

Examination Reconstructing Quaternary Environments (GEO4-4409)  
January 26, 2010

**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. OSL.
  - b. Dendrochronology.
  - c. Cryoturbation.
  - d. AMS.
  - e. Last Termination.
  
2. Dating
  - a. Describe the principle and application of tephrochronology.
  - b. In a coring from the western part of the Netherlands marine shells are present at about 15 meters below the present sea level in a fluvial deposit underlying a layer of coversand. How old are these shells and how can they be dated?
  - c. What is the basis for the construction of the  $^{14}\text{C}$  calibration curve?
  - d. How would you date the formation and decay of pingos in N Germany?
  - e. In a lake in Northern Sweden a tree trunk has been found with 250 countable rings, in the deeper part of the lake, varves have been formed over a period of 8000 years. How would you date and correlate these two records?
  
3. Proxies
  - a. Give at least 3 proxies that can be used for reconstructing changes in precipitation.
  - b. Which environmental changes can be deduced from the fluvial record?
  - c. How can you use the Loss on Ignition method for the reconstruction of environmental changes?
  - d. What is the indicator value of chironomids?
  - e. Describe the principles and applications of palynology.
  
4. Events
  - a. What is the approximate age (in kyrs BP) of the glacial deposits that can be found in the Netherlands?
  - b. Draw a temperature curve for the time period since the end of the Saalian in northwest Europe.
  - c. 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.
  - d. How fast were the changes from Glacial to Interglacial conditions and vice versa?
  - e. Make a chronostratigraphical interpretation of the pollen diagram obtained from a core from the coversand area in the S Netherlands (peat on gyttja on humic sand) that is given on the back of this page. Subsequently, give a best estimate of the moment of organic infilling in  $^{14}\text{C}$  yrs BP.

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

Good-luck !

