Lab #3

The Precautionary Principle

Introduction

Our discussions of global warming in lecture have touched on the difficulty of making long-term forecasts of the Earth's climate. For example, suppose the Carbon content in our atmosphere triples (or more) during the next 100 years. What will then happen to our weather? The answer is almost impossible to determine because it depends upon a number of known (and unknown) positive and negative feedback mechanisms.

For example, what if the increase Carbon Dioxide in our atmosphere warms the Earth to a point where much of the ice on the surface melts? The surface of the Earth would get darker, meaning it would absorb (rather than reflect) more energy from the Sun. This would make the Earth warmer and is an example of a positive feedback effect, meaning that some effect (melting ice) amplifies the original cause (warming), resulting in more warming.

Extra water vapor in our atmosphere as a result of higher temperatures may act as an additional greenhouse gas if it forms into high clouds. That's because high clouds tend to allow visible light from the Sun to reach the ground during the daytime, but they do not allow infrared light from the Earth to escape at night. That's another example of a potentially positive feedback effect.

Or perhaps the extra water vapor in our atmosphere from the warming would instead form into low, thick, reflective clouds. This would tend to cool us off, canceling out some or maybe all of the initial warming. This is an example of a negative feedback effect in which the effect (low, thick clouds) cancels out the original cause (warming).

Our problem is that we cannot easily predict which feedbacks will be the most important. If we assume the positive feedbacks are the most important, then our models of future climate forecast an increase in average temperature of 10 or more degrees, which could cause many environmental and societal

problems. If the negative feedbacks are most important, then the average temperature in the future may only be a degree or two warmer, which is unlikely to make a significant impact on the Earth.

In this lab exercise, we will explore what to do in the face of this uncertainty, which is unlikely to go away any time soon. We are going to study the Precautionary Principle as it applies to global warming.

The Precautionary Principle

A widely accepted definition of this principle reads: "In order to protect the environment, the precautionary approach shall be widely accepted by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

Applied to global warming, Precautionary Principle (PP) proponents would argue that, though we do not know the ultimate outcome of fossil fuel burning in terms of the global climate, we should, as a precaution, stop burning fossil fuels anyway until scientists have certainty that the long-term effects that fossil fuel burning has on the climate will not be harmful.

In the most rigorous interpretation, PP supporters would say that until there is scientific certainty that no harm to the climate will occur, we should stop burning fossil fuels. The most common interpretation of the PP, however, would be more practical: if there is good reason to believe (but not certainty) that harm will come to the climate, we should stop burning fossil fuels.

This sort of logic has some history, found in common sayings such as "Better safe than sorry," or in medicine, "First, do no harm." There is much debate in governments of countries around the world over how and whether to codify this thinking into legal practice.

Making Your Case

Your TA will assign your group to one side of the debate: either the "pro" or "con" side with regard to the Precautionary Principle. You will have about 45 minutes to build your case. Because resources on the web tend to change locations and new resources often appear, I will ask you to visit a web page that I keep updated with links to both sides of the debate.

http://personal.tcu.edu/dingram/pp.html

Use these links to research and build your case. For the longer articles, you may want to assign each part to a different person in your group. On your lab worksheet, provide an 8-12 sentence argument that justifies your team's position.

Debate

Next, your TA will moderate a short debate, in which a representative from each side of the debate will present their supporting evidence. After the debate, finish the remaining questions on your worksheet.

Lab #3 Worksheet

Name:

Home TA:

Part 1

In the space below, state your group's assigned position on the Precautionary Principle, then justify it in 8-12 sentences:

Part 2

In the space below, provide a 3-5 sentence summary of the opposing position on the Precautionary Principle:

In the space below, write a 3-5 sentence statement of which side makes the most convincing argument and why.