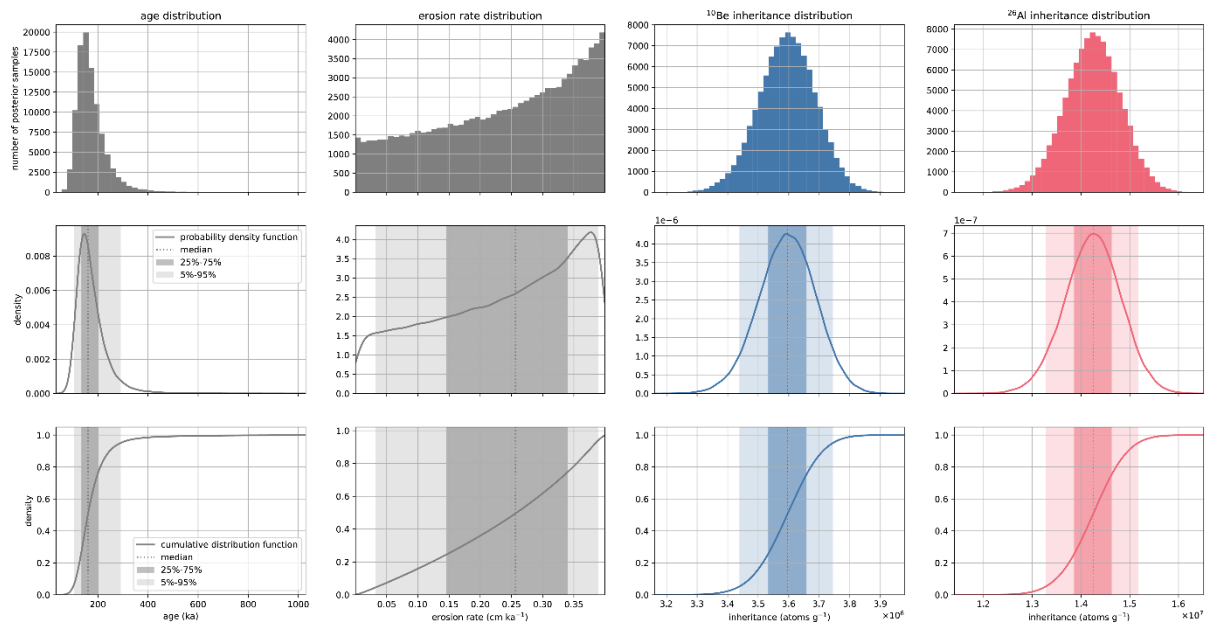
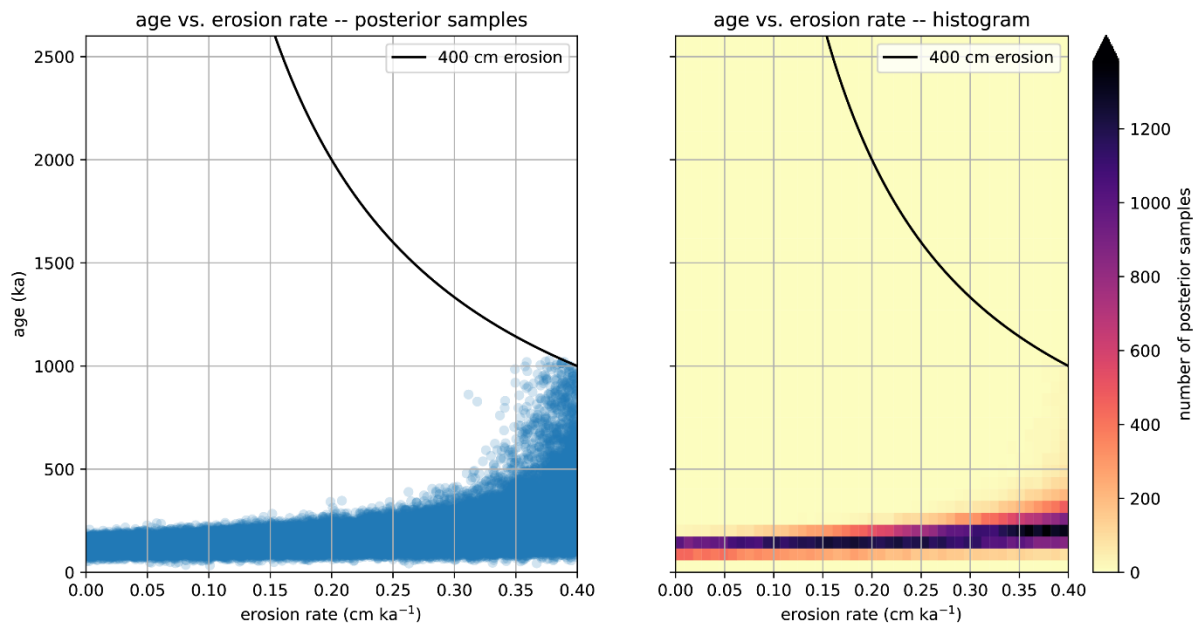


