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Bioavailability And Long Range Metal Transport

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Beamline(s): X26A

Introduction: In this research synchrotron radiation is used to quantify the metal distribution in the annual growth rings of trees on long transects downwind from metal smelters. Synchrotron X-ray fluorescence provides a comparatively rapid means of analyzing for metals in complete tree cores. In this work several trees are selected at each of six downwind sites to provide sufficient data to obtain a reliable statistical analysis of the metal bioavailability at each site as a function of time.

Methods and Materials: Tree cores were collected at each site using standard methods. The cores were subjected to synchrotron radiation analysis. Tree rings were extracted from selected cores and were subjected to Inductively Coupled Plasma/ Mass Spectroscopy(ICP/MS). The results were used to calibrate the X-ray fluorescence signal. The results are being used to establish a record of metal bioavailability with time at each site.

Results: A typical result is shown in figure 1. This work is in progress.

Conclusions: Synchrotron radiation analysis may be combined with ICP/MS of wood samples to provide an internal standard to make X-ray fluorescence intensity a direct, measure of the metal content in the annual growth rings of trees.

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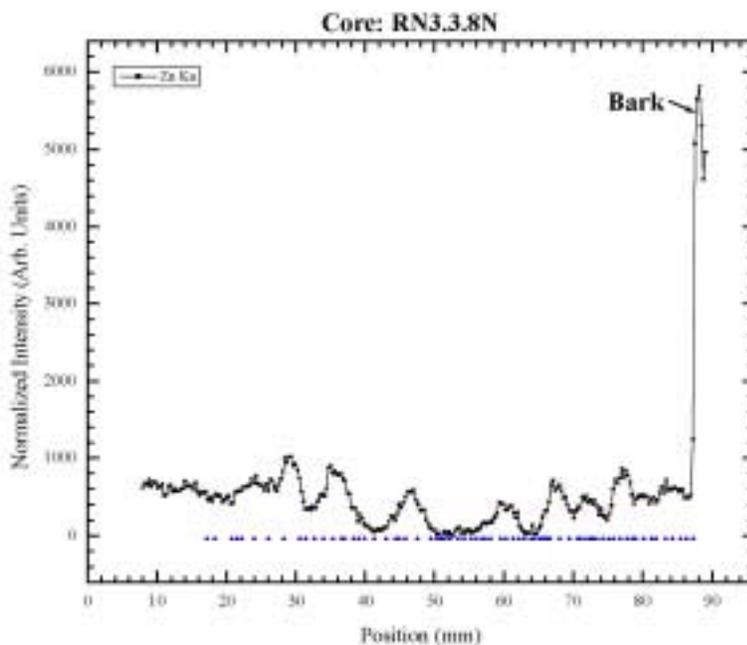


Figure 1. Zn K-alpha X-Ray Fluorescence, as function of distance, pith to bark. The triangles indicate the positions of the growth rings.