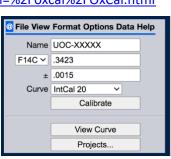
### IntCal

The raw isotopic ratio of <sup>14</sup>C/<sup>12</sup>C in the atmosphere has varied over time due to the changes in <sup>14</sup>C production (cosmic ray flux), carbon cycle dynamics (e.g., uptake by the ocean), and anthropogenic inputs (burning fossil fuel and above ground nuclear weapons testing). Since the calculation of a radiocarbon date assumes a constant proportion of <sup>14</sup>C/<sup>12</sup>C in the atmosphere over the past 50,000 years, a radiocarbon date must be calibrated. Thus, the international calibration curve "IntCal" was created, and it is built on <sup>14</sup>C measurements on records with independent dates such as tree rings, banded corals, and varved lake sediments. IntCal is updated every few years with the discovery of new records, improvements to measurement techniques, and changes to the statistical treatment of the data. The latest curves, IntCal20, SHCal20, and Marine20, were ratified by the radiocarbon community in December 2020 (Reimer et al. 2020). This does not include samples >Modern (AD 1950).

## **Calibration using OxCal**

https://c14.arch.ox.ac.uk/login/login.php?Action=Logout&Location=%2Foxcal%2FOxCal.html

- 1. Create an account and login
- 2. Enter Sample Name (UOC#)
- 3. From the drop-down menu select F14C and enter values
- 4. Select curve from drop-down menu: IntCal 20 for Northern Hemisphere SHCal 20 for Southern Hemisphere
- 5. Click 'Calibrate'
- 6. Click through the tabs to edit things like units (calAD/BC, calBP), or statistics (median)





# **Marine Samples**

The ocean contains a vast pool of old carbon due to slow exchange of atmospheric carbon through the surface of the water. This is known as the marine reservoir effect and it causes a discrepancy up to several hundred years between atmospheric and marine  $^{14}$ C signatures. The marine reservoir effect is accounted for by applying a localized reservoir correction,  $\Delta R$ .

- 1. Determine ΔR value from <a href="http://calib.org/marine/">http://calib.org/marine/</a>
- 2. Under Options, open the curve tab
- 3. Select the Marine 20 curve, set Marine % to 100, and enter  $\Delta R$  and error
- 4. Enter the F14C values into the @ tab.
- 5. Click Calibrate.

#### Analysis Curve 14C Calibration Curve Atmospheric IntCal 20 V Reservoir τ 0 ± 0 Marine/mixed curve Marine Marine 20 V Atmospheric % 0 Marine % 100 ± 0 Delta\_R 70 ± 20

## References

The 2020 calibration issue of Radiocarbon is open source and can be found here: <a href="https://www.cambridge.org/core/journals/radiocarbon/issue/E4F797FE1EF62148836A0EC13A8E9892">https://www.cambridge.org/core/journals/radiocarbon/issue/E4F797FE1EF62148836A0EC13A8E9892</a>

Reimer, P., Austin, W., Bard, E., Bayliss, A., Blackwell, P., Bronk Ramsey, C., . . . Talamo, S. (2020). The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 cal kBP). Radiocarbon, 62(4), 725-757. doi:10.1017/RDC.2020.41