Examination Reconstructing Quaternary Environments (GEO4-4409)

January 28, 2008

Answers may be given in English or Dutch, in any case: please answer concise and readable !

For every sub-question you can earn 5 points.

1. Give a short and to the point description of the following subjects:
   a. Eemian.
   b. Chironomids.
   c. Loss-on-Ignition.
   d. Heavy mineral analysis

2. Dating
   a. Describe the principle and application of Luminescence Dating in dating fluvial sediments.
   b. What are the advantages and limitations of tephrostratigraphy in Quaternary science?
   c. How would you date the formation and disappearance of the pingos in the Northern Netherlands?
   d. What is meant with cross-dating?

3. Proxies
   a. Which proxies can be used to reconstruct past summer and winter temperatures, give for both at least 3 examples each.
   b. What causes the patterns in both tree-rings and varves, give the indicator value of these proxies.
   c. Give at least 5 different palaeoenvironmental implications of fossil periglacial phenomena.
   d. Describe the principles and applications of palynology.

4. Events
   a. How has the Quaternary been sub-divided ?
   b. Give at least 3 interstadials that occurred before the Last Glacial Maximum and describe how they can be recognised in terrestrial environments in comparison with stadials that occurred during the same time interval.
   c. What is the approximate age (in kyrs BP) of the glacial deposits that can be found in the Netherlands ?
   d. How stable was the Holocene ?

5. Synthesis
   a. Sketch the Greenland oxygen isotope record for the Last Glacial-Interglacial Transition (LGIT), give the ages on the vertical axis;
   b. make a comparison with the vegetation development from the Netherlands;
   c. which methods can you use to correlate these records ?
   d. what were the causes behind the LGIT climate changes in the North Atlantic ?

The results will be available within 2 weeks and published on WebCT.

Good-luck !