# Online Supplementary Information 2

## Bayesian modelling of wood-age offsets in cremated bone

*Helene Agerskov Rose, John Meadows, Mogens Bo Henriksen*

## Calculating carbon exchange

The percent carbon exchange between unburned apatite and the pyre atmosphere, as indicated by F14C, can be calculated using mass balance equation 1, assuming the F14C content to be evenly distributed throughout the wood and animals.

$\%carbon exchange= \frac{F^{14}C\_{unburned apatite}-F^{14}C\_{CB}}{F^{14}C\_{unburned apatite}-F^{14}C\_{pyre atmosphere}}\*100(\%)$ (1)

where F14Cunburned apatite is theatmospheric F14C when the animal was slaughtered, F14CCB is the F14C concentration in cremated bone, and F14Cpyre atmosphere is the mean F14C over the period of wood growth.

% carbon exchange uncertainties for individual samples can be calculated using equation 2, where δbone is the uncertainty in unburned apatite F14C, δCB is the uncertainty in cremated bone F14C, δfuel is the uncertainty in wood (fuel) F14C, and F14CCB is the F14C concentration in cremated bone.

$\%uncertainty=\frac{\sqrt{σ\_{bone}^{2}+σ\_{CB}^{2}+σ\_{bone}^{2}+σ\_{fuel}^{2}}}{F^{14}C\_{CB}}\*100(\%)$ (2)

*Example:* x231\_1 from pyre no. 8

RICH-25820: 1.0443 ± 0.0031 F14C

Animal (2013): 1.0231 ± 0.0018 F14C

Recent wood: 1.0954 ± 0.0032 F14C

$$\%carbon exchange=\frac{1.0231-1.0443}{1.0231-1.0954}\*100\left(\%\right)$$

= 29.3%

$$\%uncertainty=\frac{\sqrt{0.0018^{2}+0.0031^{2}+0.0018^{2}+0.0032^{2}}}{1.0443}\*100(\%)$$

 = 0.5%