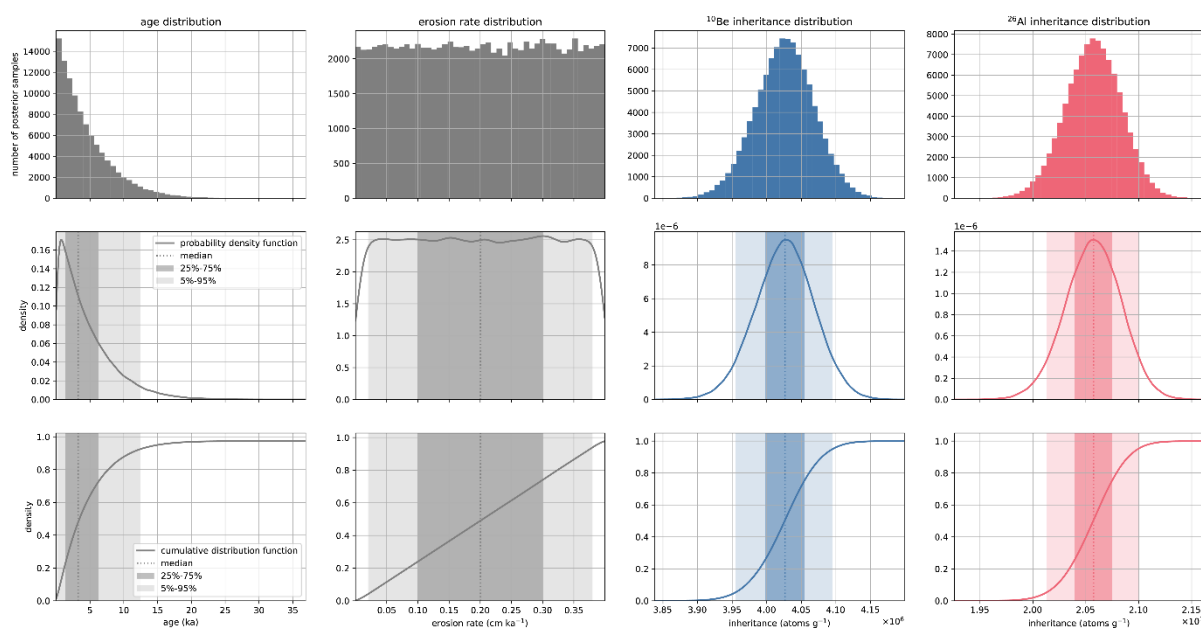
## Supplementary Data



**Figure S1.** Probability density function, and cumulative distribution function for exposure age, erosion rate and inheritance using dual-nuclide depth profile modelling for PV14-A. Showing 25<sup>th</sup> to 75<sup>th</sup> and 5<sup>th</sup> to 95 percentiles. For all samples between 0.02 – 0.65 m depth, we used the average concentration of all measurements for model outputs.



**Figure S2.** Age-erosion rate solution spaces using dual-nuclide depth profile modelling for PV14-A. Left panel shows all posterior profile solutions while right panel shows a histogram of these solutions. Black line indicates 400 cm net erosion limit based on geologic constraints described in Sect. 4.2.



**Figure S3.** Probability density function, and cumulative distribution function for exposure age, erosion rate and inheritance using dual-nuclide depth profile modelling for WV14-I. Showing 25<sup>th</sup> to 75<sup>th</sup> and 5<sup>th</sup> to 95 percentiles.