

Homework Question Set #7
NATS 101, Section 13
Fall 2010

The following questions cover the last lectures since Midterm #3. Provide thorough, complete answers for maximum credit. Two of the following questions will be randomly graded as bonus questions for the final exam.

Due Wednesday, December 8 by 5pm. Submit completed assignment to D2L as .doc or .pdf file and hardcopy in class or to my office mailbox. Scanned copies of handwritten answers are fine, provided the document is neat and clearly legible. Note that diagrams or pictures can—and should—be used to answer many of the questions. Please scan in any drawings or diagrams in your answers, if possible. For the problems involving calculations, clearly label and provide appropriate accompanying textual description for equations used.

1. What meteorological and geographic factors make cities in the Southwest part of the United States susceptible to air pollution? What is the type of air pollution that is most prevalent in our region and how is it formed?
2. Explain how the air pollutants from coal burning in the Ohio River Valley cause acid rain to occur in the mid-Atlantic states and New England? What are some of the environmental consequences of acid rain?
3. Why is stratospheric ozone beneficial to life on Earth, whereas tropospheric (ground-level) ozone is not?
4. Explain how the Antarctic “ozone hole” forms. What time of year is the ozone most apparent and why?
5. For at least three natural proxies, describe how these sources are used to determine the climate of the past before the existence of any meteorological instrumentation. What type(s) of data do these proxies provide?
6. What are the principal factor(s) that explain the regular occurrence of ice ages on Earth? Should we be concerned about another ice age happening within our lifetimes? Why or why not?
7. The absolute amount of carbon dioxide in the atmosphere is relatively small (less than 1%), so why should we even worry about it?
8. Explain how global climate models, such as those used by the Intergovernmental Panel on Climate Change, have been used to attribute recently observed climate change to human activity.

9. In what region(s) of the world has the climate changed most dramatically, according to the observational record of the late twentieth century to the present? Do such changes provide a positive or negative feedback to global warming? Explain.

10. Quote from a newly elected member of the U.S. House of Representatives: “We have discovered that a good portion of the science used to justify climate change was a hoax.” Do you agree or disagree with that statement? Support your opinion with at least three scientific facts. Do not include any political arguments in your answer.