Geology 382--Global Change

Additional Reading List For Exam 1

There may be additions and deletions as the semester proceeds as I find new pertinent papers;
check the ERes site weekly for updates and changes.

* = On reserve in the Mansfield Library and/or ERes.
Some articles may be in hardcopy, e.g., books, and are on 4 hour or overnight reserve.
Those readings marked with "**#**" will be emphasized in class.

General Aspects of Global Change

*# McKibben, Bill, 1998, A Special Moment in History, *The Atlantic Monthly*, May 1998, p. 55-78. Or can be downloaded from: http://ic.ucsc.edu/~rlipsch/pol70/McKibben.1998.pdf

*# Ledley, et al., 1999, Climate Change and Greenhouse Gases, *EOS*, v. 80, no. 39, p. 453-458. This is a bit out of date but a very good summary of the fundamentals of greenhouse gases. Also available at: www.agu.org/eos_elec/99148e.html.

* Clark, W.C., 1989, Managing Planet Earth, *Scientific American*, v. 261, no. 3, p. 47-54. This is an introduction to a now fairly old but still useful special issue in *Scientific American* on "Managing Planet Earth". This is an excellent, but somewhat dated, overview of the various aspects of anthropogenic global change. It will be interesting for you to compare what we discuss with this 18 year old assessment of the problem.

*****Schneider, S.H. and R. Londer, 1984, *The Coevolution of Climate and Life*, Sierra Club Books, San Francisco. This is a good overview on nearly everything we will discuss in class plus some other issues. It is a good place to get information for a term paper of look for data on many aspects of global climate change. It also has a good discussion of the Gaia hypothesis (we will talk about this later in the course).
Schneider has several other books that are worth reading as well:
*****Schneider, Stephen Henry, 1989, *Global warming : are we entering the greenhouse century?* Sierra Club Books, San Francisco.

Check out population and other global/climate change sources/sites at the following sites:
This excellent site from the University of Michigan on population and global change,
http://www.globalchange.umich.edu/globalchange2/current/lectures/human_pop/human_pop.html
http://www.ucsusa.org/global-environment/index.cfm, maintained by the Union of Concerned Scientists.

For an animation of maps of human world population change see http://desip.igc.org/populationmaps.html , from the International Society of Malthus home page, and click on the “animated version” link.
The U.S. Census site, http://www.census.gov, has all sorts of information on human populations and links to the “Population Clock” and other useful/enlightening data.
Go to http://www.ibiblio.org/unarbin/worldpop for an online calculator that allows you to determine the population at any date from 1970 to the present; see what the population was when you were born and what it is now.

System Thinking Fundamentals

The original Gaia hypothesis can be found in:

Lovelock, J.E. and L. Margulis, 1973, Atmospheric homeostasis by and for the biosphere: The Gaia hypothesis, *Tellus*, v. 26, no. 2.

More recent and expanded views can be found in the following two books:

*****Lovelock, James, 1988, *The Ages of Gaia: A Biography of Our Living Earth*, W.W. Norton & Co., New York and London.

*****Lovelock, J.E., 1979, Gaia: A new Look at Life on Earth, Oxford Univ. Press, New York.

Lovelock, J.E., *Healing Gaia: Practical Medicine for the Planet*, Harmony Books, New York.

This site, http://www.usra.edu/esse/essonline/, is a resource for different aspects of Earth System Science. Read the introduction, "Earth Science in a Nutshell" under “resources”, as a starting point to understanding the approach and applications of system thinking in global change. Then explore any of the other links for data and information. The NASA links via the introductory material can especially useful for background on basic concepts.

If you would like to experiment with your own modeling of systems try using the Stella software demos at this site:
http://www.iseesystems.com/. Stella is a computer model that lets you setup your own complex systems and then test them. You can download examples from the site as well as a "runtime version" of Stella for either Apple Macintosh or Windows machines. The runtime version is complete, except it will not allow you to save files. But, it is still an excellent way to learn systems thinking via the software. They have examples in many fields.

Go to this site, http://www.usra.edu/esse/learnmod.html, for some Stella models and other programs/information that deal directly with global change and earth system science problems. This is a great site to get some working models to play with.

Global Energy Balance

***** Kiehl, J.T. and K.E. Trenberth, 1997, Earth's Annual Global Mean Energy Budget, *Bull. Amer. Meteorology Soc.*, v. 78, no.2 p. 197-208.

*****Andreae, M.O., Jones, C.D. and P.M. Cox, 2005, Strong Present-day Aerosol Cooling Implies a Hot Future, *Nature*, v. 435, p. 1187-1190, doi:10.1038/nature03671.

* Rosenfeld, Daniel, 2006, Aerosols, Clouds, and Climate, *Science***,** v.312, p. 1323-1324.

Atmospheric and Ocean Circulation Effects on Climate

For a good introduction to the effects of ocean temperature on climate, especially El Niño and La Niña, see the NOAA page at: http://www.elnino.noaa.gov/. This also has many links to many other climate sites.

* McPhaden, M.J., Sebiak, S.E. and M. H. Glantz, 2006, ENSO as an Integrating Concept in earth Science, *Science*, v. 314, p. 1740-1745.

***** Sirocko, F., 1996, Perspectives: Past and present subtropical summer Monsoons, *Science*, v. 274, p. 937-938.

*McPhaden, M.J., 1999, Genesis and Evolution of the 1997-98 El Niño, *Science*, v. 283, p. 950-954. DOI: 10.1126/science.283.5404.950

March 2, 2007: FIRST EXAM