



## **Subvolcanic rocks intercalated with alluvial Middle-Upper Permian sediments in the Alcotas Fm., Iberian Range, Eastern Spain: Paleogeographic and tectonic significance**

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Permian and Triassic alluvial sediments of the Iberian Range, an intracratonic, linear alpine structure occupying central and eastern Spain, were deposited in the fault-bounded Iberian Basin during an extensional period. The earliest sedimentary infill consists of alluvial deposits subdivided into three unconformity-bounded macrosequences. The second of these sequences is late Guadalupian to early Lopingian (Middle-Late Permian) in age and consists of the Boniches and Alcotas Fms., the latter one being the focus of this study.

The Alcotas Fm. may reach 170m in thickness and consists of red siltstones and clays and associated lenticular conglomerate and sandstone bodies of tens to hundreds metres length and decimetric to metric in thickness. Isolated levels of volcanoclastic sediments have been recently found in the eastern part of the basin. These sediments represent the youngest Paleozoic volcanoclastic events found up to now in the Iberian Basin.

The sub-volcanic rocks occur as five lenticular bodies tens of metres long and less than 1m in thickness found near Alfondeguilla village. Centimetric-scale cooling edges and a central doleritic texture can be recognized within each of these lenticular bodies. The mineral assemblage is formed by weathered olivine (7 %), plagioclase (80 %) with compositions ranging between An<sub>97</sub> - An<sub>50</sub>, Ti-augite (15-10 %) with compositions between En<sub>50</sub>Wo<sub>42</sub>Fs<sub>8</sub> - En<sub>40</sub>Wo<sub>38</sub>Fs<sub>22</sub>, and minor percentages of oxides (namely magnetite and ilmenite) and Cl-apatite. Compositional trend of Ti-augite and plagioclase are indicative of an alkaline affinity. The temperatures estimated from Ti-augite extreme compositions (Fs<sub>8</sub> and Fs<sub>22</sub>) range between 1200 to 700 °C.

The location of these bodies is related to the intersection of two perpendicular fault systems in the basin orientated NW-SE and NE-SW that played an important role during the first stages of the Iberian Basin development. Chemical composition shows high contents in MgO, TiO<sub>2</sub> (1.71 %), and P<sub>2</sub>O<sub>5</sub> (0.5 %), as well as Nb, Ta and La, indicative of alkaline affinity. Trace elements relationships indicate an asthenospheric mantle source. These compositions are similar to those found in the Middle Permian alkaline basalts of the Pyrenean Range. These results allow to establish a new alkaline magmatism of probable Middle Permian age, linked to a deep rifting structure, which started during Early Permian times with a calc-alkaline magmatism.