



Bayesian Analysis of ^{14}C Dating Results As A Chronometric Tool In Archaeological Studies – Various Examples From Poznan Radiocarbon Laboratory

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Past fluctuations of radiocarbon concentration in the atmospheric CO_2 , caused that radiocarbon age (that can be measured in ^{14}C laboratory) as a function of calendar date, has a form of wiggly line (called as calibration curve). For that reason, determination of calendar date of a sample analysed with ^{14}C , has a form of probability distribution that is complex in shape and usually covers time interval much wider than the uncertainty of ^{14}C age itself. Accuracy of calendar age determination can be largely improved by dating series of samples, given the relationships between their calendar dates are a priori known. The most classical approach of wiggle matching, concerns sequences of samples with differences of calendar dates exactly known and usually is applied to wood from tree trunks with tens/hundreds of annual increments preserved, and it was applied e.g. in studies of barrows in Bukivna (Ukraine) and Łęki Małe (Greater Poland). More general approach, of sequence with time gaps loosely related to differences of sampling depths in sedimentary profile was used e.g. in studies of Neolithic ceremonial centre at Nowe Objezierze (NW Poland). Studies of objects used or cultural strata deposited over certain time span, and of their sequences, utilised the Bayesian tool of phases, clustering ^{14}C dates of samples, preferably of short living materials like grains (Tell Arbid, Syria), but also of bones and wood/charcoal particles, with the issue of old wood particularly addressed (Bukivna/Ukraine and Ostrów Lednicki/Greater Poland). The Bayesian chronological models applied to dates of artefacts from the earliest time of the Polish state excavated in Ostrów Lednicki, and also in nearby Giecz, Poznań and Gniezno, allowed to reduce uncertainty of calendar dating to single decades only.