is on to find additional ozone friendly substitutes.

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Video Lecture, Assignments, and Readings for Week 08
http://lab.dce.harvard.edu/extension/environment/week08em2_new.html

Weekly Feedback Assignment (All Students)
http://lab.dce.harvard.edu/extension/environment/distance-students/feedback-frameset.html

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NO CLASS March 27th, 2002 -- Spring Break
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NEXT CLASS -- April 3rd, 2002
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ATMOSPHERIC ACIDITY
Professor Petros E. Koutrakis, Ph.D.

Key Links:

Environmental Management II Course Website (Home Page)
<http://lab.dce.harvard.edu/extension/environment/em2.html>

General Help Information
<http://lab.dce.harvard.edu/extension/environment/HelpResources.html>

Personalized Help via Email from Teaching Assistant
<http://lab.dce.harvard.edu/extension/environment/E126ask-the-TA.html>

Help with Passwords
<http://lab.dce.harvard.edu/extension/environment/passwords.html>

Syllabus
<http://lab.dce.harvard.edu/extension/environment/syllabus2.pdf>

Current Week's Lecture
<http://lab.dce.harvard.edu/extension/environment/autoselect.html>

Upcoming Lectures (Video Index)
<http://lab.dce.harvard.edu/extension/environment/video-lectures-em2.html>

Environment News:

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THE HARVARD ENVIRONMENT NETWORK BULLETIN
A weekly calendar of environmental events for the greater Boston community
<http://environment.harvard.edu/lists/archives/hen%2Dl/index.html>

SEMINARS
A guide to environmental research, education and outreach at Harvard University
<http://environment.harvard.edu/envath/seminars.html>

CONFERENCES
<http://environment.harvard.edu/lists/archives/envconfs%2Dl/index.html>
An electronic mail discussion list for environmental event, conference, and publication opportunity announcements

JOB OPPORTUNITIES
An electronic mail discussion list for environmental job and educational opportunity announcements
<http://environment.harvard.edu/lists/archives/envjobs%2Dl/index.html>

Software for Viewing Lectures and Assignments:
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Internet Explorer (5.5):
<http://www.microsoft.com/windows/ie/>

Realplayer 8 (Basic):
<http://www.real.com/player/index.html>

Adobe Acrobat Reader:

Back Issues of the Course Newsletter
<http://lab.dce.harvard.edu/extension/environment/newsletter.html>

Password Access for Registered Students:
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Passwords are required to access streaming audio-video lecture presentations beginning with week 03.

Registered Harvard students of Environmental Management are authorized to view the materials during the current semester. After selecting the appropriate video link, a popup window (see above) will prompt you to enter a user name and password.

For USER NAME, enter your Harvard University ID (HUID) number. It is typically an 8-digit number that begins with '001'. This number was assigned to you by the Registrar and appears on your registration confirmation. All students should have received this information by mail. (This letter has information about the computer accounts which are available to registered students.) If are a Harvard employee, please note that the HUID # is NOT the same as your employee number. It is also not the same as any Harvard PIN you might have, such as the one used for DCEWEB.
For PASSWORD, enter your last name (all lowercase letters). Only eight (8) characters are allowed, so if your name is longer (i.e. Washington), use only the first 8 letters (washingt).

If you have not received, or cannot locate, your HUID you can contact the Registrar's office.

Harvard Registrar (DCE)
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Cambridge, MA 02138
(617) 495-4024

HARVARD UNIVERSITY
Harvard Extension School Distance Education Program

COURSE NEWSLETTER FOR ENVR E-102 CRN-21783
Environmental Management II
Petros E. Koutrakis, Ph.D., and John D. Spengler, Ph.D.

Classes meet at Harvard Wednesdays 7:35pm-9:30pm
Harvard Hall 104 - Harvard Yard
Streaming Media Presentation online by the next Monday

Environmental Management I & II Web Sites
http://lab.dce.harvard.edu/environment/

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Course web site questions

Technical Support: dce-distance-ed@harvard.edu
For video related problems only

Newsletter Editor: nscie127news@sciencenetwork.com

[NOTE: Environmental Management uses the List Server designated 'NSCIE126' for both Fall and Spring term classes. This Newsletter was prepared for students of Environmental Management II, ENVR E-102, CRN 21783.]

For subscribe/unsusbscribe instructions, see:
<http://lab.dce.harvard.edu/extension/environment/ListServer.html>