

## GEOL-412 Assignment 3

Please answer the following questions as succinctly as you can. Some questions can be answered from material presented in class, on the course website or in the text. Others may require a small amount of research. Full-sentence answers are not required. I don't mind if you work on these in groups, as long as your answers are in your own words. Please reference any sources of information that you use. The total number of points is 20, and this assignment counts for 10% of the final mark. Completed assignments are due by December 3<sup>rd</sup>.

1) The European Project for Ice Coring in Antarctica (EPICA) uses data from its EDML ice core and from the Greenland GRIP ice core to advance a hypothesis about the origin of Dansgaard-Oeschger (D-O) events. What is the hypothesis, and how do the ice-core comparisons support the hypothesis? (4 points)

2) The "Bond Cycle" provides a possible link between Dansgaard-Oeschger events and Heinrich events. Briefly summarize this link. (2 points)

3) W. Ruddiman has suggested that fewer than 10 million people living on earth 8000 years ago (about 0.1% of our current population) had a significant impact on the climate. His assertions could be described as being either unrealistic or extremely disturbing for our future. Explain. (4 points)

4) Both Hansen et al. (2008)\* and Lenton and Vaughn (2009)\* suggest that conversion of organic matter to charcoal (biochar) and mixing biochar with soil could contribute significantly to atmospheric carbon drawdown and sequestration. Do some research into the production and uses of biochar and discuss the viability of this concept for large-scale sequestration of C. (10 points)

\*both papers are available on the GEOL-412 website under "Resources"