

Reading list

Review of the Earth System (3-4 weeks)

Aug. 31. Introduction and example of connectivity of Earth Systems (Large igneous provinces)

<http://www.ldeo.columbia.edu/~polsen/nbcp/lipmc.html>

Sept. 1. Earth's energy balance and atmospheric circulation

Kump, L.R., Kasting, J.F., and Crane, R.G., 1999. The Earth System. Prentice-Hall, New Jersey, p. 34-42, 46-53.

Sept. 6. Productivity and metabolism

Stiling, P., 2002, Ecology: Theories and Applications, 4th ed., Prentice-Hall, New Jersey, 403 p. (Chap. 21, Energy Flow)
Rosenzweig, M.L. and Abramsky, Z., 1993, How are diversity and productivity related? in Species Diversity in Ecological Communities (Ricklefs, R.E. and Schluter, D., eds.), University of Chicago Press, p.52-65.

Additional reference:

Tilman, D., Lehman, C.L., and Thomson, K.T., 1997, Plant diversity and ecosystem productivity: Theoretical considerations. PNAS 94:1857-1861.

Sept. 8. Ocean circulation, ocean productivity and chemistry

Kump, L.R., Kasting, J.F., and Crane, R.G., 1999. The Earth System. Prentice-Hall, New Jersey, p. 79-95, 133-138.

Sept. 13. Terrestrial productivity

Perry, D. A., 1994. Ch. 15, Primary Productivity and parts of Ch. 16 Forest Nutrition. p. 300 - 349. In: Forest Ecosystems. Baltimore, MD, The Johns Hopkins University Press. 649 p.

Leith, H., 1975. Primary productivity in ecosystems: Comparative analysis of global patterns. p. 67-88. In: van Dobben, W. H. and Lowe-McConnell, R. H., Unifying Concepts in Ecology. Rept. Plenary Sessions, First Internat. Cong. Ecol, Dr. W. Junk B. V. Publishers: The Hague, The Netherlands; and Centre for Agricultural Publishing and Documentation: Wageningen. 302 p.

Jordan, C. F., 1971. A world pattern in plant energetics. American Sci. 59(4):425-433.

Whittaker, R. H., 1968. A map of world terrestrial biomes. Endpiece, In: Communities and Ecosystems, 2nd edition. New York, Macmillan Publishing Co., Inc. 385 p.

Sept. 15. Lithosphere and tectonics/climate interaction

Molnar, P. and England, P., 1990, Late Cenozoic uplift of mountain ranges and global climate change: chicken or egg?: Nature, 346:29-34.

Raymo, M.E. and Ruddiman, W.F., 1992, Tectonic forcing of late Cenozoic climate: Nature, 359:117-122.

Hudson, T.L., and Magoon, L.B., 2002, Tectonic controls on greenhouse gas flux to the Paleogene atmosphere from the Gulf of Alaska accretionary prism: Geology, 30:547-550.

Montgomery, D.R., Balco, G., and Willett, S.D., 2001, Climate, tectonics, and the morphology of the Andes: Geology, 29:579-582.

Peizhen, Z., Molnar, P., and Downs, W.R., 2001, Increased sedimentation rates and grain sizes 2-4 Myr ago due to the influence of climate change on erosion rates: Nature, 410:891-897.

Moore, T.L. and Worsley, T.R., 1994, Orogenic enhancement of weathering and continental ice-sheet initiation: Geol. Soc. America Spec. Paper 288, Klein, G.D., ed., p.75-89.

Sept. 20. Proxies for paleoclimate and the paleochemistry of Earth's past oceans and atmospheres

Bakwin, P.S., 1999. Carbon Cycle, in Marshall, C., and Fairbridge, R., eds., The Encyclopedia of Geochemistry, Kluwer Academic Publishers, Lancaster, p. 65-67.

Grossman, E.L., 1999. Oxygen isotopes, in Marshall, C., and Fairbridge, R., eds., The Encyclopedia of Geochemistry, Kluwer Academic Publishers, Lancaster, p. 470-475.

Hannen, K., 1999. Sulfur isotopes in Geochemistry, in Marshall, C., and Fairbridge, R., eds., The Encyclopedia of Geochemistry, Kluwer Academic Publishers, Lancaster, p. 610-615 (read 610-613).

