A Re-Analysis of the Lake Suigetsu Terrestrial Radiocarbon Calibration Dataset

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Lake Suigetsu, Honshu Island, Japan provides an ideal sedimentary sequence from which to derive a wholly terrestrial radiocarbon calibration curve back to the limits of radiocarbon detection (\emph{circa} 60 cal. ka BP). The presence of well-defined, annually-deposited laminae (varves) throughout the entirety of this period provides an independent, high resolution chronometer from which radiocarbon measurements of plant macrofossils from the sediment column can be directly related. However, data from the initial Lake Suigetsu project (Kitagawa and van der Plicht 2000) were found to diverge significantly from alternative, marine-based calibration datasets released around the same time (e.g. Hughen \textit{et al}. 1998; Beck \textit{et al}. 2001). The sediment coring technique of the Suigetsu project – leading to missing sections of the sediment column of unknown duration – as well as varve counting uncertainties, were believed to be at least partially responsible for such divergence.

Here, a re-analysis of the previously-published Lake Suigetsu data is made. The most recent developments in Bayesian statistical modelling techniques (OxCal v4.1; Bronk Ramsey 2009) are implemented to fit the Suigetsu data to the latest radiocarbon calibration curves and thereby estimate the duration of the inter-core section hiatuses in the Suigetsu dataset. In this way, the absolute age of the Lake Suigetsu sediment profile will be more accurately defined, providing significant information for both radiocarbon calibration and palaeoenvironmental reconstruction purposes.

References: