
FIRST SYSTEMATIC APATITE AND ZIRCON FISSION-TRACK, AND APATITE, ZIRCON AND MAGNETITE (U-TH-SM)/HE DATA FROM THE CERRO DE MERCADO (DURANGO, MEXICO) IRON ORE DEPOSIT

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The paper presents the first systematic data set of radiometric age determinations of zircon (U-Pb, fission-track, (U-Th-Sm)/He), apatite (fission-track and (U-Th-Sm)/He) and magnetite (U-Th-Sm)/He minerals from several outcrops and lithologies within the Cerro de Mercado iron ore deposits. The Cerro de Mercado iron deposit is located outside of Durango City within the Chupaderos Caldera complex and is one of the most important iron ore deposits in Mexico. Detailed geologic studies in the area have been performed by several authors. Fluorapatite crystals obtained from the open pit mine of the iron ore deposit Cerro de Mercado, Durango, Mexico; generally referred to as "Durango apatite" is with an assumed age of 31.4 ± 0.4 Ma the most commonly used fission-track and (U-Th-Sm)/He age standard.

Surprisingly, despite its common use as geochronometric standard no detailed studies on the precise ages of its various and heterogeneous occurrences within the open pit mine have previously been performed. Therefore, a potential for uncertain calibrations due to unresolved age variations exists. They confirm earlier age estimates and render the issue of the above mentioned uncertain calibrations unwarranted. At the same time the data demonstrates that the entire Chupaderos Caldera complex was deposited within in a surprisingly brief period of volcanic activity. The formation of the complex must have occurred very rapidly so that the different phases cannot be resolved within the analytical errors of the applied dating techniques. Hence the Durango locality promises to offer the potential for the establishment of additional minerals such as zircon and magnetite as age standards.