# https://extendedessays.wikispaces.com/file/view/ageog.jpg/297772754/ageog.jpgGEO 215 Global Environmental Change T/TH 11-11:55am

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| Instructor: | | Dr. Susan W. S. Millar | |
| Office: | | Eggers 532 | |
| Office Hours: | | 1-2 pm T/TH, & by arrangement | |
| Phone: | | (315) 443-5635 | |
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| TA: | Jared Van Ramshorst (jpvanram@syr.edu) | | | |
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## **Audience:**

This course is an introductory level course aimed at first and second year students.

## **Description:**

Focusing on physical processes and patterns of environmental change, changes occurring as a result of human activities, and the social consequences of environmental change.

**Additional Course Description**: In this class we will focus on the scientific processes associated with global change and their connections to global, regional and local scale human activity. We will use a systems approach to understand the multi-scaled interactions that manifest as elevated CO2 levels in the atmosphere, and other forms of pollution. We will consider global atmospheric radiation balance and greenhouse effect and their interaction with the changing carbon balance. These gross scale phenomena will be unpackaged to examine the nature of change in specific geographic areas (from changes in permafrost distribution in the arctic, to forest cover in the tropics). The title of the course invokes the temporal scale: *change* can only be measured over time, therefore we will examine some of the human processes that have changed and can be associated with observed changes in the natural systems. As such, we will address questions of population change, urbanization, resource use, and regional development.

This course fulfills a natural science core requirement (non-lab) in the A&S curriculum. Therefore, the emphasis on topics is firmly embedded in the natural science tradition. This course is not a venue to discuss or develop policy solutions, nor deconstruct the economic and political contexts of global change. Rather we will focus on biogeochemical processes, their rates of spatial and temporal change, and the role of humans in effecting these changes.

***Credits:***

This class fulfills three (3) non-lab credits in the A&S natural science and mathematics division.

## **Learning Objectives:**

## **After taking this course, the students will be able to:**

* Explain the radiation balance and greenhouse effect
* Explain links between the greenhouse effect and changes in the carbon cycle
* Critically assess data presenting global environmental change
* Explain the relation between human and natural drivers of global change
* Synthesize, in writing, natural and human drivers of global environmental change
* Critically read scientific literature on global environmental change
* Compare and contrast rates and scales of change in biogeochemical processes

## **Bibliography/ Texts / Supplies – Required:**

Mackenzie, F. T., 2010. *Our Changing Planet: An Introduction to Earth System Science and Global Environmental Change*. New Jersey, Prentice Hall, 579pp.

**Additional Readings (posted on Blackboard):**

Anon (2014, Dec 20). Empire of the Pig, *The Economist*, p.67-70.

Gillis, J. (2014, Dec 23). Restored forests breathe life into efforts against climate change, *New York Times*, Retrieved from <http://www.nytimes.com/2014/12/24/science/earth/restored-forests-are-making-inroads-against-climate-change-.html> (last accessed 1/6/15)

Houghton, R.A., 2007. Balancing the global carbon budget, *Annual Review of Earth and Planetary Sciences*, Vol. 35: 313–347.

Lambin, E. F., and 25 others, 2001. The causes of land-use and land-cover change: moving beyond the myths. *Global Environmental Change 11*: 261-269.

Liverman, D., 1999. Annals of the Association of American Geographers,

Painter, T.H., Flanner, M.G., Kaser, G., Marzeion, B., VanCuren, R.A. & Abdalati, W., 2013. End of the Little Ice Age in the Alps forced by industrial black carbon, *PNAS 110*:15216-15221.

Ruddiman, W.F., 2013. The Anthropocene, *Annual Review of Earth and Planetary Sciences*,

*Vol. 41*: 45-68.

Schmale, J., Shindell, D, von Schneidemesser, E., Chabay, I., & Lawrence, M., 2014. Clean up our skies, *Nature 515*: 335-337.

Spickell, S. (2014, Apr 4). Spike in smog raises questions over UK’s air, *New Scientist*, April 4, 2014.

Wong, E. (2013, Apr 2). Early deaths linked to China’s air pollution totaled to 1.2 million in 2010, data shows, *New York Times*, Section A.; Column 0; foreign desk; p.9.

Zalasiewicz, J. et al 2010. The new world of the Anthropocene. *Environmental science & technology: 44, (7)*: 2228.

