The textbook being used to supplement the lecture material is: The Earth System, 2nd Edition, by Kump, Kasting, and Crane. This book is available in the bookstore. Assignments from this book will be given in class.

Required readings: These readings will be placed on the course web site throughout the semester as Adobe Acrobat (PDF) files. The address for this site is: www.as.wvu.edu/biology/bio463

Exams: There will be two mid-term examinations and a final. To ensure that you have sufficient time to complete the mid-terms, these exams will be given in the evening from 7-9 PM on the dates indicated on your syllabus. Each mid-term will comprise 25% of your grade for the course. The final examination will comprise 35% of your grade for the course. The dates for each exam are as follows:

- Mid-term I: September 17 (7-9 PM)
- Mid-term II: October 22 (7-9 PM)
- Final Exam: December 10 (11 AM - 1 PM)

The exams will contain questions from the lectures, and assigned readings.

Missing an exam: If you miss a mid-term examination, you will receive a grade of zero for that exam. If an exam is missed due to an unavoidable absence, you must present (in person) a convincing written statement explaining the reason for your absence no later than 1 week after you return to class. Your statement should note the dates that were missed and may include any documentation you may wish to provide. Students with an acceptable excuse (as determined by the instructors) will be allowed to take a make-up exam.

Writing assignments: You are expected to find six articles in scientific journals that deal with some aspect of global environmental change and that were published in the last three years. For each article: (1) read the entire article; (2) write a summary that fits in the space provided on the summary template found on the class web site; (3) provide a complete citation for the article; and (4) attach a copy of the article when you turn in your summary. For your first article, you must also complete the critical thinking template found on the class web site and turn it in along with your summary. All summaries must be typed in the form provided on the class web site using a
Each article must be from a different journal found on the list of acceptable journals that I provide you. Your summaries are due in class on the dates indicated in your syllabus, and only one summary per date will be accepted, no more and no less. Your lowest grade on the 6 writing assignments will be dropped. The summaries will comprise 15% of your grade for the course.

Attendance: Attendance is required. More than two unexcused absences will result in the loss of a letter grade for every additional class that is missed. For example, three unexcused absences would drop a final grade of an A to a B, and four unexcused absences would drop a final grade of an A to a C, etc.

If you miss class due to an unavoidable absence, you must present (in person) a convincing written statement explaining the reason for your absence no later than 1 week after you return to class. Your statement should note the dates missed and may include any documentation you may wish to provide. Students with an acceptable excuse (as determined by the instructors) will not lose an attendance point for that absence.

Grades: Letter grades are not assigned until the end of the course. Grades are based on the total number of points accumulated by the end of the semester and are determined using the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100-90</td>
</tr>
<tr>
<td>B</td>
<td>89-80</td>
</tr>
<tr>
<td>C</td>
<td>79-70</td>
</tr>
<tr>
<td>D</td>
<td>69-60</td>
</tr>
<tr>
<td>F</td>
<td>59-0</td>
</tr>
</tbody>
</table>

Social justice: West Virginia University is committed to social justice. The instructors of this course concur with West Virginia University’s commitment to maintain a positive learning environment based upon communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Suggestions as to how to further such an environment will be appreciated and given serious consideration.

Evacuation Plan for Room G21: In the event of an emergency, leave the classroom in an orderly manner. Proceed down the hallway to the main lobby and exit the building through either of the two main doors located to the right and left. Once you’ve left the building, quickly move as far away as possible while avoiding parking lots. Do not congregate near the building or in parking lots.

Syllabus: This syllabus is issued for the convenience of the student and does not constitute a contract between the student and the instructor. The instructor reserves the right to change the syllabus at any time during the semester.
Information About Your Writing Assignments

You may summarize recent articles from any of the following scientific journals. Some of these journals are available online, others are not.

