



## **Stratigraphic and structural reconstruction of an Upper Ordovician super-eruption (Catalan Pyrenees)**

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Pre-Variscan basement of the Pyrenees includes evidence of many magmatic episodes represented by different types of granitoids and volcanic rocks, which indicates the complex geodynamic history of this peri-Gondwana terrane during Palaeozoic. One of the most significant magmatic episodes is that of Upper Ordovician (Caradocian) age, which is represented by several granitic and granodioritic bodies and volcanic rocks mostly of pyroclastic nature. In the Catalan Pyrenees this magmatism is well represented in the Ribes de Freser and Nuria area, where the orthogneisses from the Nuria massif and the Ribes granophyre, both with a similar age of 457 Ma, seem to form a calc-alkaline plutonic suite covering terms from deeper to shallower levels. The presence of numerous pyroclastic deposits and lavas interbedded with Caradocian sediments and intruded by and immediately above the Ribes granophyre, suggests that this intrusive episode also generated significant volcanism. The area also hosts an important volume of rhyolitic ignimbrites and andesitic lavas strongly affected by Alpine tectonics and commonly showing tectonised contacts at the base and top of the sequences. These volcanic rocks were previously attributed to the Upper Carboniferous late-Variscan volcanism, extensively represented in the Pyrenees. However, new laser ablation U-Pb zircon geochronology from these rocks has revealed an Upper Ordovician age ( $\sim 455$  Ma), similar to that of the plutonic rocks of the same area, thus suggesting a probable genetic relation between all them. The palinspatic reconstruction of the Alpine and Variscan tectonic units that affect this area has permitted to infer the geometry, facies distribution, original position, and thickness of these volcanic rocks previously attributed to the late-Variscan volcanism, and reveals how they are spatially (and stratigraphically) associated with the previously identified Late Ordovician volcanic rocks. In particular, the volcanic rocks cropping out at the Ribes de Freser area correspond to intra-caldera deposits representing a minimum volume of 600 km<sup>3</sup>, (DRE), which confirm the existence of super-eruptions of Upper Ordovician age in the Pyrenees.