METR 113: Assignment 1 (Spring 2011)
Due Date: February 24, 2011

Complete each of Parts 1, 2 and 3 below. Separate the responses in three separate sections accordingly, i.e. one section for each part. Write in paragraph format in a manner that is targeted towards a general reader (i.e. not me). See 'requirements' below for additional instructions.

Part 1: Based on data the last 100+ years, a fairly indisputable statement is as follows:

> "*Increasing carbon dioxide concentrations in the atmosphere have been an inevitable result of providing for increasing human population and maintaining an ever-increasingly industrialized society"*.

Discuss why this is the case by showing and briefly discussing key data that support this statement.

Part 2: One may then expand the above statement as follows (see underlined):

> *"Increasing carbon dioxide concentrations in the atmosphere <u>and resulting global warming</u> have been an inevitable result of providing for increasing human population and maintaining an ever-increasingly industrialized society."*

What would need to be additionally established for this expanded statement to be true? Why might you suspect, or "hypothesize", it to be true based on specific things covered so far in class? Why would this only be a hypothesis, however, and not clear support that this statement is true?

Part 3: One may then further change, or alternatively phrase, the statement as follows:

> "*Increasing ~~carbon dioxide concentrations in the atmosphere and resulting global warming~~ <u>air pollution concentrations in the atmosphere</u> have been an inevitable result of providing for increasing human population and maintaining an ever-increasingly industrialized society.*

What would need to be established for this changed statement to be true? That is, what would need to be established so that we can change the phase crossed out to "air pollution concentrations in the atmosphere"?

The implication from the above sequence of statements is that the "air pollution" referred to in the statement in Part 3 is carbon dioxide. Why can't 'air pollution' instead refer to air pollution species in general? To answer this, give and briefly discuss one example of an air pollution species for which the above statement is false.

Requirements

1. In your write-up, **present and discuss at least three graphs**. Explain the meaning of the graphs presented and why they are relevant to the point you are making. The graphs you will use are all provided in lecture slides (Lecture 1 and Lecture 2), and you may simply cut-and-paste these into your responses (or attach them to the back if that is easier). Be sure to appropriately reference each figure with figure numbers in your write-up.

2. Somewhere in your write-up reference point(s) found by researching http://www.footprintnetwork.org/en/index.php/GFN/.

3. Except for things you pull out of http://www.footprintnetwork.org/en/index.php/GFN/, all ideas and required plots, figures, graphs are contained in lecture notes. Course reading from books on reserve can also be used if you'd like.

4. This assignment should be about 2 – 3 pages excluding graphs, using 1.5 inch spacing and standard size margins. It's ok if you go slightly above 2 – 3 pages if you feel the need, however going much beyond this indicates that you probably aren't being concise enough in your write-up. In that case, make an effort to be more concise in your explanations or discussions.

5. See course greensheet for general writing instructions. I **do** grade on presentation, spelling, punctuation, etc … as well as content. This is to be "final product" quality work, not "rough draft". However, no cover page or other things ("pretty fonts") should be included to embellish the visual presentation of the work. Leave it fairly generic and bland … just no typos, spelling errors, inconsistent margins and indentations, etc … (!)

Objectives

1. To appreciate the necessary logical and scientific steps that need to be taken to clearly attribute the main cause of global warming to the rise in carbon dioxide and other greenhouse gas concentrations in the atmosphere the last 100+ years. We will make these logical and scientific connections later in the semester, but for now we just want to set the stage by appreciating what would be required.

2. To appreciate the difference between scientific hypothesis and scientific "fact", "theory" or a scientific consensus belief that something is true.

3. To further develop the practice of substantiating statements by referencing data.

4. To further develop technical and scientific writing skills. This is one of the reasons for the requirement that at least three graphs are included in your write-up, with appropriate explanation and discussion of why these are relevant to your points.

5. To make connections between air pollution and the "three Es" (Energy, Environment and Economy). The "ecological footprint" concept on http://www.footprintnetwork.org/en/index.php/GFN/ will help make this connection. This is the reason for the requirement that some part of your write-up reflect research from this site.