

# Comparison of sediment core analysis by mobile scanning

## XRF system and by PIXE

D. Strivay<sup>(1)</sup>, A. Beckers<sup>(2)</sup>, A. Hubert-Ferrari<sup>(2)</sup> and F.-P. Hocquet<sup>(1)</sup>

*(1) Institut de Physique Nucléaire, Atomique et de Spectroscopie & Centre Européen d'Archéométrie, Sart Tilman B15, Université de Liège, B-4000 Liège, Belgium*

*(2) Géomorphologie, Sart Tilman B11, Université de Liège, B-4000 Liège, Belgium*

Sediment cores provide fundamental information in environmental research studies like global climate change or pollution assessment. Several laboratory instruments based on X-ray fluorescence spectrometry have been developed these last years to analyze their elemental composition directly on the cores without any sampling.

We have improved our XRF mobile system [1,2] to allow analysis of this kind of samples by adding a fully-automatic scanning system and a specific software for data acquisition. Helium flux was also improved to allow better analysis of light element. This system is then now able to analyze by 1mm step 1 meter long cores in one time with detection of elements from Na to U.

At the same time, we have developed a similar system on the PIXE system installed on the extracted beamline of the IPNAS cyclotron. The cores are analyzed by a 3 MeV proton beam and X-rays are detected by two detectors, the first one with a filter for trace element analysis, the second with a helium flux to detect low energy X-rays. A specific translation system and data acquisition have also been developed.

In order to evaluate the advantages and disadvantages of both systems, we have analyzed a core coming from lake Hazar (Turkey) that was previously analyzed with an XRF Avaatech system. The results will be compared and discussed.

[1] F.-P. Hocquet, H.-P. Garnir, A. Marchal, M. Clar, C. Oger, D. Strivay, *X-ray Spectrometry* 37 (4), 2008, 304

[2] F.-P. Hocquet, H. Calvo del Castillo, A. Cervera, C. Bourgeois, C. Oger, A. Marchal, M. Clar, S. Rakkaa, E. Micha, D. Strivay, *Analytical and Bioanalytical Chemistry* 399 (9), 2011, 3109