Agronomy Journal  Journal of Applied Ecology
Ambio  Journal of Ecology
American Journal of Botany  Journal of Environmental Quality
American Midland Naturalist  Journal of Forestry
American Scientist  Journal of Geophysical Research
Applied and Environmental Microbiology  Journal of Hydrology
Arctic and Alpine Research  Landscape Ecology
Atmospheric Chemistry  Limnology and Oceanography
Atmospheric Environment  Nature
Biogeochemistry  Oecologia
Biology and Fertility of Soils  Palaeobotany and Palynology
BioScience  Palaeogeography, Palaeoclimatology, and Palaeoecology
Biotropica  Plant and Soil
Canadian Journal of Botany  Plant, Cell and Environment
Canadian Journal of Earth Science  Plant Ecology
Canadian Journal of Forest Research  Plant Physiology
Climatic Change  Proc. of the National Academy of Science
Ecological Applications  Quaternary Research
Ecological Modelling  Remote Sensing of Environment
Ecological Monographs  Science
Ecology  Soil Biology & Biochemistry
Ecosystems  Soil Science
Environmental and Experimental Botany  Soil Science Society of America Journal
Forest Ecology and Management  Tellus
Functional Ecology  Tree Physiology
Geochimica et Cosmochimica Acta  Urban Ecosystems
Geophysical Research Letters  Water, Air, and Soil Pollution
Global Biogeochemical Cycles  Water Research
Global and Planetary Change  Water Resources Research
Global Change Biology  Wetlands
Hydrobiologia

If there is an article you wish to summarize that is a journal other than one of those listed above, please get my approval first.
The citation you provide for each article **MUST** follow precisely the style given in the following examples.

**Examples of the style to be used for literature citations.**

**SINGLE AUTHOR**

*JOURNAL*


**MULTIPLE AUTHORS**

*JOURNAL*


Points will be deducted if the proper format is not used! **If you have any questions, come and see me before your assignment is due.**

**Suggestions**

Type everything you’d like to say about the paper and then edit it to fit on the space on the summary template.

Have a friend read your summary to check for misspelled words and poor grammar.

Use a word processor to compose your summary. This will make editing easier, ensure that your summary is legible, and allow you to use a spell-check program.

Don’t wait until the night before!
WRITING ASSIGNMENT CRITERIA

Form
Legibility
Clarity
Spelling
Grammar
Article within last 3 years (2005-2008)
Article from the primary literature (i.e., written by people who do the science)
Different journal than those previously used
Proper citation

Content
Was sufficient background information (i.e. context) provided?

A.K.A - Why should we care?
Is there a clear statement of purpose?
Is the relevance to global ecology clear?
Were the important details and conclusions included?
Were trivial details excluded?
Were reader expectations met?

Were all issues raised, addressed?

Was quantitative information used wherever possible and was it put in a meaningful context?

Was the content summarized rather than described?
Was the content summarized in the student’s own words?

Example

Increases in sea-floor hydrothermal activity, linked to periods of intense tectonic activity during the Eocene Epoch (50 Mybp), resulted in CO₂-induced climatic changes. This phenomenon may provide an historical precedent against which current climatic models can be evaluated, and the consequences of the present-day global warming trends better predicted.

During the Eocene, increased tectonic activity created deep fissures in sea-floor basaltic rocks, allowing cold water to penetrate the earth’s crust as much as 1-2 km. Under high temperatures (~300°C), calcium, iron and silica were exchanged for magnesium and sulfate in seawater. For each mole of Ca²⁺ added to seawater, equivalents of CaCO₃ and CO₂ were released (Ca²⁺ + 2HCO₃⁻ → CaCO₃ + CO₂ + H₂O). Atmospheric CO₂ is the principle global warming agent.

Under current conditions, estimates of the total annual hydrothermal Ca²⁺ input into the oceans suggest that 14–22% of the total CO₂ budget can be accounted for by hydrothermal activity. The authors propose that a fourfold increase in tectonic activity during the Eocene led to a comparable increase in hydrothermal Ca²⁺ input to the oceans, and consequently, a doubling of atmospheric and oceanic CO₂. Six characteristics of this geologic time period confirm their hypothesis: 1) global warming rose 5°C above Paleocene values; 2) warm high-latitude temperatures, a low pole-to-equator temperature gradient, and decreased atmospheric circulation; 3) the presence of a flora adapted to increased global humidity; resulting from 1) and 2); 4) increased deposition of hydrothermal iron and 5) silicon in sea-floor sediments, linked to the Ca-Mg exchange; and 6) increased Ca²⁺ concentrations in seawater and CaCO₃ accumulation in marine sediments. Estimates of the upper limit of oceanic Ca²⁺ concentration then restrict the length of this period of high hydrothermal activity to 10⁴ years.

The authors suggest that hydrothermal activity may have increased by as much as five- to tenfold. They caution that some of these data are representative of limited areas of the globe, although they attribute this more to limited investigation than to any conflicting evidence. Older geologic time periods with similar tectonic and climatic characteristics, the Late Cretaceous, for example, may provide further historical analogs to the CO₂ induced global warming expected to occur by the middle of the next century.