E I N L A D U N G

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V E R A - S E M I N A R

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Bayesian Sequencing of Radiocarbon Dates - Problems and Improvements

In radiocarbon dating the real age of a sample can only be obtained with the help of a calibration curve. Caused by 'wiggles' in this curve, the resulting age may extend over a rather large time range. However, if there is a whole series of samples available from an excavation site, of which various relations between their ages can be deduced (e.g. older/younger relations), 'Bayesian sequencing' can reduce this uncertainty significantly. Therefore, Bayesian sequencing has become a generally accepted tool in the last two decades. Unfortunately, the method bears a considerable drawback by itself, which is a problem of Bayesian statistics in general: The 'prior information' - that is the archaeological evidence in the application here - has to be expressed as a probability distribution (prior function), but this is not possible in an unambiguous way. Usually, the available prior information can be formulated by various different prior functions, what makes the method arbitrary in some sense.

In this talk the mathematical foundation of Bayesian sequencing and its numerical realisation is explained initially. In a second part the mentioned prior-ambiguity problem is illustrated in detail. Finally, the principle and the practical realisation of 'robust Bayesian sequencing', an improved method to overcome the prior-ambiguity problem, is discussed. This method is based on the idea to use a theoretically infinite set of prior functions, including all possible function shapes that are consistent with the available archaeological information. Although the principle sounds simple, there are some challenges one has to deal with, which will also be outlined in this talk.

Donnerstag, 12. Mai 2011, 16:30 Uhr

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