EES tentamen Global Change 28-06-10 15.0015 9-12 hr

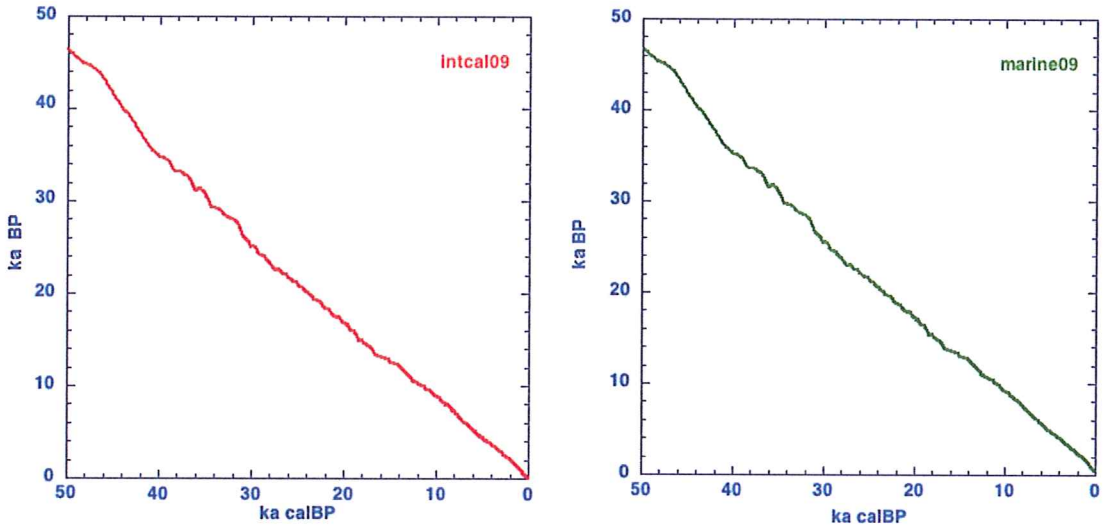
please write your name and student number on each paper you hand in

1.

a) the ^{14}C timescale is not an absolute (calendar) timescale. Explain why.

b) how can ^{14}C dating be made "absolute"?

c) the figures show 2 calibration curves, one for atmospheric/terrestrial and one for marine samples. They show a difference of 4-6 centuries BP (small on this scale). Explain why they are different.



d) what are the definitions of the time units BP and calBP?

e) what is the definition of $\Delta^{14}C$

f) make a sketch of the terrestrial $\Delta^{14}C$ based on the above curve.

2.

a) a water sample is measured as 20‰ enriched in Deuterium with respect to a secondary standard called SLAP (Standard Light Antarctic Precipitation). Calculate the $^{2}\delta$ value for the water sample with respect to the primary standard VSMOW.

b) another water sample is measured as 20‰ enriched in ^{18}O with respect to SLAP.

Calculate the $^{18}\delta$ value for the water sample with respect to the primary standard VSMOW.

The SLAP water has the following δ values with respect to the primary standard VSMOW: $^{2}\delta$ = -428.0‰ and $^{18}\delta$ = -55.50‰.

3.
a) Describe two processes that increase the sensitivity of global temperature to radiative forcing
b) Give (rough) estimations of sea level change, compared to present day value, for the end of this century and the maximum during the last interglacial. Explain the difference.

4.
opgave Rolf

5.
Rainwater at present contains about 5 TU (Tritium Units) of ^{3}H (tritium).
a) calculate how many molecules of $^{3}H^{1}HO$ there are in 1 liter of such precipitation.
b) how many moles is this, and how many grams of $^{3}H^{1}HO$?
c) how large is the decay constant λ?
d) how large is the ^{3}H activity (in Bq/l) of the water?
given: halflife ^{3}H = 12.32 yr, Avogadro number = 6.10^{23}, 1 TU is defined as a tritium isotope ratio of 10^{-18}