Assessment of trace element concentration related to the K-Pg event by the use of PXRF

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The field portable X-ray fluorescence (PXRF) analyser is a useful tool for screening and assessing contaminated areas. This equipment allows *in situ* trace-element concentrations to be determined both rapidly and easily. According to its advantages, the method reveals especially appropriate when sampling is difficult or even forbidden (e.g. scarce sample, difficult access to sampling or protected areas), as is the case of the K-Pg boundary layer in some sections. To check its potential applicability, the K-Pg boundary layer at the Caravaca section (Murcia province, SE Spain), has been analyzed. In this section, the 2-3 mm thick K-Pg rust-red boundary layer has been previously characterized by the presence of Ir and other geochemical anomalies that, together with other evidences, where related to a extraterrestrial origin. Samples were taken to analyse *in situ* the element concentrations in the sediments of the K-Pg boundary interval, from the uppermost Maastrichtian to the lowermost Danian, including the boundary layer, as well as in the infilling material of trace fossils registered at the K-Pg boundary interval. The results indicated statistical significant differences between the different samples analysed for the following elements: Zn, As, Ti, Fe, Sr, Ca and K. Maximum values of these elements (up to 1480 ppm of As, 1272 ppm of Zn and 166 g/kg of Fe) were detected in the K-Pg boundary layer. Cretaceous sediments were characterized by the lowest concentration of these elements but the maximum values of calcium. Tertiary materials statistically differ from the Cretaceous sediments, with significant increase in Sr, Fe, and Ti and strong decrease in Ca content. Finally, trace fossils registered at the K-Pg boundary interval show variable concentrations according to the type of infilling material.

In this study, PXRF has proved to be a useful tool for screening and assessing particular fossil examples as that from the K-Pg boundary for quick and easy *in situ* determination of trace-element concentrations related to this type of events.

Zircon typologies and internal structures as petrogenetic indicators in contrasting Variscan biotite-rich granite plutons from Northern Portugal

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The aim of the present morphological zircon study is to characterize the sources reservoirs involved in the generation of the different type of granites, testing the classic 'Pupin method' and zircon geochemistry against the petrogenetic indications given by geochemical and isotopic data. In northern Portugal large volumes of granitoids were emplaced during the last stage (D3) of the Variscan orogeny and display a wide range of petrological signatures. We studied the morphologies, internal structures and geochemistry of zircons from (1) Syn-D_3 biotite granitoids: Ucanha–Vilar, Lamego, Felgueiras, Sameiro and Refoios do Lima plutons (2) Late- D_3 biotite-dominant granitoids: Vieira do Minho pluton and (3) post- D_3 biotite granitoids: Vila Pouca de Aguiar pluton. The typological evolutionary trends suggest a crustal or dominantly crustal origin for the syn-D_3 Refois do Lima granite and for the late- D_3 pluton whereas an hibridisation process is proposed for the Ucanha-Vilar, Lamego and Sameiro granites. The zircon population from the post- D_3 granites define a typological evolutionary trend betweeen calc-alkaline and subalkaline granites suggesting a under crustal or mantle source. The petrogenetic model proposed by zircon typological and geochemical study in all plutons is in accordance with geochemical and isotopic data. In fact the Syn-D_3 biotite granitoids display Sr_i ratios and εNd values varying in the range 0.7072-0.7116 and - 4.4 to - 6.3, respectively; the late- D_3 pluton present Sr_i= 0.7089-0.7090 and εNd = - 5.6 to - 5.7 and finally post- D_3 biotite granitoids present weakly evolved isotopic compositions, Sri=0.7044–0.7077 and εNd=–2.0 to –2.6.