

WAS THE VALAISAN BASIN FLOORED BY OCEANIC CRUST? EVIDENCE OF PERMIAN MAGMATISM IN THE VERSOYEN UNIT (VALAISAN DOMAIN, NW ALPS)

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ABSTRACT

The Versoyen Unit (Western Alps) and its mafic rocks have been long considered the remnants of the oceanic crust that supposedly floored the Valaisan basin during the Cretaceous. Here we present U-Pb dating of zircons from a metaleucogabbro and a metagranite from the Versoyen Unit challenging this view. Magmatic zircon cores yield Permian ages of 267 ± 1 and 272 ± 2 Ma, respectively, which are interpreted as dating the crystallization of the magmas. Older inherited crystals and rare Cretaceous zircon rims (~ 110 -100 Ma) are also present. The young rims are characterized by very high U and REE contents. We speculate that the Cretaceous ages are related to a thermal/fluid event possibly induced by the opening of the Valaisan basin. The proposed Permian age for the Versoyen magmatism, together with the lack of geochronological evidence for a Cretaceous oceanic crust in the Valaisan domain *sensu stricto*, may force to reconsider the oceanic nature of the Valaisan Basin. We propose a model in which the Versoyen Unit is unrelated to and pre-dates the extensional tectonics that led to the formation of the Valaisan Basin and the Cretaceous deposition of sediments on this Permian basement. The Permian ages for the Versoyen intrusives correlate with extensive Permian intra-plate magmatism related to lithospheric stretching prior to the break-up of Pangea. The Versoyen Unit becomes the most external Alpine terrane that displays traces of this Permian basic magmatism. Traces of Cretaceous magmatism are preserved in the more internal Chiavenna and Balma units, located in the Central and Western Alps, respectively. However, several lines of evidence suggest that such units may have been unrelated to the Valaisan Basin. Therefore, we propose a new palaeogeographic scenario for the western Tethys, where two independent basins, the Valaisan Basin and the Chiavenna/Balma Ocean, were located between the Briançonnais micro-Plate and the European Plate *sensu stricto*.