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FIELD AND LABORATORY ANALYSIS OF URANIUM CONTAMINATED SOILS USING DIFFERENT X-RAY TECHNIQUES

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From 1974 to 2000, open pit mines for uranium beneficiation were exploited in the Salamanca mining district (NW, Spain). The uranium mining district covers an area of approximately 200 km² where soils and near-surface rocks contain up to 2000 mg·kg⁻¹ of uranium. During the mining period, exploited soils and rocks having less than 250 mg·kg⁻¹ were discarded for their use at the concentration factory and deposited in several tailings along the area. Likewise, particulate uranium was generated and settled in the surrounding soils.

At now the whole area have a wide distribution of uranium-rich soils and surface sediments. Since 2001 a remediation programme for the uranium immobilization in tailings and surface soils is running. We applied several X-ray techniques to the analysis of uranium content in soils near the Saelices el Chico mine. A portable radioisotope X-ray equipment (¹⁰⁹Cd and ²⁴¹Am) for field campaigns and other two equipments (EDXRF and WDXRF systems) for detecting levels too low for the portable system were employed.

Samples were also investigated by __-spectrometry and X-ray diffraction in order to establish relationships among mineralogy, chemistry and radiological activity.