Karhu, J., 1999. Carbon isotopes, in Marshall, C., and Fairbridge, R., eds., The Encyclopedia of Geochemistry, Kluwer Academic Publishers, Lancaster, p. 67-73.

Schoonen, M.A.A., 1999. Sulfur, Sulfur Cycle, in Marshall, C., and Fairbridge, R., eds., The Encyclopedia of Geochemistry, Kluwer Academic Publishers, Lancaster, p. 608-609.

Veizer, J., 2004. Strontium isotopes in geologic processes, <http://www.science.uottawa.ca/~eih/ch9/9stront.html>.

Sept. 22. Earth System Modeling. Atmospheric CO2 throughout the Phanerozoic: The GEOCARB Approach

Berner, R.A. (1991). A model for atmospheric CO2 over Phanerozoic time. Amer. Jour. Science 287:177-196.

Sept. 24. Glacial climate: a comparison of the Pleistocene and Carboniferous

Isbell, J.L., Lenaker, P.A., Askin, R.A., Miller, M.F., and Babcock, L.E., 2003. Reevaluation of the timing and extent of late Paleozoic glaciation in Gondwana: Role of the Transantarctic Mountains.

Shackleton, N.J., 2000. The 100,000-year Ice-age cycle identified and found to lag temperature, carbon dioxide, and orbital eccentricity. Science 289:1897-1902.

Sept. 27. Strontium and osmium isotopes, weathering, and Tertiary cooling

Raymo, M.E., 1991. Geochemical evidence supporting T.C. Chamberlin's theory of glaciation. Geology 19:344-347.

Ravizza, G., and Peucker-Ehrenbrink, 2003. Earth and Planetary Science Letters 210:151-165.

Sept. 29. The early Tertiary climate maximum: Do gas hydrates modulate climate?

Dickens, G.R., O'Neil, J.R., Rea, D.K., and Owen, R.M., 1995. Dissociation of oceanic methane hydrate as a

