



Contribution ID: 48

Type: **Oral Contribution**

## Applications of accelerator mass spectrometry radiocarbon dating in forensics

*Friday 28 October 2022 10:10 (35 minutes)*

Different studies have shown the high potential of AMS (Accelerator Mass Spectrometry)  $^{14}\text{C}$  dating in forensics sciences where high chronological resolution (annual or even sub annual) is mandatory on samples typically younger than one hundred years ca. In this field, radiocarbon dating is based on the detection of the excess of the atmospheric radiocarbon concentration induced by aboveground nuclear detonation tests carried out after the second world war. The curve (bomb peak) representing the variation of the  $^{14}\text{C}$  atmospheric concentration is well known with high resolution for several locations around the globe both in the Northern and the Southern hemispheres and it is widely used as reference for forensics dating. Indeed, though different studies have shown the potential of the method in different fields (such as in forensics anthropology), important aspects have to be considered and addressed when the method is used in the routine forensics practice. These aspects such as the possible multiple intercepts with the bomb spike curve, possible regional offsets, considerations related to carbon fixation and turnover in living tissues are presented and discussed refereeing to different kind of materials. The achievable uncertainty levels are also discussed as well as the advantages related to the use of advanced statistical tools for data interpretation.

We also report on the outcome of a Work Package (WP4) specifically dedicated to  $^{14}\text{C}$  within a CRP-Coordinated Research Program funded by the International Atomic Energy Agency and aimed at enhancing the use of nuclear based techniques in forensics. Within the CRP different intercomparison exercises were designed and run among different AMS laboratories on sample materials relevant in forensics such as bones, ivory, food-stuff, paper, and textiles.

Case studies will be also presented and discussed such as the dating of seized ivory samples, the analysis of human remains, the identification of forgeries in cultural heritage and the identification of missing persons in war scenarios.

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**Session Classification:** Plenary Talks

**Track Classification:** Plenary Talks