EDXRS-2000
EUROPEAN CONFERENCE ON
ENERGY DISPERSIVE X-RAY
SPECTROMETRY 2000

Faculty of Physics and Nuclear Techniques
University of Mining and Metallurgy
Kraków, Poland

18 - 23 June, 2000

Conference Programme

University of Mining and Metallurgy
Faculty of Physics and Nuclear Techniques
National Atomic Energy Agency
THE USE OF EDXRF ASSESSING SOIL CHEMISTRY OF AGRICULTURAL CATCHMENTS

I. Queralt(1), A. Coll(2), I. Vallés(2), R. Josa(3) and A. Hereter(3)

(1) Inst. of Earth Sciences "Jaume Almerà", CSIC, Sot de Sabaris s/n, 08028 Barcelona, Spain
(2) Institut de Tècniques Energètiques, Universitat Politècnica de Catalunya, Barcelona, Spain
(3) Escola Superior d’Agricultura de Barcelona. Universitat Politècnica de Catalunya, Barcelona, Spain

A growing qualitative and quantitative degradation of soil resources has been reported worldwide over recent decades. Agricultural practices can generate changes in some topsoil characteristics (like nutrients content, available water content, porosity, etc.) and redistribution of major and minor components in a spatial scale. These changes in soil properties can imply a deterioration of the soil quality, limiting soil sustainability. Soil quality indicators include physical, chemical and biological variables (Carvalho et al., 1997).

Soil redistribution and soil losses may be assessed either from the study of radionuclides (137Cs and 210Pb) or magnetic properties of soils. However, the common radionuclides need long-time for analytical results.

In an agricultural catchment (Tornamarina Farm-School, Caldas de Monchique, Barcelona, NE Spain), a long term investigation has been conducted to assess a catchment database. EDXRF is applied to obtain elemental distribution maps of major and minor elements in order to study the relationship between chemical properties and redistribution processes of the topsoil.

Sampling and analytical equipment

- Topsoil sampling (106 samples, 0-20 cm depth, 50 x 50 m grid sampling, hand-auger sampler)
- EDXRF analysis has been performed by means of a portable analyser (55Fe, 109Cd, 241Am sources) and a Si(Li) detector

Results

EDXRF analysis can be used as one rapid technique reporting valuable data in order to assess soil redistribution processes.

Elemental distribution reflect the influence of topographic factors and soil particles redistribution processes within the catchment.

EDXRF also offer possibility to document chemical parameters (nutrients and/or contaminants) affecting soil quality.

References:


Acknowledgments
This work has been sponsored by the Programme project (ref. HÍD97-0581) funded by Spanish Commission for Science and Technology (CICYT)

Previous data

- Contents of organic matter, nitrogen and organic carbon can be related with soil use content (Herter et al., 2000)
- Soil redistribution indicators (137Cs, 210Pb and bulk magnetic susceptibility) are markedly related with the grain size distribution

EDXRS-2000

European Conference on Energy Dispersive X-Ray Spectrometry
Krakow, Poland 18-23 June 2000