- cause of the carbon isotope excursion at the end of the Paleocene. *Paleoceanography* 10:965-971.
- Katz, M.E., Pak, D.K., Dickens, G.R., and Miller, K.G., 1999. The source and fate of massive carbon input during the latest Paleocene thermal maximum. *Science* 286:1531-1533.
- Schiermeier, Q., 2003. Gas leak! *Nature*, 423:681-682.
- Thomas, D.J., Zachos, J.C., Bralower, T.J., Thomas, E., Bohaty, S., 2002. Warming the fuel for the fire: Evidence for the thermal dissociation of methane hydrate during the Paleocene-Eocene thermal maximum. *Geology* 30:1067-1070.
- Oct. 4. Spread of land plants and erosion-The Devonian as a case study**
- Algeo, T.J., and Scheckler, S.E., 1998. Terrestrial-marine teleconnections in the Devonian: Links between the evolution of land plants, weathering processes, and marine anoxic event. *Phil Trans. Biol. Sci* 353:113-128.
- Berner, R.A., 1998. The carbon cycle and CO₂ over Phanerozoic time: the role of land plant. *Phil Trans. R. Soc. Lond. B* 353:73-82.
- Oct. 6. Chemistry of ancient oceans: Calcite and aragonite seas**
- Lowenstein et al., 2001. Oscillations in Phanerozoic seawater chemistry: Evidence from fluid inclusions. *Science* 294:1086-1088.
- Stanley, S.M., and Hardie, 1999. Hypercalcification: Paleontology links plate tectonics and geochemistry to sedimentology. *GSA Today* 9:1-7.
- Steuber T., and Veizer J., 2002. Phanerozoic record of plate tectonic control of seawater chemistry and carbonate sedimentation. *Geology* 30 (12):1123-1126.
- Oct. 11. Modern global warming: hypothesis versus fact**
- Karl, T.R., and Trenberth, K.E., 2003. Modern global climate change. *Science* 302:1719-1723.
- Ruddiman, W.F., and Thomson, J.S., 2001. The case for human causes of increased atmospheric CH₄ over the last 5000 years. *Quat. Sci. Reviews* 20:1769-1777.
- Oct. 13. Snowball Earth: fact or myth**
- Kirschvink, J. L., 1992. in *The Proterozoic Biosphere* (eds Schopf, J. W. & Klein, C.) 51-52 (Cambridge University Press).
- Hoffman, P. F., Kaufman, A. J., Halverson, G. P. & Schrag, D. P., 1998. A Neoproterozoic snowball earth. *Science* 281, 1342-1346
- Hyde, W.T., Crowley, T.J., Baum, S.K., and Peltier, W.R., 2000. Neoproterozoic 'snowball Earth' simulations with a coupled climate/ice-sheet model. *Nature* 405:425-429.
- Schrag, D.P., Hoffman, P.F., 2001. Life, geology and snowball Earth. *Nature* 409:306.
- Hyde, W.T., Crowley, T.J., Baum, S.K., and Peltier, W.R., 2001. Reply to Schrag and Hoffman. *Nature* 409:306.
- Oct. 20. Do erosion rates control tectonics?**
- Molnar, P., and England, P., 1990, Late Cenozoic uplift of mountain ranges and global climate change: Chicken or egg? *Nature* 346, 29-34
- Gibbs, M.T., Bluth, G.J.S., Fawcett, P.J., and Kump, L.R., 1999. Global chemical erosion over the last 250 MY: Variations due to paleogeography, paleoclimate, and paleogeology. *American Journal of Science*, 299: 611-651.
- Hoffman, P.F. and Grotzinger, J.P., 1993. Orographic precipitation, erosional unloading, and tectonic style. *Geology*, 21: 195-198.
- Whipple, K.X., Kirby, E., and Brocklehurst, S.H., 1999. Geomorphic limits to climate-induced increases in topographic relief. In *Nature* 401: 39-46.
- Oct. 27. Volcanism and Climate**
- Huang, C., Zhao, M, Wang, C., and Wei, G., 2001. Cooling of the South China Sea by the Toba eruption and correlation with other climate proxies ~71,000 years ago. *Geophysical Research Letters* 28(20):3915-18.
- Wignall, P.B., 2001. Large igneous provinces and mass extinctions. *Earth Science Reviews* 53:1-33.
- Zielinski, G.A., 2000. Use of paleo-records in determining variability within the volcanism-climate system. *Quaternary Science Reviews* 19:417-38. (430-434).
- Nov. 3, 10. The Cambrian explosion**
- Knoll, A.H., and Carroll, S.B., 1999. Early animal evolution: Emerging views from Comparative Biology and Geology. *Science* 284:2129-2137.
- Morris, S.C., 2000. The Cambrian "explosion": Slow-fuse or megatonnage? *PNAS*:4426-4429.
- Brennan, S.T., Lowenstein, T.K., and Horita, J., 2004. Seawater chemistry and the advent of biocalcification. *Geology* 32:473-476.
- Derry, L.A., Brasier, M.D., Corfield, R.M., Rozanov, A. Yu., and Zhuravlev, A. Yu., 1994. Sr and C isotopes in Lower Cambrian carbonates from the Siberian craton: A paleoenvironmental record during the "Cambrian explosion". *Earth Planet. Sci. Lett.* 128:671-681.
- Nov. 15, 17. Frasnian-Famennian extinction**
- Algeo, T.J., and Scheckler, S.E., 1998. Terrestrial-marine teleconnections in the Devonian: links between the evolution of land plants, weathering processes, and marine anoxic events. *Phil. Trans. R. Soc., Lond. B* 353:113-130.
- House, M.R., 2002. Strength, timing, setting and cause of mid-Paleozoic extinctions. *Palaeogeography, Palaeoclimatology, Palaeoecology* 181:5-25.
- Nov. 22, 24. The Permian-Triassic extinction**
- Erwin, D.H., 1994. The Permo-Triassic extinction. *Nature* 367:231-236.
- Jin, Y.G., Wang, Y., Wang, W., Shang, Q.H., Cao, C.Q., and Erwin, D.H., 2000. Pattern of marine mass extinction near the Permian-Triassic boundary in South China. *Science* 289:432-436.
- Mundil, R., Ludwig, K.R. Metcalfe, I., and Renne, P.R., 2004. Age and timing of the Permian mass extinctions: U/Pb dating of closed-system zircons. *Science* 305: 1760-1763.