## **Grading:**

There are 500 points available in the following categories:

* Attendance and Participation in lecture and discussion (50 pts)
* Four written assignments (200 pts)
* Two exams (75 pts each)
* Final term project – news portfolio (100 pts)

*Grade Scale*

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| --- | --- |
| A | 465-500 |
| A- | 450-464 |
| B+ | 435-449 |
| B | 415-434 |
| B- | 400-414 |
| C+ | 385-399 |
| C | 365-384 |
| C- | 350-364 |
| D+ | 325-349 |
| D | 275-324 |
| F | <275 |
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## **Important Dates:**

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| Event | Date or Due Date |
| * Assignment 1 | Feb 13th in discussion section |
| * Assignment 2 | Feb 27th in discussion section |
| * Exam 1 | March 5th in lecture |
| * Assignment 3 | April 3rd in discussion section |
| * Assignment 4 | April 17th in discussion |
| * Term Project – News Portfolio | Tuesday April 28th in lecture |
| * Exam 2 | Friday May 1st 5:15-6:15 pm |

## **Please make a note of these dates NOW in your planner. “Forgetting” is not an excuse.**

## **Course Specific Policies on attendance, late work, make up work, examinations if outside normal class time, etc.:**

**Attendance is expected** at lectures and discussions. Random attendance checks will be conducted. Absence at more than one check will result in a 1 point reduction in attendance and participation grade for each subsequent miss. Arriving late and/or departing early from class will count as zero attendance.

Work will be handed in **on or before the due date**. Late work will result in a reduction of half a grade (15 pts) per day late. Work more than 1 week late will not be accepted for grade.

No make-up exams are given. If you expect to be absent during the exam dates scheduled you MUST contact me or the TA to arrange an alternate date sometime prior to the scheduled date.

## **Additional Information:**

Cell/smart phones, headsets, and computers are not permitted during class time. Conversation should be directed towards the professor and relate to course content. Conversation and disruptive behavior during class will result in ejection from classroom and deduction of attendance point.

**Academic Integrity**

Syracuse University’s Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the policy and know that it is their responsibility to learn about course-specific expectations, as well as about university policy. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. The presumptive penalty for a first offense by an undergraduate student is course failure, accompanied by a transcript notation indicating that the failure resulted from a violation of Academic Integrity Policy. The standard sanction for a first offense by a graduate student is suspension or expulsion. For more information and the complete policy, see <http://academicintegrity.syr.edu/academic-integrity-policy/>

A student shown to have engaged in cheating, plagiarism, or activity considered to be a violation of academic integrity in an assignment, that assignment will receive a zero (0) score. Any subsequent violation will result in an official report filed at the Academic Integrity Office, which may lead to expulsion.

**Disability-Related Accommodations**

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu>, located in Room 309 of 804 University Avenue, or call (315) 443-4498, TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

**Religious Observances Policy**

SU religious observances policy, found at <http://supolicies.syr.edu/emp_ben/religious_observance.htm>, recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes and by the submission deadline for flexibly formatted classes.

For fall and spring semesters, an online notification process is available through **MySlice/StudentServices/Enrollment/MyReligiousObservances.**

**List of Class Topics**

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|  | Tuesday | Thursday | Discussion & Reading |
| Jan 13 | Introduction | Global Change over Time | Liverman (1999)  Mackenzie Chapter 1 |
| Jan 20 | Atmosphere & Hydrosphere | Atmosphere & Hydrosphere | Mackenzie Chapter 4 & 5 |
| Jan 27 | Biogeochemical Cycles | Biogeochemical Cycles | Mackenzie, Chapter 6 |
| Feb 3 | The Carbon Cycle | The Carbon Cycle | Mackenzie Chapter 7  Gu *et al* (2013)  Houghton (2007)  http://carboncycle.aos.wisc.edu/ |
| Feb 10 | Monitoring Change | Measuring Past Change | NASA website on global change  http://climate.nasa.gov/ |
| Feb 17 | Population, Development and Resource Consumption I | Population, Development and Resource Consumption II | Mackenzie Chapter 9  Ruddiman (2013)  Zalasiewicz *et al* (2010) |
| Feb 24 | Population, Development and Resource Consumption III | Population, Development and Resource Consumption IV | Exam Review |
| **Mar 3** | **Exam Review** | **EXAM 1** |  |
| Mar 17 | Changing Earth I: Biosphere | Changing Earth I: Biosphere | Mackenzie Chapter 10  The Economist, 12/20/14  Justin Gillis (NYT) 12/23/14 |
| Mar 24 | Changing Earth II: Land & Water | Changing Earth II: Land & Water | Mackenzie Chapter 11  Lambin *et al* (2001) |
| Mar 31 | Changing Earth III: Atmosphere | Changing Earth III: Atmosphere | Mackenzie Chapter 12  Wong (2013)  Spickernell (2014)  Schmale *et al* (2014) |
| Apr 7 | Changing Earth IV: Climate | Changing Earth VI: Climate | Mackenzie Chapter 14  Painter *et al* (2013) |
| Apr 14 | Changing Earth IV: The forecast | Changing Earth VI: The Forecast | Review of News Portfolio |
| Apr 21 & 23 | No Classes or Labs | (AAG Meeting, Chicago) |  |
| Apr 28 | Exam Review |  |  |
| **May 1** | **5:15 – 6:15** | **EXAM 2** |  |