Evidence Figure Set Descriptions

1. CO₂ Levels vs. Volcanic Activity — Volcanoes emit CO₂ both on land and underwater. Underwater volcanoes have little effect on atmospheric CO₂ levels. Land volcanoes are estimated to emit 242 million tons of CO₂ per year. In contrast, humans are currently emitting around 29 billion tons of CO₂ per year. Human CO₂ emissions are over 100 times greater than volcanic CO₂ emissions. When comparing atmospheric CO₂ levels to volcanic activity, it is apparent that large volcanic eruptions have little impact on CO₂ levels.

2. Temperature vs. Solar Activity — Over the last 35 years the sun has shown a slight cooling trend. However global temperatures have been increasing. Since the sun and climate are going in opposite directions scientists conclude the sun cannot be the cause of recent climate change. The only way to blame the sun for the current rise in temperatures is by cherry picking the data. This is done by showing only past periods when sun and climate move together and ignoring the last few decades when the two are moving in opposite directions.

3. Heat-Trapping Gas Levels — Current atmospheric levels of carbon dioxide, methane, and nitrous oxide are notably higher than their pre-industrial (1750) averages. Air sampling from 1958 shows the steady increase in CO₂, which has been largely influenced by humans. The increases and decreases in the Carbon Dioxide graph is caused by seasonal changes in the Northern Hemisphere. As the leaves come out in the spring, they capture more CO₂ from the atmosphere. In the winter they lose their leaves and are not able to capture the CO₂ and therefore, the amount of CO₂ in the atmosphere goes up.

4. Atmospheric Carbon Dioxide Levels — Air bubbles trapped in ice cores can be examined to help scientists determine what the atmosphere was like many years ago. Ice core data goes back 800,000 years, and only recently has the CO₂ level increased to 400 parts per million (ppm). Before human activity, CO₂ levels fluctuated between 170 and 300 ppm. By 2100, additional emissions from human activities are projected to increase CO₂ levels to 420 ppm (Lower Scenario), which would require immediate and sharp emissions reductions. If we continue to increase our emissions, the Higher Scenario predicts that we will reach 935 ppm by 2100.

5. Carbon Emissions in the Industrial Age — This figure shows global carbon emissions from burning coal, oil, gas and producing cement. These emissions account for about 80% of the total emissions of carbon from human activities. Land-use changes (like cutting down forests) accounts for the other 20% of emissions in recent decades. Land-use changes increases total emissions because the carbon that was stored in a tree is released after the forests are cut down.

6. Sources and Sinks in U.S. Agriculture and Forests — This figure shows the annual average greenhouse gas emissions from land use including livestock and crop production, but does not include fossil fuels used in agricultural production. Forests are a significant “sink” that absorbs CO₂ from the atmosphere. Urban trees and wetlands are also sinks. As we cut down more and more forests, we are not only adding the carbon that was captured in the trees, but are also unable to capture any more carbon in the future. All values shown are for 2008, except wetlands, which are shown for 2003. (Black lines in graph represent uncertainty.)
Evidence Figure Set Descriptions (cont.)

7. U.S. Greenhouse Gas Emissions and Sinks by Economic Sector — This figure shows greenhouse gas emissions and sinks by source in the United States from 1990 - 2012. The only sinks are land-use sinks, like forests and wetlands. Notice how there are many more sources of emissions than sinks. In order to decrease emissions, the negative values must be closer to the positive values to cancel each other out.

8. U.S. Methane Emissions — This pie chart shows the U.S. methane emissions by source. Methane (CH₄) is the second most prevalent greenhouse gas emitted in the United States from human activities. Methane accounts for about 10% of all U.S. greenhouse gas emissions. Methane is also emitted by natural sources, such as wetlands. Methane’s lifetime in the atmosphere is much shorter than CO₂, but methane is a much stronger greenhouse gas. Globally, over 60% of total CH₄ emissions come from human activities. (Enteric fermentation is a process that takes place in the stomachs of livestock animals and leads to the animal passing gas and releasing methane.)

9. World Population: 1950-2050 — The world population increased from 3 billion in 1959 to 6 billion by 1999, a doubling that occurred over 40 years. The Census Bureau’s latest projections imply that population growth will continue into the 21st century, although more slowly. The world population is projected to grow from 6 billion in 1999 to 9 billion by 2044, an increase of 50 percent that is expected to take 45 years.

10. Energy Consumption in the United States (1776-2014) — This graph shows the energy consumption of the U.S. from 1776 to 2014. Nonrenewable resources like coal, natural gas, and oil have created most of the energy for the U.S. over the nation’s history. But new forms of energy—nuclear—and renewable forms of energy—wind, solar, geothermal, and biomass—have started to provide a larger share of the U.S. energy consumption. The total amount of energy consumed continues to rise overall because of increased population and consumption. Notes: a BTU (British Thermal Unit) is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at a specified temperature.