The Albo-Cenomanian paleogeography of Haute-Provence: a crucial geological record of the South-East France Basin

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Located at the Pyrenees-Alps linking zone, the SE Basin is a key area to better understand the role of structural inheritance in the formation of the SW Alps fold and thrust belt and foreland basin. The Albo-Cenomanian interval is marked by the "Durancian uplift" formation in Haute-Provence and by the Mid-Cenomanian Event (i.e. a major disruption of the carbon cycle). Recently, our very detailed sedimentological and stratigraphical analyses and correlation of 5 Cenomanian sections have shown important variations of facies and thickness, which suggest a significant tectonic control on subsidence and sedimentation that might be due to crustal deformation and/or halokinetic motions. Each section belongs to different paleoblocks bounded by Jurassic and Cretaceous normal faults of N-S orientation. From our dataset, we show that the differential vertical motions of these paleoblocks mimics a west-to-east spatiotemporal migration of a long-wave deformation over an interval of only 2 Ma during the early Cenomanian. This migration might be related to an active tectonic phase that could be laterally synchronous with the Pyrenean rifting and whose mechanism (either extension or compression) is still debated despite its importance for the kinematics of regional plates.
This is what our project is aiming to answer by unraveling a more detailed pre-alpine paleogeography in the Haute-Provence area. This will be done by characterizing and dating the Albo-Cenomanian tectonic and paleoenvironmental events. It will combine very detailed sedimentological and stratigraphic analyses of sections further constrained by subsurface boreholes with thorough structural analysis. Notably, U/Pb dating on calcite-mineralized faults will enable to identify active fault systems. All these results will be used for a 3D subsidence analysis and structural restorations. This multi-method approach aims at delivering paleogeographic reconstructions of unprecedented accuracy (i.e. 100 kyrs) that are essential to precise the nature, geometry, kinematic (either extensional or compressional) for the poorly documented Albo-Cenomanian period within the Haute-Provence area. Replaced in its geodynamic context, this crucial geological record may provide new keys to assess the still disputed Pyrenean-Alpine linking zone.

Keywords: high-resolution paleogeography, “Durancian uplift”, Albo-Cenomanian, Pyrenean-Alpine kinematics

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