Name _____

Climate History & the Cryosphere

PART A: Glacial Ages

1: Explain how the three Milankovitch cycles combined can cause glacial and interglacial periods to occur.

2: Why is it important to study climate data and glacial ages as far back as hundreds of thousands or even millions of years?

3: How do you think scientists separate human influences on climate from natural variations?

PART B: Ice Cores

1: Does age increase or decrease down the core? Why?

2: Is the thickness of an annual layer of ice smallest at the top or bottom of the core? Why?

3: The present atmospheric CO_2 concentration is 379 ppmv (IPCC, 2007). Calculate the change in CO_2 concentration between the last glacial maximum (~20,000 years ago) and the 18th century, and between the 18th century and today. You can assume that the shallowest ice core measurements represent the environmental conditions in the 18th century. Why were CO_2 and dust concentrations different during the glacial time as compared to the 18th century?

4: Why are these ice core paleoclimate records so important to our understanding and prediction of climate change?

5: Note that there were two major warming events representing two deglaciations in the Vostok calculated temperature data. Look at how CO_2 changes during those deglaciation periods. From the data provided in this lab, can you tell which changes first, temperature or CO_2 concentration? Why is this important?

PART C: Ocean Impacts

1: Describe how the U.S. coastline during the last glacial age 20,000 years ago compares to the coastline during the interglacial period 125,000 years ago. What factors contributed to these changes?

2: Does the amount of ice on Earth only affect places we typically think of as being "cold"? Explain your reasoning.