

Assignment 9: Climate change

1. Distinguish *climate* from *weather*.

2. The controls on the Earth’s climate are numerous, and operate on different **timescales** (the time needed for that particular control to affect worldwide climate). Fill in the table below:

Climate control	Brief description of how the control affects the climate	Timescale (millions of years, thousands of years, years)
Plate tectonics (positions of the continents)		
Astronomical parameters (Milankovitch controls)		
Sea surface warming or cooling (El Nino, La Nina)		

3. a. Describe the positive climatic feedback that the **Icehouse Earth** scenario of about 700 million years ago demonstrates (in other words, how did Icehouse Earth perpetuate itself)?

b. How did the Earth finally free itself of the Icehouse?

4. The fluctuations in the **oxygen isotope** record of the Greenland and Antarctic Ice Sheets are correlated to what climatic phenomenon? Briefly describe the mechanism of the oxygen isotope record in ice. Hint: Recall back to the first group project.

5. Rising sea levels are one obvious result of **global warming**. How will global warming affect agriculture? Include at least one negative impact and one positive impact.

6. a. The scientific evidence for **anthropogenic** (human-induced) **global warming** are many; give **three** lines of evidence.

b. In the face of all that evidence, give **one plausible** argument against anthropogenic global warming.