**SUPLEMENTARY MATERIALS**

**THE MARINE RESERVOIR EFFECT: A CASE STUDY OF ARCHAEOLOGICAL SITES AT GUANABARA BAY, RIO DE JANEIRO, BRAZIL**

Ronaldo Janvrot Vivone1, Zenildo Lara de Carvalho1, Ricardo Tadeu Lopes2, Roberto Ventura dos Santos3, José Marcus Godoy4

1Divisão de Radioproteção Ambiental e Ocupacional, Instituto de Radioproteção e Dosimetria, Rio de Janeiro, RJ, 22783-127, Brazil.

3Programa de Engenharia Nuclear, COPPE, Universidade Federal do Rio de Janeiro, Cidade Universitária, Rio de Janeiro, RJ, 21945-970, Brazil

3Universidade de Brasília, Instituto de Geociências, Campus Universitário

Darcy Ribeiro CEP 70910-900 Brasília, DF, Brazil

4Departamento de Química, Pontifícia Universidade Católica do Rio de Janeiro, Rio de Janeiro-RJ, 22453-900, Brazil

**Radiocarbon age uncertainty calculation**

Radiocarbon ages were calculated as follows:

$$T=-8033.ln⁡(\frac{I\_{corrected}}{I\_{0}})$$

Were:

$$\frac{I\_{corrected}}{I\_{0}}= \frac{I}{I\_{0}}-2\*∆/(1000\*(1+\frac{I}{I\_{0}})$$

$$I= \frac{(R\_{sample}-R\_{BG})}{m\_{sample}} \left(\frac{cpm}{g\_{carbon}}\right)$$

And I0 = Mean decay corrected measured IAEA 14C reference materials counting rate (cpm/gcarbon) (10.72 (0.18) cpm/gcarbon (n=9))

Due to the low uncertainty related to the Δ13C measurements (0.05‰), only the counting and system calibration errors were considered.

Therefore, the age uncertainty calculation was:

$$u\_{T}=8033.\sqrt{(\frac{u\_{I}}{I})^{2}+(\frac{u\_{Io}}{I\_{0}})^{2}}$$

And

$$u\_{I}=(\frac{\sqrt{\frac{R\_{sample}}{T\_{c}}+\frac{R\_{BG}}{T\_{c}}}}{m\_{sample}})$$

RBG = 1.0 cpm

Tc = 1440 minutes

**Reservoir effect calculation**

The reservoir effect was calculated based on the mean shells and charcoal radiocarbon ages for each sampling site. For example:

For Sernambetiba site, the local marine reservoir age was calculated pairing shell and charcoal fragment samples, obtaining a value of (256±37) 14C yr. The ΔR, and its associated uncertainty, were calculated applying (500±60) yr as RGlobal Av.

$$∆R=\left(256-500\right) yr=-244 yr$$

$$u\_{∆R}= \sqrt{37^{2}+60^{2}}=70 yr$$