Tectono-sedimentary evolution of the late-Carboniferous intramountain basins of the Maures-Tanneron Massif: a key to precise the late-orogenic structural setting of the southeastern European Variscan Belt?

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Résumé

Understanding the geodynamic history of the Southeastern European Variscan Belt, including the Corsica, Sardinia and Maures-Tanneron massifs, is challenging, because it developed in a context of orogen-parallel extension associated with ductile strike-slip shearing. While this question is often addressed by studying the tectono-metamorphic evolution of deep crustal level, new answers could be provided by studying the infill and geometry of the contemporary sedimentary basins.

Here, we investigate the Maures-Tanneron Massif (Provence, southeastern France), structured during the Devonian and Carboniferous with high-grade metamorphism related to the crustal thickening of the Variscan orogeny. It displays two intramountain late-Carboniferous basins: the Reyran and Plan-de-la-Tour basins, relatively well-preserved at present-days, and supposedly developed during the latest stages of the Variscan Orogeny.

We document (i) the nature of the basin infills, the depositional environments and sedimentary fluxes through time, (ii) the relationship between basin deposits and the basement, and (iii) the volcanic contribution. We aim to discuss the timing of the basin development and deformation in relation to the tectonic and magmatic setting.

In the light of recent sedimentological concepts, the observations in the Reyran and Plan-de-la-Tour basins contrast with the previous attribution to fluvial-dominated environments. Instead, we show that most of the sediments were deposited in subaqueous environments,

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i.e. in a relatively shallow lake, with sedimentary fluxes supplied by river-delta systems dominated by flood processes and subordinate hyperpycnal flows. Little subaerial lake-plain or delta-plain deposits are preserved.
Regarding (i) the spatial distribution of the facies through time, (ii) the nature of the contacts with both the basement and the overlying Permian strata, (iii) the syn- to post-sedimentary deformation of the Carboniferous strata, (iv) the deformation of the crystalline basement, and (v) new U–Pb ages obtained on interbedded or neighboring plutonic and volcanic rocks, we also question the current tectonic model for the development of the Carboniferous basins in this area, and bring new insights on the tectonic and tectono-magmatic histories.

Mots-Clés: late Carboniferous, intramountain basin, late Variscan tectonic, continental paleoenvironment